MACTEC

engineering and constructing a better tomorrow

August 6, 2009

Mr. Martin Doster
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

Subject: **Pre-Design Investigation Work Plan**
Buffalo Color Site – Areas A, B, C & E
NYSDEC # C915230, #C915231, #C915232
Buffalo, New York (Erie County)
MACTEC Project: 3410090701

Dear Mr. Doster:

Enclosed please find two (2) copies of the Pre-Design Investigation (PDI) Work Plan for the referenced Site. The PDI Work Plan has been prepared by MACTEC Engineering and Consulting, Inc. on behalf of our client, South Buffalo Development LLC (SBD).

We intend to begin the field work in late August if at all possible. We will keep you apprised of our schedule.

Please contact me at (412) 279-6661 or Mr. John Yensan of SBD at (716) 856-3333 ext. 302 should you have any questions regarding this submittal or require additional information.

Sincerely,

MACTEC Engineering and Consulting, Inc.

John M. Scrabis
Senior Principal Engineer

JMS:llg

cc w/atts: J. Yensan (SBD)-CD
R. Galloway (Honeywell)-CD
C. O'Connor (NYSDOH)
J. Hausbeck, Esq. (NYSDEC)

PRE-DESIGN INVESTIGATION WORK PLAN

FORMER BUFFALO COLOR CORPORATION SITE
AREAS A, B, C AND E
NY BCA Nos. C915230, C915231 & C915232
BUFFALO, NEW YORK

Prepared for:

SOUTH BUFFALO DEVELOPMENT LLC

Buffalo, New York

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Buffalo, New York

Nicole C. Feczko
Project Scientist

John M. Scrabis
Senior Principal Engineer

MACTEC Engineering and Consulting, Inc.
Pittsburgh, Pennsylvania

August 6, 2009

MACTEC Project 3410090701

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1.0 INTRODUCTION

MACTEC Engineering and Consulting, Inc. (MACTEC) has prepared this Pre-Design Investigation (PDI) Work Plan on behalf of South Buffalo Development LLC (SBD) for the Former Buffalo Color Corporation (BCC) Area ABCE Site (Site). The location of the Site is shown on Figure 1. This PDI will be completed in accordance with the Brownfield Cleanup Agreements (Nos. C915230, C915231, and C915232) executed between SBD and the New York State Department of Environmental Conservation (NYSDEC). The work will be performed in accordance with the requirements of the New York State Brownfield Cleanup Program, specifically the regulations provided in 6NYCRR Part 375 (http://www.dec.ny.gov/regs/2491.html).

SBD has teamed with Honeywell to facilitate the demolition of the former dye plant and remediate the property. The proposed remediation and redevelopment approach for the Site, crafted jointly by Honeywell and SBD, will utilize the Track 4 cleanup track in accordance with the New York Brownfield Cleanup Program (BCP) regulations to transform the Site from an abandoned and blighted property into viable commercial/industrial property. The goal for this Site is to remediate and build new, environmentally sustainable commercial/industrial facilities that will support jobs and promote the economic stability of the region. The plan also calls for creation of substantial open space and potential access to the Buffalo River for the public. A web site has been established by SBD that provides information about the project. The web site address is http://www.buffalocolorredevelopment.com.

This PDI Work Plan addresses the additional site investigation activities specified in Section 9.3.6 of the Alternatives Analysis Report (AAR) prepared for the Site (MACTEC, February 2009). The Remedial Work Plan (Chapter 9 of the AAR) is provided in its entirety for reference in Appendix A. Concurrent with the activities described herein, other field work may be completed to gather chemical and physical data necessary to design the final remedy components specified in the AAR.

1.1 SITE DESCRIPTION

The Site is located on the south side of the City of Buffalo, Erie County, New York, in an area of heavy industrial development that dates to the mid-1800s. The Site occupies approximately 47 acres near and adjacent to the Buffalo River and consists of four distinct areas (Areas A, B, C, and E). The Site layout is shown on Figure 2.

Area A is approximately 10.2 acres in size and is located on the southern end of the Site. The property is fenced and is accessible by vehicle via gated entrances along South Park Avenue. Presently, it includes various former production buildings, several aboveground storage tank (AST) farms, and an office/maintenance building. It is bounded by South Park Avenue to the north, the Buffalo River to the east, an inactive rail line to the south (beyond which is Area D, which is not part of the Site for the purposes of this remedial effort), and railroad tracks to the west.

Area B is approximately 5.5 acres in size and is located to the north of Area A. Area B is fenced and is accessible by vehicle via a gated entrance along Lee Street. Area B includes the former BCC office building, located at 100 Lee Street, and surrounding asphalt parking area which totals approximately three acres and is under new ownership; this portion of Area B is not owned or controlled by SBD, nor is it part of the Brownfield Cleanup Agreements (BCA). The western portion of Area B (approximately 2.5 acres) is owned and controlled by SBD and is included in the BCA. Area B is bounded by a rail spur and Area C to the north, Lee Street to the east, South Park Avenue to the south, and railroad tracks to the west.

Area C is located on the northwestern corner of the Site. It is fenced and accessible by vehicle from gated entrances along Lee Street. Area C covers approximately six acres and includes the former powerhouse building and former ice house. A large AST, formerly used for storage of fuel oil, is presently located on the western side of the property. Area C is bounded by Elk Street to the north, Lee Street to the east, a rail spur and Area B to the south, and railroad tracks to the west.

Area E is the largest of the four areas (approximately 25.5 acres) and is located on the northeastern side of the Site. Former BCC Building 322 and surrounding property totaling about 9.1 acres is under new ownership and is not part of the BCA. The remaining 16.4 acres of Area E will be owned and redeveloped by SBD under the BCA. The western side of Area E presently includes

various former production buildings, maintenance sheds, a former laboratory, the former wastewater treatment plant (which at one time included several surface impoundments) and a large AST farm. The eastern half of Area E is vacant, with much of it grass-covered. Area E is bounded by Elk Street to the north, Orlando Street to the east (across which is the Exxon Mobil bulk petroleum terminal), and Prenatt Street to the south.

1.2 SITE HISTORY

Originally founded as the Schoellkopf Aniline and Dye Company in 1879, the plant produced dyes and organic chemicals based primarily on aniline and various aniline derivatives. Beginning in 1977 until manufacturing operations ceased in 2003, the operations at BCC mainly involved production of Indigo dye, alkylanilines, anhydrides, and dye intermediates.

The plant was reorganized into the National Aniline Chemical Company in 1916. It became one of the five companies that merged to create Allied Chemical Corporation (Allied Chemical) in 1920. The existing dye-making facility and the right to produce certain dyes and intermediates were sold by Allied Chemical to Buffalo Color Corporation (BCC) on July 1, 1977. At the time of the sale, the plant was divided into eight areas designated with the letters A, B, C, D, E, F, G, and H. BCC purchased the manufacturing areas A through E, while Allied Chemical retained the acid plant (sold to PVS in 1981), the research and development facility on Area F, and the parking lots on Areas G (Elk Street) and H (Smith Street).

In 2005, BCC filed for bankruptcy. During the bankruptcy proceedings, some of the facility's production equipment was sold and removed from the site. In conjunction with the bankruptcy, the office building and former plant hospital located at 100 Lee Street on Area B and the warehouse building (Building 322) located near Elk Street on Area E, along with some of the land under and around those buildings, were sold to other parties. Agreements are in place to preserve access rights to the land for the purposes of any required environmental investigation and remediation activities. The remaining buildings and property on Areas A, B, C and E were purchased by SBD in 2008.

1.3 OVERVIEW OF SITE CONTAMINATION

The Site has been extensively characterized via numerous investigations dating to the 1980s and including the 1996-1997 RCRA Facility Investigation and the 2007 Remedial Investigation. During these investigations, over 100 monitoring wells/piezometers and approximately 200 soil borings have been advanced across the Site. Over 250 groundwater samples and over 200 soil samples were submitted for analytical testing for a broad list of organic compounds, metals and other analytes. Hundreds of additional soil samples have been subjected to field instrument screening and visual inspection.

The following is excerpted from Section 3.3 of the AAR and summarizes the present understanding of contamination at the Site:

- SOIL (SOURCES OF GROUNDWATER CONTAMINATION): Based on proximity to shallow groundwater that contains similar contaminants, two likely sources of soil to shallow aquifer impact have been identified above the first zone of saturation: 1) approximately 2,100 cubic yards of soils impacted by semi-volatile organic compounds (SVOCs) located in the central part of Area A, and 2) approximately 8,150 cubic yards of soil impacted by volatile organic compounds (VOCs) in the vicinity of the large AST farm on the southwestern side of Area E.

- SOIL (DIRECT CONTACT PATHWAY): Metals (primarily arsenic and to a lesser extent mercury) and polyaromatic hydrocarbons (PAHs) were found across the Site in both surface and subsurface soil at levels that exceed the NY Commercial Soil Cleanup Objectives (SCOs). For the direct contact pathway, surface soil samples are considered the most relevant data points. A background study completed by MACTEC suggests that the majority of the soil samples collected during the RI contained arsenic and PAHs at levels that are within the calculated Site-specific background standards. The data also suggests that the locations with levels of arsenic and PAHs within background levels are not sources of groundwater contamination. The majority of the site (roughly 60%) is currently covered by pavement or buildings, which have concrete floor slabs.

- SHALLOW AQUIFER: Groundwater is not used or planned for use at the Site or in the vicinity of the Site for drinking purposes. Thus, there is no current human exposure pathway associated with the presence of metals and inorganic compounds in the shallow aquifer at levels that exceed the NY Class GA standards (which are based on a potable use scenario). Potential adverse impact to the Buffalo River and ecological receptors via discharge of contaminated shallow groundwater exists at Area A, which is the only portion of the Site that abuts the river. Shallow groundwater on Areas B, C and E also flows toward the river. However, the RI/FS data indicate the chlorobenzene plumes on Areas C and E have not migrated beyond the property boundaries. During the pre-design investigation, additional monitoring wells will be installed on Areas C and E, and these wells (as well as certain existing wells in Area E) will be sampled to further delineate the

extent of the groundwater plumes. Remedial action specified in the AAR focuses on shallow groundwater impacted by chlorobenzene and other organic contaminants at the following locations:

- On the southern portion of Area A, where the shallow groundwater contains chlorobenzene, aniline and other organic Site-related constituents at part per million levels and which, under static conditions, extend to and could possibly flow into the Buffalo River;

- On the northwestern corner of Area C, where levels of chlorobenzene at part per million levels were identified; and

- On the southwestern portion of Area E in a limited area around the large AST farm where levels of chlorobenzene and other organic compounds have been identified in groundwater at part per million levels and impacted soil has also been identified.

- DEEP GROUNDWATER (CONFINED AQUIFER): Metals/inorganic compounds and part per billion levels of SVOCs were identified sporadically in the groundwater samples collected from the wells screened within the confined aquifer. As described in the AAR, institutional controls/environmental easements will be utilized to preclude on-Site use of the confined aquifer.

- SITE SEWERS AND STORMWATER OUTFALLS: The existing Site process sewers are connected to the nearby BSA sewer lines. The RI/FS sampling completed in 2007 identified the presence of residual contaminants in solids within the facility process sewers (including sediments or sludges). Shallow groundwater may infiltrate portions of facility storm sewers and discharge to the Buffalo River via existing stormwater outfalls, specifically Outfall 006 on Area A. Abandonment/plugging or rehabilitation of the Site underground sewer system will be completed by SBD, as described in the AAR.

- FORMER AREA E WASTEWATER LAGOONS: As discussed in Section 2.1 of the AAR, the former wastewater lagoons located on the southeastern side of Area E were drained, dredged and capped between 1984 and 1988 in accordance with closure plans approved by the NYSDEC. Groundwater samples collected from shallow wells located near the locations of the three former lagoons did not contain VOCs above NY Class GA standards or otherwise show evidence of impact related to the former lagoons. Additional groundwater monitoring will include sampling of specified monitoring wells in the vicinity of the former lagoons.

- AREA E LNAPL: Light non-aqueous phase liquids (LNAPL) in the form of a weathered petroleum substance were identified in two monitoring wells near the southeastern border of Area E during 2008 quarterly groundwater monitoring activities. Additional focused investigation of this area will be completed as part of the remedial design process to evaluate the extent of LNAPL and determine future monitoring and remedial requirements.

1.4 PROJECT ORGANIZATION

Listed below are the key project personnel and their office/primary telephone numbers. The complete contact information for these individuals (address, phone, email address, etc.) is provided in Appendix B.

NYSDEC Region 9

Mr. Martin Doster, Regional Hazardous Waste Remediation Engineer, (716) 851-7220

Ms. Linda Ross, Engineer Geologist I, (716) 851-7220

SBD
Mr. Jon Williams, President, (716) 856-3333

MACTEC
Mr. John Scrabis, Project Manager, (412) 279-6661

1.5 SCOPE OF WORK

SBD is in the process of redeveloping the Site and began demolition of the former BCC plant in June 2009. This work includes implementing the recommendations provided in the AAR as well as obtaining certain additional data for the Site as specified in Section 9.3.6 of the AAR (Appendix A). The following is excerpted from Section 9.3.6 of the AAR:

The RI data adequately assesses environmental conditions at the Site. NYSDEC has requested that SBD obtain certain limited additional data. This request will be addressed as part of the remedial design process. The data to be obtained consist of the following:

- Delineation of Area C Chlorobenzene Plume: The well with the highest chlorobenzene concentration on Area C (well RFI-20) is located on the upgradient corner of the Site (Figure 16 of the AAR). NYSDEC has inquired if the chlorobenzene could be associated with conditions at the adjacent Honeywell Buffalo Research Laboratory. That facility conducts annual groundwater monitoring as a condition of its RCRA permit. MACTEC obtained and reviewed a copy of a recent Groundwater Monitoring Report (Parsons, May 2007) for the laboratory site. Groundwater samples collected on the site, which were analyzed for VOCs in accordance with EPA Method 8260, did not identify detectable concentrations of chlorobenzene. Thus, it is not believed that an off-site release from this location is responsible for the Area C groundwater contamination. As part of the remedial design process, MACTEC will further evaluate the on-Site extent of the Area C

chlorobenzene plume. This will include the installation of additional monitoring wells on Area C during predesign studies.

- Delineation of Area E Chlorobenzene Plume: The RI data indicates that the chlorobenzene plume on Area E is limited to the vicinity of the AST farm and has not migrated offsite. To verify this conclusion and to further evaluate the location and extent of the plume, additional monitoring wells will be installed during predesign studies. Additional test borings may also be advanced as part of the pre-design studies for the Area E source area removal, which would provide additional data on the extent of the impacted area.

- Presence of LNAPL at Area E Wells R-14 and ICM-PZ-04S: As described in Section 3.2.3 of the AAR, LNAPL has been identified in well R-14 and piezometer ICM-PZ-04S during 2008 quarterly groundwater monitoring activities. Samples of the LNAPL and groundwater at these two locations were collected by MACTEC for laboratory testing during the Third Quarter 2008 groundwater monitoring event. The analytical results for these samples were not available as of the date of this report and will be provided separately. Additional focused investigation of this area will be completed as part of the remedial design process to evaluate the extent of LNAPL and determine future monitoring and remedial requirements.

- Vapor Intrusion Issues (Area B and 343 Elk Street): As described in Section 3.2.5 of the AAR, Honeywell will attempt to collect additional vapor samples from the 100 Lee Street building, including indoor and outdoor air samples, during the remedial design process to be consistent with NYSDOH guidance. Honeywell will collect similar samples from the former Plant hospital building located on the southeastern corner of Area B. This assumes that access to these two buildings will be granted by the current owner. On Area E, SBD and Honeywell will perform additional evaluation to determine if further vapor intrusion investigation or mitigation is necessary for the 343 Elk Street property. This also assumes that access to this building will be granted by the current owner.

- PCB Soil Sampling – Area A: Two surface soil samples will be collected adjacent to the electrical buildings present on Area A for PCB laboratory analysis, in accordance with the original RI Work Plan. These samples inadvertently were not collected during the RI sampling efforts.

- Groundwater Contours for Confined Aquifer – Area E: As depicted on Figure 17 of the AAR and described in the RI, data collected during the RI and during the prior RFI study indicates that a high point exists for the Confined Aquifer potentiometric surface at or near well R-07. Potential reasons for this condition include a natural anomaly, surveying error (i.e., incorrect top-of-casing elevation) or man-made conditions such as a compromised well seal. This issue will be further evaluated as part of future groundwater monitoring activities.

- Former Lagoons and Groundwater Conditions on Southeastern Portion of Area E: As part of future groundwater monitoring efforts, it was agreed that MACTEC will work with NYSDEC to identify existing monitoring wells for inclusion in the monitoring program that can be used to evaluate groundwater quality downgradient of the former Area E wastewater lagoons and where the RFI (Golder, 1997) identified aniline in groundwater. It is anticipated that monitoring wells R-08, R-09, R-11, R-13, and R-14, along with other wells as appropriate, will be included in the groundwater monitoring program for this area.

- Other Potential Source Areas: The analytical results for subsurface soil samples collected at certain RI boring locations on Areas B, C and E contained concentrations of some constituents above the Commercial SCOs. Examples of these sample locations include Area B soil boring TB-B09 (834 mg/kg arsenic), Area C boring TB-C12 (60.2 mg/kg mercury), and Area E boring TB-E16 (470 mg/kg chlorobenzene, total SVOCs > 10,000 mg/kg). Although the RI groundwater data indicate that these substances are not present in the Site groundwater at levels of concern, NYSDEC has requested that further investigation of such sample locations be completed to determine if they represent threats to the shallow groundwater at the Site that will not be controlled via implementation of the remedy currently proposed in the AAR.

- To comply with NYSDEC's request, a new round of groundwater monitoring will be completed at Areas B, C and E during the pre-design environmental studies. The groundwater monitoring program will include "shallow" monitoring wells on Areas B, C and E that were previously sampled during the RI. The list will be expanded to include the "PS"-series piezometers screened within the fill/upper water table, the new monitoring wells to be installed on Areas C and E for further delineation of the chlorobenzene plumes, and the "R" series monitoring wells on the southeastern side of Area E (as specified above). In addition, water table monitoring wells will be installed to further investigate soil samples from 4 test borings (TB-C12, TB-E15, TB-E16, and TB-E30) that NYSDEC identified as requiring further study to determine whether or not they would be considered Source Areas as defined by Part 375-1.2. The groundwater sampling and analytical methods used will be the same as those used during the prior RI sampling event, with some modifications made as appropriate to focus on specific COCs. If available, the logs of all PS wells will be submitted to NYSDEC. The complete list of wells/piezometers at Areas B, C, and E from which groundwater samples will be collected during the pre-design groundwater monitoring event is as follows:

    - Area B: RFI-18, RFI-27, RFI-28, RFI-30, RFI-35, RFI-45, PS-07, PS-08, and PS-9

    - Area C: RFI-20, RFI-31, PS-04, PS-05, PS-6, plus three new monitoring wells to further delineate the chlorobenzene plume (one of these new wells will be located approximately 100 ft. downgradient of boring TB-C12).

    - Area E: RFI-17, RFI-29, RFI-32, RFI-33, RFI-36, RFI-39, RFI-42, RFI-43, RFI-51, RFI-PZ-17, RFI-PZ-18, RFI-PZ-19, PS-01, PS-02, PS-03, PS-10, PS-11, PS-12, PS-13, R-08, R-09, R-11, R-13, R-14; three new monitoring wells installed to further delineate the Area E chlorobenzene plume; and one well downgradient of test borings TB-E15, TB-E16, and TB-E30 (one well can adequately investigate all three of these borings).

- If laboratory results from the groundwater sampling described in this section are clearly indicative of (1) concentrated solid or semi-solid substances; (2) non-aqueous phase liquids; or (3) grossly contaminated media in accordance with Part 375-1.2, then additional investigation or remediation may be proposed.

A detailed description of the PDI activities and objectives is contained in Section 2.0. The following is a summary of the planned PDI activities that will be completed at the Site to comply with the requirements of Section 9.3.6 of the AAR:

- Areas C and E: Additional characterization of chlorobenzene plumes;
- Area E: Evaluation of LNAPL;
- Area B and Area E: Evaluation of vapor intrusion for the 100 Lee Street and former hospital buildings at Area B, and for the 343 Elk Street building at Area E;
- Area A: Collection and analysis of soil samples near a former electrical transformer building for polychlorinated biphenyls (PCBs);
- Area E: Evaluation of groundwater contour data for the Confined Aquifer;
- Area E: Collection and evaluation of groundwater data near the former lagoons; and
- Areas B, C, and E: Collection and evaluation of groundwater data for other potential source areas based on RI data.

1.6 LIMITATIONS

This document was prepared for the sole use of SBD, Honeywell, and the NYSDEC. No other party should rely on the information contained herein without prior written consent of MACTEC. We believe that the scope of work specified is reasonably supported by the results of the previous work made known to MACTEC and the application of professional standards of care that are generally accepted for completion of environmental investigations.

The scope of work described herein is based on information obtained during previous studies and our experience. If additional information becomes available which might impact our scope of work, we request the opportunity to review the information, reassess the potential concerns, and modify our approach, if warranted.

2.0 SAMPLING AND ANALYSIS PLAN

The following sections describe the PDI activities and objectives as well as identify the proposed sampling and analysis methods and procedures.

2.1 GROUNDWATER PLUME DELINEATION – AREA C AND AREA E

As discussed in the AAR, field work conducted to date has identified the presence of two chlorobenzene groundwater plumes (VOC concentrations greater than 1 mg/L) in the shallow groundwater aquifer, one at Area C and the other at Area E. In order to further delineate the extent of the plumes and define the characteristics of groundwater constituents, MACTEC proposes conducting further characterization in these areas. The characterization will include the collection of groundwater and soil samples and the installation of groundwater monitoring wells. The approximate location of the chlorobenzene plumes on Areas C and E are shown on Figure 3.

2.1.1 Groundwater and Soil Sampling

Using direct-push drilling equipment, Geoprobe™ or similar, groundwater samples will be collected across each plume area using an approximate 50-foot-on-center grid configuration as guidance. Based upon available data, the chlorobenzene plumes have been estimated to be approximately 135 feet by 450 feet (60,750 square feet) in Area C, and approximately 135 feet by 340 feet (45,900 square feet) in Area E. Assuming that three samples will be collected across the width of the plumes, this will result in the collection of an estimated 30 groundwater samples in Area C and 22 groundwater samples in Area E. At each proposed location, a single groundwater sample will be collected from the upper zone of saturation (a depth of 15 feet or less) for off-site analysis of Target Compound List (TCL) VOCs by Method 8260B and TCL SVOCs, including aniline, by Method 8270C, with a subset of the samples (25%) also analyzed for biochemical oxygen demand (BOD), chemical oxygen demand (COD), and total petroleum hydrocarbons.

The groundwater samples will be collected directly from the borings through the sample rods via a submersible or peristaltic pump. Temporary sand filter packs may be utilized where appropriate groundwater sample collection for the direct-push borings. During sampling, an attempt will be made to collect SVOCs, inorganics, and metals samples with turbidity measuring below 50

Nephelometric Turbidity Units (NTUs). The use of low-flow sampling techniques, where possible, will help minimize turbidity levels in the samples. If the field turbidity measurements cannot be reduced below 50 NTUs at a particular boring, filtered samples will be collected through a 0.45 micron filter for SVOCs and metals in addition to the unfiltered fraction.

It is assumed that at Area E the groundwater profiling will coincide with soil source area investigation activities. Based upon data collected during the RI, the scope of work for the Area E soil source area removal identified in the AAR includes excavation to the water table (a depth of approximately 4 to 5 feet below existing grade) and off-site disposal of approximately 8,150 cubic yards of VOC-impacted soil located around the AST farm in the southwestern corner of Area E.

MACTEC proposes to conduct a pre-design investigation to:

- Further define the areal extent of source area contamination requiring removal;
- Confirm the depth to saturated soil and, accordingly, depth of soil removal; and
- Characterize the contaminant levels within the source area to facilitate scoping the handling and disposal of these materials.

The proposed pre-design investigation would consist of the advancement of soil borings in an approximate 50-foot-on-center grid configuration throughout the estimated source area with collection of one soil sample per boring location (for a total of approximately 22 samples). The borings will be advanced using direct-push drilling equipment into the first zone of saturation. During drilling activities, MACTEC will visually inspect the samples for evidence of contamination such as odor, discoloration, staining, or liquid-phase contaminants. A photoionization detector (PID) will be used to screen the borings for organic vapors. MACTEC will classify the soil using the Unified Soil Classification System (USCS). Boring logs will be prepared for each location and will include USCS descriptions and other pertinent information. Each soil sample collected will be shipped for off-site laboratory analysis for Target Compound List (TCL) VOCs by Method 8260B, TCL SVOCs, including aniline, by Method 8270C, and RCRA metals by Method 6010B including mercury by Methods 7470A and 7471A. Approximately eight soil samples will be submitted for hazardous waste characteristics testing, including toxicity characteristic leaching procedure (TCLP) VOCs, SVOCs, PCBs, and metals, corrosivity, flashpoint, H_2S/HCN release, and paint filter test. This would result in roughly one hazardous waste characteristics sample for every 1,000 cubic yards of in-place material.

2.1.2 Installation of Groundwater Monitoring Wells

Based on the results of the Area C and E groundwater plume delineation investigation described above, MACTEC proposes installing a minimum of three additional monitoring wells within each chlorobenzene plume area (six total). These wells will be used to further define the extent of the plumes and will be used in future groundwater monitoring events, as necessary, to track remedial progress.

The currently proposed locations for the additional monitoring well are shown on Figure 3. These may be adjusted based on the data obtained during the plume delineation investigation activities described in Section 2.1.1.

The borings for the monitoring wells will be advanced using direct-push drilling equipment (Geoprobe™ or similar). Monitoring wells MW-C1 through MW-C3 are proposed for Area C and monitoring wells MW-E1 through MW-E3 are proposed for Area E. The additional monitoring wells will consist of two-inch diameter Schedule 40 polyvinyl chloride (PVC) riser pipe and 5-foot well screens with a 0.02-inch slot size. The well screens will be installed with the bottom of screen at approximately 10 to 12 feet below ground surface (bgs). The annular space around the well screen will be filled with a sand pack that will be retained by the screen. The top of the sand pack will be one to two feet above the top of the screen. Two feet of bentonite pellets will be placed on top of the sand pack in the annular space and hydrated to create a seal. The remainder of the annular space will be filled with a bentonite/cement mixture. A protective steel cover will be placed over the well and anchored in a cement collar. A locking compression cap will be placed on the top of the well riser.

During drilling activities, soil core samples will be collected in 4-foot intervals. MACTEC will visually inspect the soil cores for evidence of contamination such as odor, discoloration, staining, or liquid-phase contaminants. A PID will be used to screen the borings for organic vapors. MACTEC will classify the soil using the Unified Soil Classification System (USCS). Boring logs will be prepared for each location and will include USCS descriptions and other pertinent information.

Each well will be developed in accordance with standard well installation procedures to remove sediment. Upon completion of well construction activities, a New York-licensed surveyor will

establish the horizontal and vertical locations of each well. MACTEC will collect groundwater samples from the new monitoring wells as described in Sections 2.7.1 and 2.7.2 below.

2.2 EVALUATION OF LNAPL – AREA E

As described in the RI/FS Report and AAR, LNAPL was identified in well R-14 and piezometer ICM-PZ-04S during 2008 quarterly groundwater monitoring activities. Samples of the LNAPL and groundwater at these two locations were collected by MACTEC for laboratory testing during the Third Quarter 2008 groundwater monitoring event. The analytical results for these samples indicated that the LNAPL is a weathered petroleum hydrocarbon. Additional focused investigation of this area will include a direct-push drilling investigation and may be supplemented by the installation of temporary piezometers to gauge LNAPL extent and thickness. During the direct-push investigation, real time monitoring devices (high resolution Laser Induced Fluorescence UltraViolet Optical Screening Tool™) connected to the drilling probe will be operated by Columbia Technologies to assist in profiling the LNAPL. Laboratory testing of the LNAPL and groundwater may also be conducted to evaluate chemical and physical parameters.

If temporary piezometers are installed, the number and locations of the piezometers will be installed at selected locations where evidence of LNAPL is identified during the direct-push drilling.. Piezometers will be installed using direct push techniques to an anticipated depth of, based upon earlier boring logs, between 10 and 12 feet bgs. MACTEC will retain copies of relevant boring logs in the field to identify conditions which could cause the scope to be modified.

The piezometers will be constructed of two-inch diameter Schedule 40 PVC casing. Sufficient 0.020-inch slotted screen will be placed from the bottom of the boring to at least 2 feet above the water table. Bentonite chips or pellets will be used to backfill the remainder of the annular space to with one to two feet of the ground surface. A concrete collar and stickup protective steel casing will be installed at the surface. A locking cap will be placed on the top of the PVC riser. Following installation, MACTEC will complete limited development of the piezometers to remove sediment and enhance hydraulic communication with the formation.

Upon completion of piezometer installation activities, a New York-licensed surveyor will establish the horizontal and vertical locations of each piezometer.

2.3 VAPOR INTRUSION SAMPLING

Subslab soil vapor, indoor air, and outdoor air samples will be collected from the 100 Lee Street building and the former "Hospital" building on Area B[1] (both buildings are not owned by SBD), and the samples will be analyzed for VOCs, in accordance with the New York State Department of Health (NYSDOH) "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" ("Guidance") (Public Comment Draft, February 2005). Per the Guidance, two subslab soil vapor samples, two indoor air samples, and one outdoor air sample will be collected from the 100 Lee Street building. One subslab soil vapor sample, one indoor air sample, and one outdoor air sample will be collected from the former Hospital building. The locations of these buildings are shown on Figure 4.

For the warehouse building located at 343 Elk Street on Area E (not owned by SBD), MACTEC will attempt to gather additional information (with assistance from NYSDEC) regarding the current status of any historic or ongoing indoor air investigation of this building conducted by the current owner. If necessary, MACTEC will collect two subslab soil vapor samples, two indoor air samples, and one outdoor air sample for VOC analyses per the Guidance. See Figure 4 for the location of this building.

The sub-slab samples will be collected within the specified buildings via temporary sample points. The sample locations will be selected based on accessibility, sub-slab utility locations, and other factors. The samples will be collected as follows:

1. A hole will be drilled through the concrete floor slab using hand-operated drilling or coring equipment.

2. A temporary probe consisting of stainless steel sample tip and polyethylene or Teflon® tubing will be installed no more than two inches into the sub-slab aggregate material.

3. The annular space around between the sample tube and the floor slab will be sealed as specified in the NYSDOH guidance.

4. One to three volumes of the sample probe and tube will be purged at a rate not to exceed 0.2 liters per minute.

5. Sub-slab soil gas samples will be collected in Summa® canisters in accordance with EPA Method TO-15 over an 8-hour period.

6. The holes will be filled with grout and the surface restored.

The indoor/outdoor air samples will be collected over the same 8-hour period using Summa canisters and analyzed for VOCs by EPA Method TO-15.

The vapor intrusion sampling activities will be documented in accordance with the Guidance. As recommended in the Guidance, the samples will be collected in late 2009 during the "heating" season (i.e., sometime after October 31, 2009 when building heaters are in use on a regular basis). The Summa canisters will be submitted with chain of custody documentation to a qualified laboratory for VOCs by EPA Method TO-15.

Within 60 days of receipt of all data from the laboratory, the results of the vapor intrusion investigation will be provided to NYSDEC in a letter report that will include a description of the sampling methods, summary of results, and conclusions and recommendations based on the results. Tables, figures, analytical reports and other attachments will be provided as appropriate.

2.4 PCB SOIL SAMPLING – AREA A

Two surface soil samples will be collected adjacent to the electrical buildings present on Area A for PCB laboratory analysis, in accordance with the original RI/FS Work Plan (MACTEC, 2006). These samples were inadvertently not collected during the RI/FS sampling efforts. The samples will be collected from the upper two inches of soil utilizing a pre-cleaned stainless steel hand trowel or scoop. MACTEC personnel will don a new pair of disposable nitrile gloves prior to the collection of each sample. The samples will be placed in containers provided by the laboratory and immediately placed on ice until delivery to the laboratory for PCB analysis in accordance with Method 8082.

2.5 CONFINED AQUIFER EVALUATION

Data collected during the RI/FS and during the prior RFI study (Golder, 1997) indicates that a high point exists for the Confined Aquifer potentiometric surface at or near well R-07. Potential reasons for this condition include a natural anomaly, surveying error (i.e., incorrect top-of-casing elevation) or man-made conditions such as a compromised well seal. To further evaluate this condition, the top-of-casing will be re-surveyed and MACTEC will conduct a visual inspection of

the surface casing for evidence of damage or failure. A water level will be recorded at Well R-07 and nearby wells during the round of groundwater sampling described below in Section 2.7.

2.6 EVALUATION OF GROUNDWATER NEAR THE FORMER LAGOONS

As part of future groundwater monitoring efforts, existing monitoring wells will be included in the monitoring program to evaluate groundwater quality downgradient of the former Area E wastewater lagoons and where the 1998 RFI identified aniline in groundwater. To accomplish this objective, monitoring wells R-08, R-09, R-11, R-13, and R-14, along with other wells on the southeastern side of Area E as specified below in Section 2.7, will be included in the groundwater monitoring program for this area.

2.7 GROUNDWATER MONITORING FOR OTHER POTENTIAL SOURCE AREAS

The analytical results for subsurface soil samples collected at certain RI boring locations on Areas B, C and E contained concentrations of some constituents above the Commercial SCOs. Examples of these sample locations include Area B soil boring TB-B09 (834 mg/kg arsenic), Area C boring TB-C12 (60.2 mg/kg mercury), and Area E boring TB-E16 (470 mg/kg chlorobenzene, total SVOCs > 10,000 mg/kg). Although the 2007 RI groundwater data indicate that these substances are not present in the Site groundwater at levels of concern, NYSDEC has requested that further investigation of such sample locations be completed to determine if they represent threats to the shallow groundwater at the Site that will not be controlled via implementation of the remedy currently proposed in the AAR.

To comply with NYSDEC's request, a new round of groundwater monitoring will be completed at Areas B, C and E during the PDI. The groundwater monitoring program will include "shallow" monitoring wells on Areas B, C and E that were previously sampled during the RI. The list will be expanded to include the "PS"-series piezometers screened within the fill/upper water table, the new monitoring wells to be installed on Areas C and E for further delineation of the chlorobenzene plumes, and the "R" series monitoring wells on the southeastern side of Area E (as specified in Section 2.6). In addition, monitoring well MW-C3, installed to assist in delineating the chlorobenzene plume in Area C, will also be used to further evaluate results from test boring TB-C12, and an additional monitoring well (MW-E4) will be installed to further evaluate results from test borings TB-E15, TB-E16, and TB-E30. These four test borings, TB-C12, TB-E15, TB-E16,

and TB-E30, were identified by NYSDEC as requiring further study to determine whether or not they would be considered Source Areas as defined by Part 375-1.2. Monitoring well MW-E4 will be installed using the same methods as described in Section 2.1.2. The groundwater sampling and analytical methods used will be the same as those used during the prior RI sampling event, with some modifications made as appropriate to focus on specific COCs. The complete list of wells/piezometers at Areas B, C, and E from which groundwater samples will be collected during the PDI groundwater monitoring event is as follows:

- Area B: RFI-18, RFI-27, RFI-28, RFI-30, RFI-35, RFI-45, PS-07, PS-08, and PS-9;
- Area C: RFI-20, RFI-31, PS-04, PS-05, PS-6, plus three new monitoring wells (MW-C1, MW-C2, and MW-C3) to further delineate the chlorobenzene plume (one of these new wells will be located approximately 100 ft. downgradient of boring TB-C12); and
- Area E: RFI-17, RFI-29, RFI-32, RFI-33, RFI-36, RFI-39, RFI-42, RFI-43, RFI-51, RFI-PZ-17, RFI-PZ-18, RFI-PZ-19, PS-01, PS-02, PS-03, PS-10, PS-11, PS-12, PS-13, R-08, R-09, R-11, R-13, R-14; three new monitoring wells (MW-E1, MW-E2, and MW-E3) installed to further delineate the Area E chlorobenzene plume; and one new monitoring well MW-E4 downgradient of test borings TB-E15, TB-E16, and TB-E30 (one well can adequately investigate all three of these borings).

If laboratory results from the groundwater sampling described in this section are clearly indicative of (1) concentrated solid or semi-solid substances; (2) non-aqueous phase liquids; or (3) grossly contaminated media in accordance with Part 375-1.2, then additional investigation or remediation may be proposed. Table1 (Monitoring Well and Piezometer Data) is included in this Work Plan to show pertinent information regarding existing Site monitoring wells and piezometers, including those proposed herein for additional monitoring activities.

2.7.1 Groundwater Sampling Methodology

Low-flow groundwater sampling techniques will be employed during each sampling event following USEPA guidance. However, if low-flow sampling is not possible (e.g., well diameter is too small, insufficient water level depth in the well, or groundwater recharge rate is too slow) an alternate sampling technique may be used. The wells will be sampled using peristaltic pumps or USEPA-approved submersible pumps (e.g., Grundfos® or bladder type). The tubing will be securely fastened to the well casing or cap during sampling to prevent disturbance of any sediments in the well. Pumps will be operated at less than 500 milliliters per minute during purging and sampling.

During sampling, an attempt will be made to collect metals samples with turbidity measuring below 50 NTUs. The use of low-flow sampling techniques, where possible, will help minimize turbidity levels in the samples. If the field turbidity measurements cannot be reduced below 50 NTUs at a particular well, a filtered sample will be collected through a 0.45 micron filter for metals in addition to the unfiltered fraction.

2.7.2 Groundwater Analytical Protocols

This section provides a description of the proposed laboratory analytical program and the analytical methods used to analyze groundwater samples collected during groundwater monitoring specified in this section. The groundwater analytical data will be generated using USEPA SW-846 analytical procedures (USEPA, 1997). Groundwater analytical methods and parameters are summarized below:

- VOCs by Method 8260B with reporting of Tentatively Identified Compounds (TICs) per Contract Laboratory Program (CLP) guidelines
- SVOCs by Method 8270C, to include aniline, with reporting of TICs per CLP guidelines
- RCRA Metals by Method 6010B including mercury by Methods 7470A and 7471A

Container size and type, preservative, and holding time requirements for groundwater samples will be consistent with SW-846 and NYSDEC requirements. Groundwater samples will be labeled and transported to the laboratory with chain of custody documentation in accordance with NYSDEC requirements. Quality assurance/quality control requirements for groundwater samples are addressed in the Quality Assurance Project Plan (QAPP) set forth in Appendix C.

2.8 MANAGEMENT OF INVESTIGATION-DERIVED WASTES

Investigation-derived wastes will be managed in accordance with the following:

- Well/piezometer development water, purge water, and equipment wash water will be containerized and discharged to the onsite sanitary sewer system or allowed to infiltrate in the immediate area of the well/sample location unless evidence of significant contamination (i.e., separate phase liquids, sheen or discoloration associated with chemical contamination) is observed, in which case the water will be containerized and stored on the Site until proper disposal can be arranged.

- Drill cuttings that cannot be returned to the borehole will be placed on the ground surface in the immediate area of the test boring unless evidence of significant contamination (i.e., elevated PID readings, separate phase liquids, sheen or discoloration associated with chemical contamination) is observed, in which case the cuttings will be containerized and stored on the Site until proper disposal can be arranged.

- Used personal protective equipment, used disposable sampling equipment, and other solid wastes will be bagged and disposed as municipal waste unless evidence of significant contamination is observed, in which case the solid waste will be containerized and stored on the Site until proper disposal can be arranged.

3.0 DATA EVALUATION AND REPORTING

A PDI Report will be prepared. Hard copies and electronic copies of the reports will be issued to SBD and those specified by NYSDEC. The PDI report will document the following:

- Results of the Areas C & E groundwater plume delineation;
- Results of the Area E LNAPL investigation;
- Vapor intrusion testing results for the specified Area B and Area E structures;
- Results for the PCB soil samples collected on Area A;
- Updated groundwater contours for Areas B, C, and E and an updated interpretation of the shallow groundwater flow direction;
- Results of groundwater monitoring completed at wells in the vicinity of the former Area E wastewater lagoons; and
- The results of the groundwater monitoring activities completed to evaluate potential source areas on Areas B, C and E.

The PDI Report will include tables, figures, laboratory data, and attachments, as necessary.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance/quality control (QA/QC) procedures will be utilized throughout the project as described in the QAPP set forth in Appendix C. The project QA/QC protocol will be consistent with the most recent version of DER-10.

5.0 HEALTH AND SAFETY

MACTEC will utilize the site-specific Health and Safety Plan (HASP) prepared for the prior RI work for the PDI work. The HASP will be updated as necessary to reflect current conditions and will incorporate Job Hazard Analyses (JHAs) for specific site investigation tasks. The HASP will be used by MACTEC employees and will address the potential hazards associated with the proposed work. The HASP will meet OSHA standards. The HASP includes an identification of the anticipated site hazards, requirements for personal protective equipment (PPE) and air monitoring, action levels for upgrading PPE levels, and emergency procedures. MACTEC will require that visitors to the Site, including client and regulatory agency personnel, comply with MACTEC's HASP or provide their own HASP.

MACTEC personnel will meet OSHA training and medical monitoring requirements for hazardous site operations. Prior to the start of field work or any new field activity, MACTEC's Site Safety Officer (SSO) will conduct a tailgate health and safety meeting for all field personnel. These meetings will be documented in MACTEC's master copy of the HASP kept on site and in the field notebook.

The DER-10 guidance includes provisions for a Community Air Monitoring Plan (CAMP). The HASP prepared by MACTEC adequately addresses protection of the community. The work tasks (soil borings, groundwater monitoring, and other sampling) will not result in generation of significant airborne contamination due to the nature and limited area of the activity. Furthermore, air monitoring for volatile organics will be completed within the work area during the sampling activities. The HASP requires the cessation of activities if VOC levels exceed background for more than 1 minute in the breathing zone. This action level is more conservative than the CAMP guidance in DER-10. For these reasons, the existing HASP is protective of the community and preparation of a stand-alone CAMP for the activities specified in this Work Plan is not necessary. Should it be determined that future investigation or remediation activities may create the potential for community exposure, a CAMP will be prepared.

6.0 SCHEDULE

Advance notice will be provided to NYSDEC regarding intended start dates for specific field work. It is anticipated that demolition activities at the Site will affect the schedule of PDI field tasks. MACTEC will coordinate with SBD and their demolition contractor as appropriate.

Following is the anticipated schedule for the PDI work outlined in this workplan:

TASK	START DATE	END DATE
PREPARE PRE-DESIGN INVESTIGATION WORK PLAN & SUBMIT TO NYSDEC	JULY 2009	AUGUST 7, 2009
COMPLETE PRE-DESIGN INVESTIGATION FIELD WORK	AUGUST 2009	JUNE 2010
PREPARE PRE-DESIGN INVESTIGATION/DESIGN BASIS REPORT	MARCH 2010	OCTOBER 2010

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7.0 REFERENCES

The following is a list of significant references used in preparation of this report. Other documents, including project correspondence documents and records maintained in BCC files, were used to supplement the information obtained from the references listed below.

1. MACTEC Engineering and Consulting, Inc., March 2006, "Final Operations, Maintenance & Monitoring Plan, Interim Corrective Measure, Buffalo Color Area ABCE, Buffalo, New York".

2. MACTEC Engineering and Consulting, Inc., September 2006, "Remedial Investigation / Feasibility Study Work Plan, Buffalo Color Corporation, Buffalo, New York."

3. MACTEC Engineering and Consulting, Inc., February 2009, "Final Alternatives Analysis Report, Former Buffalo Color Corporation Site, Buffalo, New York."

4. New York State Department of Health, Center for Environmental Health, Bureau of Environmental Exposure Investigation, February 2005, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Public Comment Draft".

TABLES

Table 1
Monitoring Well and Piezometer Data
Buffalo Color Facility, Buffalo, NY

Location	Area	Aquifer	Date Installed	Total Depth	Top of Screen	Bottom of Screen	Screened Material%	Screened Zone	Top of Bedrock	Latitude	Longitude	Northing	Easting	Measuring Point Elevation	D.T.W. 1-15-2007	Groundwater Elevation 1-15-2007	COMMENTS
EW-1	A	Shallow	Jun-06	32	28.0	32.0	100	Alluvium	NA	42.861982	78.845380	1042883.93	1078036.05	582.49	10.64	571.85	
EW-2	A	Shallow	Jun-06	34	29.0	34.0	100	Alluvium	NA	42.862271	78.844976	1042989.17	1078144.74	582.64	10.65	571.99	
EW-3	A	Shallow	Jun-06	38	32.0	38.0	100	Alluvium	NA	42.862576	78.844510	1043099.72	1078269.86	583.84	11.89	571.95	
EW-4	A	Shallow	Jun-06	38	33.0	38.0	100	Alluvium	NA	42.863037	78.844059	1043267.43	1078391.48	583.28	10.76	572.52	
EW-5	A	Shallow	Jun-06	37	32.0	37.0	100	Alluvium	NA	42.863420	78.843602	1043406.57	1078514.18	585.50	12.77	572.73	Sheen
ICM-101	A	Shallow	Jun-06	20	10.0	20.0	100	Alluvium	NA	42.863430	78.845782	1043411.92	1077929.88	586.37	12.44	573.93	
ICM-102	A	Shallow	Jul-06	24	14.0	24.0	100	Fine Sand	NA	42.862106	78.845129	1042929.15	1078103.36	583.24	11.08	572.16	
ICM-103	A	Shallow	Jun-06	22	12.0	22.0	100	Fill	NA	42.862396	78.844648	1043034.40	1078232.85	586.88	12.69	574.19	
ICM-104	A	Shallow	May-06	22.5	12.5	22.5	100	Alluvium	NA	42.862657	78.844178	1043129.18	1078359.08	586.84	14.07	572.77	
ICM-105	A	Shallow	Jun-06	22	12.0	22.0	100	Fill	NA	42.863078	78.843504	1043282.00	1078540.13	586.84	15.26	571.58	
ICM-PZ-02N	E	Shallow	Jun-06	17	7.0	17.0	100	Alluvium	NA	42.865033	78.839265	1043990.81	1079678.96	586.26	4.89	581.37	
ICM-PZ-02S	E	Shallow	May-06	22	12.0	22.0	100	Alluvium	NA	42.864980	78.838994	1043971.38	1079751.34	586.03	9.96	576.07	
ICM-PZ-03N	E	Shallow	Jun-06	17	7.0	17.0	100	Alluvium	NA	42.864902	78.839030	1043942.99	1079741.68	586.35	9.05	577.30	
ICM-PZ-03S	E	Shallow	Jun-06	22	12.0	22.0	100	Alluvium	NA	42.864947	78.838810	1043959.26	1079800.62	586.24	10.33	575.91	
ICM-PZ-04S	E	Shallow	Jun-06	22	12.0	22.0	100	Alluvium	NA	42.864863	78.838833	1043928.61	1079794.54	586.24	10.33	575.91	
PD-01	E	Deep	Apr-88	30	-	-			NA	42.864815	78.838578	1043910.94	1079862.85	586.58	7.22	579.36	
PD-02	E	Deep	Apr-88	28.5	-	-			NA	42.864823	78.838356	1043913.57	1079922.21	587.60	9.64	577.96	
PD-03	E	Deep	Apr-88	27	-	-			NA	42.864899	78.838684	1043941.62	1079834.37	587.07	12.58	574.49	
PS-01	E	Shallow	Apr-88	14.7	-	-			NA	42.864877	78.838690	1043933.62	1079832.81	587.27	8.19	579.08	
PS-02	E	Shallow	Apr-88	13.7	-	-			NA	42.864935	78.838855	1043954.78	1079788.66	587.41	12.01	575.40	
PS-03	E	Shallow	Apr-88	13.3	-	-	100	Alluvium	NA	42.864911	78.838883	1043946.27	1079781.13	587.26	9.96	577.30	
PS-04	C	Shallow	Nov-89	7	-	-			NA	42.866752	78.842075	1044619.61	1078927.30	587.70	4.05	583.65	
PS-05	C	Shallow	Nov-89	8	-	-			NA	42.867593	78.843094	1044927.09	1078655.23	587.35	2.29	585.06	
PS-06	C	Shallow	Nov-89	8	-	-			NA	42.866572	78.843425	1044555.18	1078565.30	587.67	4.01	583.66	
PS-07	B	Shallow	Nov-89	7.7	-	-			NA	42.865608	78.843882	1044204.08	1078441.71	586.96	-	NO DTW	
PS-08	B	Shallow	Nov-89	8	-	-			NA	42.865309	78.842819	1044094.54	1078726.34	587.76	4.74	583.02	
PS-09	B	Shallow	Nov-89	8	-	-			NA	42.864653	78.844366	1043856.68	1078310.93	587.82	2.63	585.19	
PS-10	E	Shallow	Nov-89	6	-	-			NA	42.866787	78.838128	1044629.28	1079985.46	585.05	2.52	582.53	
PS-11	E	Shallow	Nov-89	8	-	-			NA	42.866811	78.840678	1044639.98	1079302.13	585.66	2.7	582.96	
PS-12	E	Shallow	Nov-89	6	-	-			NA	42.865907	78.840558	1044310.34	1079333.12	586.12	-	NO DTW	
PS-13	E	Shallow	Nov-89	8	-	-			NA	42.865420	78.840767	1044133.34	1079276.51	585.88	-	NO DTW	Destroyed
PS-14	A	Shallow	Nov-89	10	-	-			NA	42.863385	78.845265	1043395.34	1078068.51	585.49	5.38	580.11	
PS-15	A	Shallow	Nov-89	12	-	-			NA	42.863378	78.843909	1043391.49	1078432.00	587.25	7.83	579.42	
PZ-101	A	Shallow	Jun-06	22	12.0	22.0	30/70	Fill/Alluvium	NA	42.862001	78.845484	1042891.09	1078008.16	585.51	14.51	571.00	
PZ-102	A	Shallow	May-06	30	20.0	30.0	100	Alluvium	NA	42.861972	78.845357	1042880.44	1078042.29	584.09	12.2	571.89	
PZ-103	A	Shallow	May-06	22	12.0	22.0	30/70	Fill/Alluvium	NA	42.862097	78.845300	1042925.90	1078057.55	583.46	11.52	571.94	
PZ-104	A	Shallow	May-06	21	11.0	21.0	100	Fill	NA	42.862199	78.845074	1042962.86	1078118.35	583.48	11.04	572.44	
PZ-105	A	Shallow	May-06	32	22.0	32.0	30/70	Fill/Alluvium	NA	42.862280	78.844952	1042992.24	1078150.98	583.38	11.41	571.97	
PZ-106	A	Shallow	May-06	21	11.0	21.0	100	Fill	NA	42.862335	78.844844	1043012.27	1078180.21	583.40	11.33	572.07	
PZ-107	A	Shallow	May-06	23	13.0	23.0	100	Fill	NA	42.862507	78.844623	1043074.82	1078239.44	583.94	11.9	572.04	
PZ-108	A	Shallow	May-06	38	28.0	38.0	90/10	Alluvium	NA	42.862591	78.844486	1043105.34	1078276.41	583.91	12.05	571.86	
PZ-109	A	Shallow	May-06	22	12.0	22.0	100	Fill	NA	42.862671	78.844472	1043134.23	1078280.23	583.99	8.49	575.50	
PZ-110	A	Shallow	May-06	22	12.0	22.0	100	Fill	NA	42.862925	78.844120	1043226.58	1078374.80	584.74	11.64	573.10	
PZ-111	A	Shallow	May-06	36	26.0	36.0	50/50	Fill/Alluvium	NA	42.863053	78.844042	1043273.15	1078395.86	584.31	11.74	572.57	
PZ-112	A	Shallow	May-06	22	12.0	22.0	100	Fill	NA	42.863067	78.843922	1043278.30	1078428.10	584.41	10.94	573.47	
PZ-113	A	Shallow	May-06	20	10.0	20.0	60/10	Fill/Clay	NA	42.863358	78.843704	1043384.12	1078486.79	585.13	8.92	576.21	
PZ-114	A	Shallow	May-06	36	26.0	36.0	100	Alluvium	NA	42.863398	78.843614	1043398.61	1078510.98	585.89	14.1	571.79	
PZ-115	A	Shallow	May-06	22	12.0	22.0	20/50/30	Fill/Clay/Alluvium	NA	42.863503	78.843622	1043437.00	1078509.18	585.50	-	NO DTW	
PZ-116	A	Shallow	May-06	22	12.0	22.0	100	Fill	NA	42.862254	78.844934	1042982.90	1078155.84	583.54	10.98	572.56	
PZ-117	A	Shallow	May-06	22	12.0	22.0	100	Fill	NA	42.862534	78.844452	1043084.59	1078285.48	586.25	14.69	571.56	
PZ-118	A	Shallow	May-06	22	12.0	22.0	100	Fill	NA	42.862925	78.843883	1043226.42	1078438.42	587.50	15.29	572.21	
R-01	E	Deep	May-84	46	-	-			NA	42.866838	78.837871	1044647.66	1080054.54	584.59	8.59	576.00	
R-02	E	Deep	May-84	51.4	-	-			NA	42.865098	78.839808	1044015.09	1079533.42	585.85	8.86	576.99	
R-03	E	Deep	Jun-84	50.5	-	-			NA	42.865017	78.838925	1043984.65	1079770.05	586.93	3.91	583.02	
R-04	E	Deep	May-84	52	-	-			NA	42.864895	78.838195	1043939.90	1079965.46	586.70	11.37	575.33	
R-05	E	Deep	Jun-84	48.1	-	-			NA	42.865691	78.837948	1044229.47	1080032.51	587.05	11.61	575.44	
R-06	E	Deep	Jun-84	50	-	-			NA	42.865296	78.838079	1044085.64	1079996.98	586.24	10.47	575.77	
R-07	E	Deep	Jun-84	49.5	-	-			NA	42.865602	78.839255	1044198.16	1079682.17	587.97	10.21	577.76	

Table 1
Monitoring Well and Piezometer Data
Buffalo Color Facility, Buffalo, NY

Location	Area	Aquifer	Date Installed	Total Depth	Top of Screen	Bottom of Screen	Screened Material%	Screened Zone	Top of Bedrock	Latitude	Longitude	Northing	Easting	Measuring Point Elevation	D.T.W. 1-15-2007	Groundwater Elevation 1-15-2007	COMMENTS
R-08	E	Shallow	Oct-85	24	-	-			NA	42.864989	78.838736	1043974.60	1079820.69	589.46	5.54	583.92	
R-09	E	Shallow	Oct-85	18	-	-			NA	42.864931	78.838446	1043953.13	1079898.37	588.88	11.73	577.15	
R-10	E	Shallow	Oct-85	18	-	-			NA	42.865716	78.839328	1044239.77	1079662.80	588.75	4.96	583.79	
R-11	E	Shallow	Nov-88	17.3	-	-			NA	42.865006	78.839342	1043980.98	1079658.28	586.31	3.9	582.41	
R-12	E	Deep	Oct-85	50	-	-			NA	42.865012	78.839370	1043983.42	1079650.72	586.33	10.85	575.48	
R-13	E	Shallow	Feb-86	16	-	-			NA	42.865025	78.838937	1043987.63	1079766.64	587.03	10.94	576.09	Sheen
R-14	E	Shallow	Apr-88	16	-	-			NA	42.864984	78.838705	1043972.61	1079828.79	588.89	13.39	575.50	Sheen
R-15	E	Shallow	Apr-88	13	-	-			NA	42.865698	78.839293	1044233.40	1079672.02	588.36	4.69	583.67	
RFI-16	A	Deep	May-96	64.5	60.0	64.5	100	Till	64.5	42.862393	78.846370	1043034.80	1077771.15	585.83	13.2	572.63	
RFI-17	E	Shallow	May-96	12	6.8	11.8	60/40	Till/Clay	NA	42.866842	78.837904	1044649.12	1080045.58	585.73	4.89	580.84	
RFI-18	B	Shallow	May-96	14	8.5	13.5	60/40	Till/Clay	NA	42.865505	78.842606	1044165.57	1078783.59	588.13	7.7	580.43	
RFI-19D	B	Deep	May-96	45.4	40.4	45.4	50/50	Clay/Till	45.2	42.865518	78.842594	1044170.29	1078786.78	588.27	14.55	573.72	
RFI-20	C	Shallow	Apr-96	12.3	5.9	11.9	90/10	Clay/Till	NA	42.867800	78.842987	1045002.22	1078684.07	587.52	4.95	582.57	
RFI-21D	C	Deep	Apr-96	40.8	35.5	40.4	100	Till	40.8	42.867783	78.842997	1044996.22	1078681.36	587.83	14.92	572.91	
RFI-22	A	Shallow	May-96	35	24.8	34.8	90/10	Alluvium/Clay	NA	42.863240	78.843306	1043340.64	1078593.58	590.11	17.9	572.21	
RFI-23D	A	Deep	May-96	62.5	56.5	61.9	40/60	Clay/Till	61.9	42.863254	78.843293	1043345.73	1078596.89	590.37	18.09	572.28	
RFI-24	A	Shallow	May-96	32	21.5	31.5	90/10	Alluvium/Clay	NA	42.862722	78.844322	1043152.92	1078320.59	583.60	11.47	572.13	
RFI-25	A	Shallow	Apr-96	30	19.5	29.5	80/20	Alluvium/Clay	NA	42.861941	78.845322	1042868.87	1078051.61	586.25	14.46	571.79	
RFI-26	A	Shallow	May-96	36	25.5	35.5	80/20	Alluvium/Clay	NA	42.862957	78.845387	1043239.49	1078035.28	587.33	14.7	572.63	
RFI-27	B	Shallow	Apr-96	18	12.1	17.5	60/40	Till/Clay	NA	42.864613	78.844979	1043842.66	1078146.41	587.01	4.65	582.36	
RFI-28	B	Shallow	May-96	16	9.9	14.9	10/90	Fill/Till	NA	42.864413	78.843794	1043768.66	1078463.84	588.09	5.51	582.58	
RFI-29	E	Shallow	May-96	14	7.5	12.5	60/40	Till/Clay	NA	42.865716	78.842060	1044241.94	1078930.41	585.82	3.14	582.68	
RFI-30	C	Shallow	Apr-96	15.1	10.0	15.0	80/20	Till/Clay	NA	42.866108	78.843721	1044386.23	1078485.37	587.53	7.11	580.42	
RFI-31	C	Shallow	May-96	14	8.5	13.5	80/20	Till/Clay	NA	42.866821	78.842461	1044645.08	1078824.06	587.86	7.2	580.66	
RFI-32	E	Shallow	May-96	13	7.5	12.5	60/40	Till/Clay	NA	42.865397	78.840947	1044125.07	1079228.36	586.44	4.44	582.00	
RFI-33	E	Shallow	Apr-96	12	5.0	10.0	80/20	Till/Clay	NA	42.867250	78.839975	1044799.54	1079490.82	582.53	0.5	582.03	
RFI-34	PVS	Shallow	May-97	30	12.5	27.5	100	Alluvium	NA	42.863838	78.843562	1043558.96	1078525.47	585.66	-	NO DTW	
RFI-35	PVS	Shallow	Jun-97	18	10.0	15.0	100	Till	NA	42.864913	78.842873	1043950.26	1078711.46	584.26	-	NO DTW	
RFI-36	E	Shallow	Jun-97	16	8.0	13.0	10/90	Fill/Till	NA	42.865173	78.840950	1044043.14	1079227.30	587.39	4.41	582.98	
RFI-37	PVS	Shallow	Jun-97	22	11.0	21.0	100	Till	NA	42.864681	78.842174	1043865.00	1078898.62	583.33	-	NO DTW	
RFI-38	PVS	Shallow	May-97	30	12.0	27.0	30/70	Fill/Alluvium	NA	42.863595	78.842679	1043469.61	1078762.05	582.25	-	NO DTW	
RFI-39	PVS	Shallow	May-97	26	13.1	23.1	30/60/10	Fill/Till/Clay	NA	42.864340	78.840826	1043739.74	1079259.51	584.78	-	NO DTW	
RFI-40	PVS	Shallow	May-97	30	14.5	29.5	100	Alluvium	NA	42.863902	78.839022	1043578.56	1079742.78	585.27	-	NO DTW	
RFI-41	PVS	Shallow	May-97	28	15.5	25.5	100	Alluvium	NA	42.864092	78.838121	1043647.08	1079984.59	584.89	-	NO DTW	
RFI-42	E	Shallow	Jun-97	12	6.0	11.0	40/60	Fill/Alluvium	NA	42.866331	78.837626	1044462.66	1080119.53	582.38	-	NO DTW	Could not locate
RFI-43	E	Shallow	Jun-97	14	8.0	13.0	40/60	Till/Clay	NA	42.865152	78.837578	1044032.74	1080131.18	586.50	4.42	582.08	
RFI-44	PVS	Shallow	Jul-98	38	16.0	36.0	100	Alluvium	NA	42.863460	78.842997	1043420.58	1078676.60	582.76	-	NO DTW	
RFI-45	PVS	Shallow	Jul-98	34	18.0	33.0	90/10	Alluvium/Clay	NA	42.864187	78.843345	1043685.82	1078584.04	582.67	-	NO DTW	
RFI-46	PVS	Shallow	Jul-98	34	16.0	32.0	90/10	Alluvium/Clay	NA	42.863824	78.842307	1043552.90	1078861.97	582.21	-	NO DTW	
RFI-47	PVS	Shallow	Jul-98	30	13.5	28.5	90/10	Alluvium/Clay	NA	42.864181	78.842510	1043683.02	1078808.01	582.37	-	NO DTW	
RFI-48	PVS	Shallow	Jul-98	28	12.0	27.0	90/10	Fill/Alluvium	NA	42.864244	78.839645	1043703.66	1079576.02	582.49	-	NO DTW	
RFI-49	PVS	Shallow	Jul-98	26	14.0	24.0	100	Alluvium	NA	42.864381	78.839187	1043753.36	1079699.10	585.66	-	NO DTW	
RFI-50	PVS	Shallow	Jul-98	26	16.0	26.0	80/20	Alluvium/Clay	NA	42.864065	78.838583	1043637.70	1079860.73	581.31	-	NO DTW	
RFI-51	E	Shallow	Jul-98	14	8.0	13.0	40/60	Till/Clay	NA	42.865009	78.840036	1043982.87	1079472.12	586.90	3.15	583.75	
RFI-PZ-16	E	-	-	-	-	-	100	Fill	-	42.864992	78.839393	1043976.04	1079644.49	586.71	2.56	584.15	
RFI-PZ-17	E	-	-	-	-	-	100	Fill	-	42.864743	78.838010	1043884.18	1080014.99	585.97	10.22	575.75	
RFI-PZ-18	E	-	-	-	-	-	100	Fill	-	42.864932	78.839021	1043953.90	1079744.22	587.32	6.76	580.56	
RFI-PZ-19	PVS	-	-	-	-	-	70/30	Alluvium/Clay	-	42.864640	78.838785	1043847.43	1079807.02	585.79	-	NO DTW	
RFI-PZ-20	PVS	-	-	-	-	-	70/30	Alluvium/Clay	-	42.864617	78.838442	1043838.55	1079899.05	585.63	-	NO DTW	
RFI-PZ-21	E	-	-	-	-	-			-	42.864836	78.838564	1043918.62	1079866.46	586.5	-	NO DTW	Could not locate
RFI-PZ-22	E	-	-	-	-	-			-	42.865002	78.839593	1043979.74	1079590.91	586.85	-	NO DTW	
RFI-PZ-23	E	-	-	-	-	-			-	42.865225	78.840670	1044061.90	1079302.48	586.78	-	NO DTW	
RFI-PZ-24	E	-	-	-	-	-			-	42.865418	78.841671	1044133.06	1079034.12	584.34	-	NO DTW	
RFI-PZ-25	C	-	-	-	-	-			-	42.865690	78.842417	1044232.95	1078834.56	583.35	-	NO DTW	Full of sediment
RFI-PZ-26	C	-	-	-	-	-			-	42.866063	78.843470	1044369.59	1078552.59	584.73	-	NO DTW	Could not locate
RFI-PZ-27	PVS	-	-	-	-	-			-	42.864793	78.839347	1043903.60	1079656.71	584.78	-	NO DTW	
RIV. STILLING	-	-	-	-	-	-			-	42.863183	78.843094	1043319.79	1078650.11	583.53	-	NO DTW	
W6-R-R	A	Shallow	-	18	-	-	50/50	Fill/Alluvium	NA	42.862393	78.846402	1043034.79	1077762.37	588.53	16.01	572.52	

FIGURES

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SCALE 1:24000

1 0.5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

BUFFALO SE QUADRANGLE

SOUTH BUFFALO DEVELOPMENT
BUFFALO, NEW YORK
Project No.: 3410090701

MACTEC
Engineering & Consulting Inc.
800 North Bell Avenue, Suite 200
Pittsburgh, PA 15106

SITE LOCATION MAP
BUFFALO COLOR AREAS ABCE
BUFFALO, NEW YORK

FIGURE: 1

1

P:\PROJECTS\South Buffalo Development\3410090701\CADD\FINAL\Fig 1 Site Loc.dwg Thu, 06 Aug 2009 - 2:09pm nelagattuta

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Conrail Railroad

Area-A

Area-B

Area-C

Buffalo
Research Laboratory

Area-E

PVS
Chemicals

PVS
Chemicals

BCC OUTFALL 006

BCC OUTFALL 006
INV.=567.44', 36"
RCP

BUFFALO RIVER
ELEVATION = 573.19'
FLOW

SOUTH PARK AVE.

LEE STREET

ELK STREET

OLANDO STREET

PVS
OUTFALL
004,

PVS
OUTFALL
003,

PVS
OUTFALL
002

PVS
OUTFALL
001

BCC
OUTFALL
011

LST
LOADING FACILITY

TKR1

CLF1

200 0 200
SCALE: 1"= 200'

SOUTH BUFFALO DEVELOPMENT
BUFFALO, NEW YORK
Project No.: 3410090701

MACTEC
Engineering & Consulting Inc.
800 North Bell Avenue, Suite 200
Pittsburgh, PA 15106

SITE LAYOUT
BUFFALO COLOR AREAS ABCE
BUFFALO, NEW YORK
FIGURE: 2

2

P:\PROJECTS\South Buffalo Development\3410090701\CADD\FINAL\Fig 2 Site Layout.dwg Thu, 06 Aug 2009 - 2:12pm nelagattuta

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Area-D

Conrail Railroad

Area-A

Area-B

Area-C

Area-E

Buffalo
Research Laboratory

PVS
Chemicals

PVS
Chemicals

Exxon Mobil

SOUTH PARK AVE.

LEE STREET

ELK STREET

OLANDO STREET

BUFFALO RIVER
ELEVATION = 573.19'
FLOW

BCC OUTFALL 006
INV.=567.44'
36" RCP

BCC OUTFALL 005

PVS OUTFALL 004

PVS OUTFALL 003

PVS OUTFALL 002

PVS OUTFALL 001

BCC OUTFALL 011

LEGEND

- MONITORING WELL
- MONITORING WELL (PZ)
- PROPOSED MONITORING WELLS
- RI SOIL BORING/ SAMPLE LOCATION
- WELL (PZ) WITH LNAPL DETECTED
- APPROX. EXTENT OF CHLOROBENZENE AND OTHER VOCs >1 MG/L
- GROUNDWATER CONTOUR, OCTOBER 13, 2008 (DASHED WHERE INFERRED)

100 0 100
SCALE: 1"= 100'

SOUTH BUFFALO DEVELOPMENT BUFFALO, NEW YORK Project No.: 3410090701	MACTEC Engineering & Consulting Inc. 800 North Bell Avenue, Suite 200 Pittsburgh, PA 15106	CHLOROBENZENE PLUMES & RI SAMPLE POINTS BUFFALO COLOR AREAS ABCE	3

J:\PROJECTS\South Buffalo Development\3410090701\GIS\FINAL\Fig 3.mxd Thu, 06 Aug 2009 - 2:24pm ewagstaffe

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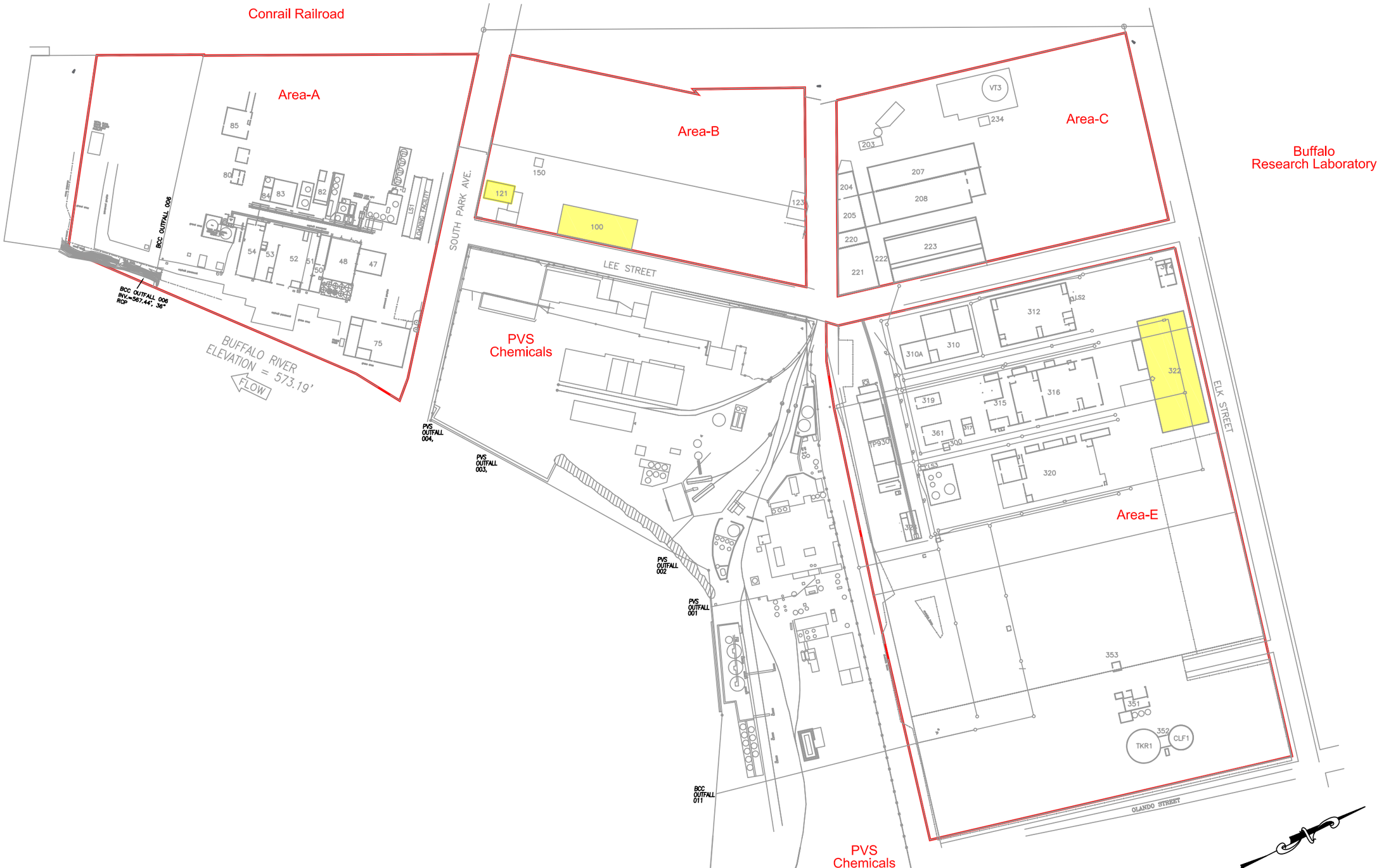

LEGEND

121 BUILDINGS REQUIRING INDOOR AIR EVALUATION

200 0 200
SCALE: 1"= 200'

SOUTH BUFFALO DEVELOPMENT
BUFFALO, NEW YORK
Project No.: 3410090701

MACTEC
Engineering & Consulting Inc.
800 North Bell Avenue, Suite 200
Pittsburgh, PA 15106

PROPOSED VI EVALUATION
BUILDING LOCATIONS
BUFFALO COLOR AREAS ABCE
FIGURE: 4

4

P:\PROJECTS\South Buffalo Development\3410090701\CADD\FINAL\Fig 4.dwg Thu, 06 Aug 2009 - 2:15pm nelsgattuso

APPENDIX A

REMEDIAL WORK PLAN

9 REMEDIAL WORK PLAN

The goal of the remedy selection process in the BCP is to select a remedy for a site that is fully protective of public health and the environment, taking into account the current, intended and reasonably anticipated future land use of the site.

This section presents the preferred remedy which has been selected as the final remedy for the Site. The preferred remedy is driven by and consistent with the BCP and SBD's proposed redevelopment approach (as described in Subsection 1.1) in that it is:

- Fully protective of human health and the environment;
- Allows for the creation of significant riverfront green space and public access;
- Provides for the accelerated demolition of the abandoned chemical plant;
- Eliminates the risks and hazards posed by the currently deteriorating infrastructure; and
- Meshes well with SBD's and other stakeholders' schedules for accelerated redevelopment of the Site.

9.1 PLANT DEMOLITION

Prior to remedial construction, SBD will complete asbestos abatement and demolition of the existing Buffalo Color facility. The work will be completed in accordance with applicable laws and regulations and will be performed as follows:

Asbestos abatement will include:

- Preparation of an asbestos abatement health and safety plan, to include requirements for employee training and medical monitoring, list of designated personnel, respiratory protection program, PPE, site and community air monitoring, and emergency procedures;
- Implementation of jobsite security to prevent access by unauthorized personnel;
- Implementation of a decontamination program;
- Implementation of a hazard communication program;
- Obtaining all required licenses, permits and approvals;
- Designation of regulated areas, including use of warning signs as appropriate;
- Provisions for adequate exhaust ventilation;
- Removal of friable asbestos, including pipe insulation and other insulating materials;
- Removal of non-friable asbestos, including floor tile, roofing materials, and transite;
- Implementation of a final cleaning and visual inspection program;
- Off-site disposal of ACM at licensed disposal facilities; and

- Preparation of submittals and reports, as necessary, to document the asbestos abatement program.

Demolition of the existing facility will include the following:

- Preparation and implementation of a demolition health and safety plan, to include requirements for employee training and medical monitoring, list of designated personnel, respiratory protection program, PPE, fire protection, site and community air monitoring programs, and emergency procedures;
- Implementation of a decontamination program;
- Implementation of a hazard communication program;
- Obtaining all required licenses, demolition permits and other permits, and approvals;
- Meeting with the appropriate City departments to discuss the re-use of foundations and slabs (SBD acknowledges that a demolition permit is required from the City);
- Mobilization of equipment and site preparation;
- Removal and proper disposal of residual chemicals remaining in piping, tanks, pits/sumps and process vessels;
- Cleaning/rinsing of piping, tanks, pits/sumps and process vessels and proper disposal of collected rinseate;
- Removal and proper disposal of regulated materials, including PCB electrical equipment, Universal wastes, mercury-containing equipment;
- Capping/plugging of drains and sewer lines exposed during demolition;
- Demolition/removal of buildings, tanks, piping, and ancillary structures, as required;
- Backfilling to grade (after cleaning) of pits and sumps;
- Cleaning (power washing, scouring, scabbling, etc.) and, if appropriate, sealing of structural floor slabs that will remain in place;
- Implementation of dust control measures;
- Implementation of erosion and sediment control measures;
- Site restoration; and
- Preparation of reports and submittals, as necessary, to document the completion of demolition activities.

9.2 DESCRIPTION OF PREFERRED REMEDY

The Preferred Remedy for the Site consists of the following components:

- Soil – Installation of a Site-wide cover system with Area E source area excavation
- Area A Groundwater – Installation of a downgradient hydraulic barrier wall combined with optimized Site groundwater extraction system and implementation of Site cover system
- Area B Groundwater – Groundwater monitoring and implementation of Site cover system

- Areas C&E Groundwater – Enhanced bioremediation with Area E source removal, implementation of Site cover system, and groundwater monitoring
- Site Sewers – plugging, removal and/or rehabilitation if necessary to mitigate active preferential contaminant migration pathways
- Use of institutional/engineering controls and environmental easements

The following subsections provide descriptions of the specific components of the preferred remedy.

9.2.1 Soil

Alternative S-3 (Cover System with Area E Source Area Excavation) has been selected as the preferred alternative for the Site soil. This alternative includes excavation to the water table and off-Site disposal of contaminated soil at the source area located on Area E (Figure 18) combined with the use of a cover system.

The source area at Area E contains approximately 8,100 cubic yards of VOC-impacted soil located around the AST farm in the southwestern corner of this area (Figure 18). The soil in this area has been targeted for removal. The removal will occur after SBD has removed/demolished the AST tank farm, buildings and any other ancillary structures that are located within the area. Removal of foundations and underground utilities that may exist within the excavation limits will also be completed. The criteria used to identify soil to be removed from this specific location will be as follows:

- Soil will be removed down to the first zone of saturation (expected to be encountered at a depth of 4 to 5 feet below existing ground surface).
- Soil above the water table within the designated area that exhibits noticeable NAPL and/or sustained open-air photoionization detector (PID) readings above 10 parts per million will be removed.
- Locations of RI soil samples (and any additional samples collected during the remedial design process) within the designated area shown through laboratory testing to contain total concentrations of Site-specific VOCs (benzene, chlorobenzene, and related compounds) or Site-specific SVOCs (aniline, nitrobenzene and related compounds) that exceed 10 parts per million (ppm) will be removed. The 10 ppm criterion was selected based on review of the analytical results for the RI soil samples collected from borings advanced around the AST farm versus other Area E soil samples (which exhibited much lower levels, if any, of similar substances).

Confirmatory soil samples will be collected from the excavation sidewalls at a frequency of one sample for every 50 lineal feet of sidewall. The confirmatory samples will be analyzed for Target Compound List (TCL) VOCs and SVOCs. No excavation bottom samples are proposed because the excavation will extend to the water table. No saturated soil samples will be collected for confirmatory analyses. Additional samples may be required if “grossly contaminated” materials are encountered (as defined in the draft Soil Fill Management Plan provided in Appendix A).

The horizontal limits of excavation will be determined based on the above criteria. Excavation will not be performed beyond property lines. If data obtained during remedial design or source area removal indicates that soil contamination at the Area E source area extends beyond the property line, additional delineation will be necessary. Excavation may be limited by the presence of subsurface obstructions or active utility lines.

As noted in prior sections, the cover system to be utilized as part of the remedy, consistent with the redevelopment of the Site, will involve use of a combination of clean soil, pavement, or building structures to provide protection from direct contact exposure to contaminated surface soils. As identified in the RI report and illustrated on Figure 20, areas that must be covered to eliminate the direct contact pathway under a Commercial use scenario exist throughout the Site. Although certain portions of the Site surface soil may in fact meet the Commercial SCOs, it would be difficult to properly delineate and manage these areas during future redevelopment. Thus, the cover system will extend across the entire Site. The cover system will reduce infiltration of precipitation through impacted soil into groundwater and promote surface drainage. The cover system will consist of a minimum of one foot of soil, asphalt or concrete pavement (with appropriate granular subbase), or building structures, consistent with the presumptive remedy as identified in 6 NYCRR Part 375. If portions of Area A are used as natural habitat resource areas, the cover soil thickness will be increased to two feet or more and the cover material shall meet the "Protection of Ecological Resources" SCOs as described in 6NYCRR Part 375-6.7. Existing paved surfaces, including building floor slabs, asphalt parking lots, and access drives which SBD chooses to use as part of the cover system will be cleaned, rehabilitated, and maintained as necessary. Any required actions for the parking lot associated with the 100 Lee Street property (Area B) will be coordinated with the owner. A demarcation layer will be placed between existing surface soils and any new soil cover materials so the boundary between clean fill and existing Site soils can be identified in the future. Best Management Practices will be implemented to manage stormwater runoff from paved surfaces, as appropriate.

9.2.2 Groundwater

Due to the variability of shallow groundwater conditions across the Site, a multi-faceted remedy has been selected to address Site groundwater in the shallow aquifer and attain the groundwater RAOs as described in the following subsections. The long term goal of groundwater remediation is restoration of groundwater to its classified use; the short term goal is plume stabilization. In addition to the remedy components described below, the implementation of a Site-wide cover system will serve to reduce surface water infiltration and minimize the soil-to-groundwater migration pathway.

9.2.2.1 Area A Shallow Groundwater

Alternative GW-A-2 (Downgradient Hydraulic Barrier Wall with Groundwater Extraction) has been selected as the preferred alternative for Area A shallow aquifer groundwater. This alternative involves the continued operation of the Area A groundwater extraction system, with an evaluation period to identify modifications as necessary to optimize groundwater containment and accommodate redevelopment. Effluent from the groundwater extraction system will continue to be pretreated as necessary to meet the requirements of the Buffalo Sewer Authority (BSA) discharge permit. During recent correspondence with the BSA (and as documented in MACTEC's letter to NYSDEC dated April 8, 2008), BSA indicated that the effluent from the Area A groundwater extraction system, due to its location, would not be discharged to any Combined Sewer overflows (CSOs).

As described in Section 7.2.1.2, the hydraulic barrier wall would be installed along the eastern edge of Area A bordering the Buffalo River. The edges of the wall would be "wrapped" along the southern border and a portion of the northern boundary of Area A (along Area D and South Park Avenue, respectively) to provide for the sufficient containment of groundwater (Figure 21). The intent of the hydraulic barrier wall is to create a physical barrier between impacted shallow aquifer groundwater at Area A and the Buffalo River. The wall would have the added benefit of reducing the volume of river water extracted by operation of the ICM. The wall would be toed into the glaciolacustrine clay layer, which acts as an aquitard separating the Shallow Aquifer from the Confined Aquifer present in the basal till and Onondaga limestone immediately below the clay. The type of wall used (sheet pile, slurry wall, etc.) would be determined based on pre-design studies. For evaluation purposes, it is assumed that the wall would be approximately 1,320 feet long and extend to an average depth of 25 feet. Soils and wastes generated during installation of the wall will be managed in accordance with the Soil Fill Management Plan (see Section 9.2.4).

The erosion protection mattress located along the southern end of the Area A riverbank was installed as an Interim Corrective Measure (see Section 2.3). The remainder of the Area A shoreline consists of vertical concrete walls and other man-made structures. The final design will address contaminated soils located between the hydraulic barrier wall and the river and will include, to the extent feasible, the restoration of the river bank to a natural vegetative state. Opportunities to enhance the habitat along the Area A shoreline will be considered during the final design process.

The LNAPL present at EW-5 and other wells/piezometers must be monitored and controlled through periodic recovery via hand bailing or use of absorbent materials. If accumulations of LNAPL increase significantly or occur persistently at new locations within Area A, or if the LNAPL interferes with operation of the groundwater extraction system, additional investigation and/or LNAPL recovery efforts will be implemented.

9.2.2.2 Area B Shallow Groundwater

Alternative GW-B-2 (Groundwater Monitoring) has been selected as the preferred alternative for the Area B shallow aquifer groundwater. During 2008, groundwater monitoring at Area B will be performed in accordance with the ICM OM&M Plan. Based on the outcome of this monitoring period, the scope and frequency of additional groundwater monitoring at Area B will be proposed.

9.2.2.3 Area C/E Shallow Groundwater

Alternative GW-C&E-2 (Enhanced Bioremediation and Groundwater Monitoring) has been selected as the preferred alternative for the Area C and E shallow groundwater. As noted in previous Sections, Alternative GW-C&E-2 includes in-situ enhanced bioremediation of the limited chlorobenzene plumes identified at Areas C&E. A pre-design investigation, including a treatability study, would be required to collect Site-specific data related to geochemical and biological processes at the Site in order to determine the appropriate amendments for enhanced bioremediation. Based on the results of the treatability study, a pilot-scale test would be conducted on-site to determine the injection point locations, spacing, and effectiveness. The full-scale implementation would be based upon the results of the treatability and pilot-scale tests. At Area E, it may be advantageous to directly apply the bio-enhancement additive to the subsurface during the source area removal action.

The long term goal of groundwater remediation is restoration of groundwater to its classified use; the short term goal is plume stabilization. The criteria for determining success for the biotreatment process will be based on confirmation through groundwater monitoring that concentrations of COCs in the plume have been reduced and that the plume is not migrating beyond the Site. If migration beyond the Site boundary occurs, an evaluation of additional remedial alternatives will be completed.

During 2008, groundwater monitoring at Areas C and E was performed in accordance with the ICM OM&M Plan. Additional groundwater monitoring may be performed as necessary to support the predesign study and to monitor the effects of treatment. The scope and frequency of additional groundwater monitoring at Areas C and E will be assessed upon evaluation of the outcome of the treatment program.

9.2.3 Site Sewers

It is recognized that Site process/sanitary and storm sewers represent potential preferential contaminant migration pathways within certain areas of the Site. It should be noted that, based on plant records and interviews with former plant personnel, it appears that no underground chemical conveyance or process piping is present at the site; all such lines are/were reportedly aboveground lines. However, as a precautionary measure, procedures for the proper management of underground piping encountered during excavation activities associated with remedy implementation or redevelopment are addressed in the Soil Fill Management Plan, a draft copy of which is provided in Appendix D. The following subsections identify the

remedial approach selected for the Site sewer system. SBD will obtain any necessary permits and approvals from the City and the BSA for these activities.

9.2.3.1 Storm Sewers

Underground storm sewer lines at the Site discharge stormwater (including water from existing building roof drains and surface runoff that is conveyed to storm sewer inlets) to the Buffalo River at Outfall 006 on Area A and at Outfall 011. These outfalls are former SPDES-permitted outfalls formerly operated by Buffalo Color. These outfalls previously also received significant volumes of non-contact cooling water (NCCW) when the Buffalo Color plant was in operation.

During the RI, sampling at Outfalls 006 and 011 indicated that groundwater likely infiltrates the storm sewer lines in areas where the lines are below the water table. At present, it has not been determined if the existing storm sewer lines and river outfalls will be preserved and reused during redevelopment of the Site. It is anticipated that SBD will evaluate the storm sewer lines and make a determination early in the redevelopment process (consistent with the schedule provided in Section 10.0) regarding which storm sewer lines/outfalls (if any) will be reused. If the lines/outfalls will be reused, then remedial measures consisting of the removal and proper disposal of sediment, followed by camera surveys where accessible/appropriate and rehabilitation of portions of the lines subject to infiltration, will be completed. If the storm sewers/outfalls will not be reused, then the associated manholes, inlets, and river outfalls will be plugged or sealed.

9.2.3.2 Sanitary Sewers

As with the storm sewers, it has not been determined if the existing sanitary lines will be preserved and reused during redevelopment of the Site, or if they will be abandoned or removed. Similar to the storm sewer system, it is anticipated that SBD will evaluate the sanitary sewer lines and make a determination early in the redevelopment process (consistent with the schedule provided in Section 10) regarding which sanitary sewer lines (if any) will be reused. Certain sewer lines may be removed during the course of remedial construction or redevelopment activities. Lines that will not be reused but left in place will be capped or plugged at inlets and where they connect with BSA sewer lines. Lines that will be reused (if any), will be flushed, camera surveyed where accessible/appropriate, and rehabilitated as necessary to prevent groundwater infiltration. Work involving the sanitary sewer lines will be coordinated with the BSA, as appropriate.

9.2.3.3 Contaminant Migration along Sewer Bedding

No evidence to indicate that sewer bedding materials are presently acting as preferential migration pathways for contaminated groundwater was found during the RI process. However, at Area A, because the underground sewer lines that connect to Outfall 006 are below the water table, the final remedy for shallow groundwater (installation of a downgradient hydraulic barrier wall combined with groundwater extraction) will designed to ensure elimination of any potential migration along the Outfall 006 bedding material. If

Outfall 006 is to remain, the hydraulic barrier wall will be sealed to the outside of the pipe to eliminate this potential migration pathway.

On Area E, the results of the soil sampling, groundwater sampling and MIP survey completed during the RI indicate that the chlorobenzene-impacted groundwater at the main AST farm has not migrated along the 36-inch diameter BSA sewer main. This sewer line runs parallel to the southern boundary of the Site, between the Site and the PVS Chemicals property (Figures 3 and 16). While it is expected that the soil and groundwater remediation to be performed at this location will minimize (if not eliminate) the potential for future migration of chlorobenzene-impacted groundwater along the 36-inch BSA sewer, it was agreed during the August 7, 2008 meeting with NYSDEC that a low-permeability collar (most likely a clay or grout collar) would be installed. Details regarding the type and location of the collar will be provided in the Remedial Design. .

9.3 GENERAL REQUIREMENTS

The following subsections describe the additional requirements, including institutional/engineering controls and environmental easements, which must be implemented as part of the preferred remedy for the Site.

9.3.1 Future Use Of Site

Environmental easements/deed notices will be implemented to ensure that the Site can be used only for commercial or industrial purposes (as the terms are defined in 6 NYCRR Part 375-1), unless the Site is subsequently remediated to meet residential use standards. The environmental easements and deed notices will be described in detail as part of the Institutional and Engineering Control Plan (which will be part of the Site Management Plan as noted below in Section 9.3.4)

9.3.2 Groundwater Use

The potable or consumptive use of groundwater (which is prohibited by City of Buffalo ordinance) will be prohibited at the Site through implementation of an environmental easement/deed notice.

9.3.3 Vapor Intrusion

An environmental easement will be implemented to ensure that occupied structures associated with future development at the Site are constructed such that the vapor intrusion (VI) pathway is eliminated. This can be accomplished through construction methods, such as installation of subslab vapor barriers and/or subgrade vapor collection systems (passive or active), or through additional characterization (conducted in accordance with NYSDEC and NYSDOH VI guidance) to ensure that the area over which the structure will reside does not present a potential VI concern.

9.3.4 Site Management Plan

A Site Management Plan must be prepared for the Site, consistent with 6 NYCRR Part 375 and the Guide. The plan will include the following components:

- Introduction, background, and summary of RI results;
- An Institutional and Engineering Control Plan;
- A Soil Fill Management Plan that specifies requirements for excavation/grading activities, stockpiling and soil staging areas, waste characterization sampling, onsite reuse criteria, soil loading and transportation, and requirements for offsite disposal ;
- Health and Safety for construction personnel, including requirements for Site and community air monitoring;
- A Quality Assurance/Quality Control Plan;
- An Operations, Maintenance and Monitoring Plan;
- Notification and reporting requirements; and
- Tables, figures and appendixes, as necessary

The Site Management Plan will be provided as a separate document later in the BCP process, consistent with the project schedule provided in Section 10. As requested by NYSDEC during the August 7, 2008 meeting, a draft Soil Fill Management Plan has been prepared, a copy of which is provided in Appendix B.

An environmental easement will be implemented that requires that any excavation or other disturbance of Site soil meets the requirements of the Site Management Plan.

9.3.5 Confined Aquifer

Based on the previous investigation data and RI data, no further investigation or remediation of the confined aquifer (i.e. the saturated unit present with the “basal” till unit and underlying Onondaga limestone) is required.

9.3.6 Additional Data To Be Obtained

The RI data adequately assesses environmental conditions at the Site. NYSDEC has requested that SBD obtain certain limited additional data. This request will be addressed as part of the remedial design process. The data to be obtained consist of the following:

- Delineation of Area C Chlorobenzene Plume: The well with the highest chlorobenzene concentration on Area C (well RFI-20) is located on the upgradient corner of the Site (Figure 16). NYSDEC has inquired if the chlorobenzene could be associated with conditions at the adjacent Honeywell Buffalo Research Laboratory. That facility conducts annual groundwater monitoring as a condition of its RCRA permit.

MACTEC obtained and reviewed a copy of a recent Groundwater Monitoring Report (Parsons, May 2007) for the laboratory site. Groundwater samples collected on the site, which were analyzed for VOCs in accordance with EPA Method 8260, did not identify detectable concentrations of chlorobenzene. Thus, it is not believed that an off-site release from this location is responsible for the Area C groundwater contamination. As part of the remedial design process, MACTEC will further evaluate the on-Site extent of the Area C chlorobenzene plume. This will include the installation of additional monitoring wells on Area C during predesign studies.

- Delineation of Area E Chlorobenzene Plume: The RI data indicates that the chlorobenzene plume on Area E is limited to the vicinity of the AST farm and has not migrated offsite. To verify this conclusion and to further evaluate the location and extent of the plume, additional monitoring wells will be installed during predesign studies. Additional test borings may also be advanced as part of the pre-design studies for the Area E source area removal, which would provide additional data on the extent of the impacted area.

- Presence of LNAPL at Area E Wells R-14 and ICM-PZ-04S: As described in Section 3.2.3, LNAPL has been identified in well R-14 and piezometer ICM-PZ-04S during 2008 quarterly groundwater monitoring activities. Samples of the LNAPL and groundwater at these two locations were collected by MACTEC for laboratory testing during the Third Quarter 2008 groundwater monitoring event. The analytical results for these samples were not available as of the date of this report and will be provided separately. Additional focused investigation of this area will be completed as part of the remedial design process to evaluate the extent of LNAPL and determine future monitoring and remedial requirements.

- Vapor Intrusion Issues (Area B and 343 Elk Street): As described in Section 3.2.5, Honeywell will attempt to collect additional vapor samples from the 100 Lee Street building, including indoor and outdoor air samples, during the remedial design process to be consistent with NYSDOH guidance. Honeywell will collect similar samples from the former Plant hospital building located on the southeastern corner of Area B. This assumes that access to these two buildings will be granted by the current owner. On Area E, SBD and Honeywell will perform additional evaluation to determine if further vapor intrusion investigation or mitigation is necessary for the 343 Elk Street property. This also assumes that access to this building will be granted by the current owner.

- PCB Soil Sampling – Area A: Two surface soil samples will be collected adjacent to the electrical buildings present on Area A for PCB laboratory analysis, in accordance with the original RI Work Plan. These samples inadvertently were not collected during the RI sampling efforts.

- Groundwater Contours for Confined Aquifer – Area E: As depicted on Figure 17 and described in the RI, data collected during the RI and during the prior RFI study indicates that a high point exists for the Confined Aquifer potentiometric surface at or near well R-07. Potential reasons for this condition include a natural anomaly, surveying error (i.e., incorrect top-of-casing elevation) or man-made conditions such as a compromised well seal. This issue will be further evaluated as part of future groundwater monitoring activities.

- Former Lagoons and Groundwater Conditions on Southeastern Portion of Area E: As part of future groundwater monitoring efforts, it was agreed that MACTEC will work with NYSDEC to identify existing monitoring wells for inclusion in the monitoring program that can be used to evaluate groundwater quality downgradient of the former Area E wastewater lagoons and where the RFI (Golder, 1997) identified aniline in groundwater. It is anticipated that monitoring wells R-08, R-09, R-11, R-13, and R-14, along with other wells as appropriate, will be included in the groundwater monitoring program for this area.

- Other Potential Source Areas: The analytical results for subsurface soil samples collected at certain RI boring locations on Areas B, C and E contained concentrations of some constituents above the

Commercial SCOs. Examples of these sample locations include Area B soil boring TB-B09 (834 mg/kg arsenic), Area C boring TB-C12 (60.2 mg/kg mercury), and Area E boring TB-E16 (470 mg/kg chlorobenzene, total SVOCs > 10,000 mg/kg). Although the RI groundwater data indicate that these substances are not present in the Site groundwater at levels of concern, NYSDEC has requested that further investigation of such sample locations be completed to determine if they represent threats to the shallow groundwater at the Site that will not be controlled via implementation of the remedy currently proposed in the AAR.

To comply with NYSDEC's request, a new round of groundwater monitoring will be completed at Areas B, C and E during the pre-design environmental studies. The groundwater monitoring program will include "shallow" monitoring wells on Areas B, C and E that were previously sampled during the RI. The list will be expanded to include the "PS"-series piezometers screened within the fill/upper water table, the new monitoring wells to be installed on Areas C and E for further delineation of the chlorobenzene plumes, and the "R" series monitoring wells on the southeastern side of Area E (as specified above). In addition, water table monitoring wells will be installed to further investigate soil samples from 4 test borings (TB-C12, TB-E15, TB-E16, and TB-E30) that NYSDEC identified as requiring further study to determine whether or not they would be considered Source Areas as defined by Part 375-1.2. The groundwater sampling and analytical methods used will be the same as those used during the prior RI sampling event, with some modifications made as appropriate to focus on specific COCs. If available, the logs of all PS wells will be submitted to NYSDEC. The complete list of wells/piezometers at Areas B, C, and E from which groundwater samples will be collected during the pre-design groundwater monitoring event is as follows:

- Area B: RFI-18, RFI-27, RFI-28, RFI-30, RFI-35, RFI-45, PS-07, PS-08, and PS-9
- Area C: RFI-20, RFI-31, PS-04, PS-05, PS-6, plus three new monitoring wells to further delineate the chlorobenzene plume (one of these new wells will be located approximately 100 ft. downgradient of boring TB-C12).
- Area E: RFI-17, RFI-29, RFI-32, RFI-33, RFI-36, RFI-39, RFI-42, RFI-43, RFI-51, RFI-PZ-17, RFI-PZ-18, RFI-PZ-19, PS-01, PS-02, PS-03, PS-10, PS-11, PS-12, PS-13, R-08, R-09, R-11, R-13, R-14; three new monitoring wells installed to further delineate the Area E chlorobenzene plume; and one well downgradient of test borings TB-E15, TB-E16, and TB-E30 (one well can adequately investigate all three of these borings).

- If laboratory results from the groundwater sampling described in this section are clearly indicative of (1) concentrated solid or semi-solid substances; (2) non-aqueous phase liquids; or (3) grossly contaminated media in accordance with Part 375-1.2, then additional investigation or remediation may be proposed.

9.4 CONTINGENCY PLAN

During the course of remedial design and construction, it may be appropriate for SBD to consider alternative or additional measures to facilitate remediation of the Site consistent with the Preferred Remedial Alternative set forth herein. Those measures which SBD may, at its discretion, consider include:

- Stabilization/Grouting: During source removal work, grouting or stabilization methods may be appropriate under certain circumstances, such as to eliminate preferential migration pathways along bedding materials of underground utility lines exposed within the excavation or around building foundations that cannot be removed.
- On-Site Treatment of Soil: During remediation or construction activities, on-Site treatment of excavated soils may be appropriate to reduce concentrations of metals or organic compounds prior

to off-Site disposal. Measures may include mixing or blending of additives to stabilize metals or biodegrade organic materials.

- Use of Sewer Infrastructure: It may be appropriate to utilize sections of existing sewer lines as conveyance structures for groundwater extraction piping on Area A (as part of the groundwater collection system to be used in conjunction with the hydraulic barrier wall) or as collection points for groundwater at other locations, if appropriate.

Prior to implementation of any of the above listed contingency items, a Work Plan will be prepared that details the scope and schedule for the proposed activities. The Work Plan will be submitted to NYSDEC for review and approval.

APPENDIX B

KEY PROJECT CONTACTS

APPENDIX B - KEY PROJECT CONTACTS

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APPENDIX C

QUALITY ASSURANCE PROJECT PLAN

APPENDIX C - QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance/quality control (QA/QC) procedures will be utilized throughout the project as described in the following sections. The project QA/QC protocol will be consistent with NYSDEC's Draft Technical Guidance for Site Investigation and Remediation (DER-10, December 2002).

C.1 LABORATORY ANALYSES

The primary goal of this section is to provide a description of the laboratory analytical program and the analytical methods used to analyze soil and water samples collected during field investigation activities. The majority of the analytical data will be generated using USEPA analytical procedures. Analyses will be completed using USEPA SW-846 methods (USEPA, 1996). Samples will be analyzed by a subcontract laboratory with NYSDOH ELAP Certification.

At this time, the analytical laboratory has not been selected for the PDI activities. Laboratory information and contacts will be included provided to NYSDEC when a laboratory is selected.

Analytical methods are summarized below and information regarding analytical requirements is provided on the included tables:

- Volatile Organic Compounds (VOCs) by Method 8260B
- Semivolatile Organic Compounds (SVOCs) by Method 8270C
- Polychlorinated biphenyls (PCBs) by Method 8082
- Metals by Methods 6010B including mercury by Methods 7470A and 7471A
- Cyanide by Method 9012A
- Alcohols by Method 8015
- Hydrocarbons (diesel fuel compounds) by methods specified in the STARS #1 Memo
- Other inorganics in groundwater by various EPA Methods
- VOCs by EPA Method TO-15 (soil gas/air samples only)

The laboratory testing will be performed in accordance with procedures specified in the NYSDEC Analytical Services Protocol (ASP) [NYSDEC, 2000] and the published EPA SW-846 methods.

C.2 RECORDKEEPING

Notes regarding field activities, observations, and measurements will be documented in ink in a bound project logbook. Information to be recorded will include the following:

- The names of personnel on site and their organizations
- A time log that records the events that occur during each day on site
- A list of equipment used
- A description of sampling methods and procedures
- Sample types, locations, collection times and required laboratory analyses
- Weather conditions
- Instrument calibration results
- Water levels
- Well purging data
- Other information as necessary

C.3 EQUIPMENT DECONTAMINATION

In order to minimize the potential for cross contamination during sampling, disposable sampling equipment will be used when possible. Decontamination of non-disposable equipment will be performed prior to use at a new location or for sample collection. Decontamination of non-disposable sampling equipment will include a soap/water wash, potable water rinse, distilled water rinse, and wipe-drying with a clean cloth or air drying. During groundwater sampling, new pump tubing will be used at each well location. The submersible pump, if used, will be cleaned with a soap/water wash and distilled water rinse prior to purging/sampling each well.

C.4 QUALITY CONTROL SAMPLES

Quality control samples will be collected and analyzed as follows:

- An aqueous trip blank prepared by the laboratory will accompany each sample shipment. The trip blanks will be analyzed for the same VOC parameters as the soil and groundwater samples.

- Aqueous field blank samples will be collected during the soil and groundwater sampling events. One aqueous field blank will be collected during the PDI soil sampling and one aqueous field blank will be collected for each groundwater monitoring event. The field blanks will be collected by pouring analyte-free water (provided by the laboratory) over the sampling equipment and

containerizing the rinsate in the appropriate laboratory bottles. The field blanks will be analyzed for the same parameters as the soil and groundwater samples.

- One duplicate groundwater sample will be collected from a specific monitoring well during each groundwater sampling event. The duplicate will be collected at the same time, using the same procedures, and analyzed for the same parameters as the original groundwater sample.

- A matrix spike/matrix spike duplicate (MS/MSD) sample will be collected from a specific well during each groundwater monitoring event. MS/MSDs are known amounts of specific chemical constituents added by the laboratory to selected samples to evaluate the effect of the sample matrix on the preparation and analytical procedures. Matrix spikes are performed in duplicate and are referred to as MS/MSDs.

- One blank sample will be collected for analysis by EPA Method TO-15 during each sub-slab vapor and indoor/outdoor air sampling event completed.

C.5 DATA REVIEW AND VALIDATION

Category B deliverables as defined in the NYSDEC ASP will be reported for all samples collected during remedial investigation activities. Analytical data will be validated by a MACTEC project chemist in accordance with NYSDEC Data Usability Summary Report (DUSR) guidelines (NYSDEC, 2002) and Honeywell Remediation program data validation procedures. Validation will be completed prior to use as final data in investigation reports. Three levels of validation are established for Honeywell projects. A data validation scope will be selected for each sample set based on the data quality goals and needs of that task.

C.5.1 Project Accuracy and Precision Goals

Accuracy and precision limits have been identified for the analytical quality control measurements that will be performed in association with the collection and analysis of field samples. A summary of project limits are summarized on the included tables. These limits were determined based on USEPA Region 2 data validation guidelines and the professional judgment of the project QAO. They represent QA/QC goals for the project to ensure that data meet a minimum quality standard for evaluation of site contamination and data use in remedial investigation reports. These limits will be used to review and evaluate data quality and data usability during data validation.

C.5.2 Data Validation Levels

Data validation will be completed for all remedial investigation samples and the data validation observations and actions will be summarized in a DUSR. Three general levels of data validation are described for data collected under the Honeywell Remediation Program. Validation Levels II, III, and IV have been established to provide standards for analytical data review and to allow projects to determine validation procedures that are appropriate for the data quality goals for each investigation task. Level II validation includes a review of basic QA/QC procedures and measurements that are associated with environmental laboratory analyses, and it represents a generic minimum review of data quality. Level II and Level IV are completed for investigation data that need more intensive validation to support additional data quality objectives or regulatory guidelines and to provide calculation and transcription. Remedial investigation samples will have Level II validation with 10 percent Level IV.

Level II includes the following data checks and evaluations:

- A review of the data set narrative to identify and issues that the lab reported in the data deliverable;
- A check of sample integrity (sample collection, preservation, and holding times);
- An evaluation of basic QC measurements used to assess the accuracy and precision of data including QC blanks, laboratory control samples (LCS), matrix spikes/matrix spike duplicates (MS/MSD), surrogate recovery when applicable, and field or lab duplicate results; and,
- A review of sample results, target compounds, and detection limits to verify that project analytical requirements are met.

Level III would include all of Level II plus some additional method-specific QC checks including instrument calibration, internal standard response for gas chromatography/mass spectrometry (GC/MS), and interference checks and serial dilutions data for inorganics.

Level IV would include all Level II and Level III checks with additional calculation and raw data checks to verify that no reporting errors have occurred. Data validation actions will be based on general USEPA National guidance documents (USEPA; 1999; USEPA, 2004) and the professional judgment of the project chemist and QAO.

MACTEC may use the EIM system to complete a computerized Level II validation of each data package to check that the project quality control requirements. Data qualifiers will be applied to results that do not meet project goals. EIM will produce a summary of data validation actions for each sample set. The summaries will be reviewed and approved by the project chemist prior to finalization of the validated data. The data will be evaluated/qualified based on the following parameters (if available/applicable) and specified criteria:

A DUSR will be prepared for data sets reported from each distinct sample collection effort. The validation report will include a summary of analytical methods performed, listings of samples included in the review, and summaries of data validation actions or observations.