FOCUSED FEASIBILITY STUDY REPORT

VILLAGE OF ENDICOTT / TOWN OF UNION
BROOME COUNTY, NEW YORK

Order on Consent Index #A7-0502-0104
Site #704014
Operable Unit #1: Railroad Corridor Source Area
Operable Unit #2: North Street Area

Prepared for:

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December 27, 2018

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Village of Endicott / Town of Union
Broome County, New York

Appendix C, Description of Operable Units
of Order on Consent Index #A7-0502-0104
Site #704014

December 27, 2018

I certify that I have reviewed the document entitled *"Focused Feasibility Study Report for Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area"* for the former IBM Endicott Facility in the Village of Endicott / Town of Union, Broome County, New York, prepared pursuant to Appendix C of Order on Consent Index #A7-0502-0104, Site #704014. This report is dated December 27, 2018 and was prepared by Groundwater Sciences Corporation (GSC) and Groundwater Sciences, P.C. (GSPC) for IBM Corporation. I certify that I have reviewed all figures, plates, and appendices relating to the focused feasibility study of Operable Units #1 and #2. To the best of my knowledge, all such engineering-related information contained in this report is complete and accurate.

I certify that all portions of this report relating to the focused feasibility study of Operable Units #1 and #2 have been prepared in accordance with good engineering practices and all such work has been performed under my direct supervision.

No alterations to the engineering-related information contained in this report may be made unless made in accordance with Title 8, Article 145, Section 7209 of New York State Education Law.

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Professional Geologist Certification
Focused Feasibility Study Report for Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area

Village of Endicott / Town of Union
Broome County, New York

Appendix C, Description of Operable Units
of Order on Consent Index #A7-0502-0104
Site #704014

December 27, 2018

As the person with primary responsibility for the performance of the geological services and activities associated with the captioned report, I certify that I have reviewed the document entitled *"Focused Feasibility Study Report for Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area"* for the former IBM Endicott Facility in the Village of Endicott / Town of Union, Broome County, New York, prepared pursuant to Appendix C of Order on Consent Index #A7-0502-0104, Site #704014. This report is dated December 27, 2018 and was prepared by Groundwater Sciences Corporation (GSC) and Groundwater Sciences, P.C. (GSPC) for IBM Corporation.

I certify that the associated geological services and this report have been prepared under my direct supervision. To the best of my knowledge, all such information contained in this report is complete and accurate.

This report bears the seal of a professional geologist. No alterations may be made to the information contained in this report unless made in accordance with Title 8, Article 145, Section 7209 of New York State Education Law.

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Table of Contents

Tables

Figures

Plates

Appendices

1 INTRODUCTION

This report presents the findings of a Focused Feasibility Study (FFS) for Operable Unit #1: Railroad Corridor Source Area (OU#1), and Operable Unit #2: North Street Area (OU#2), located at the former IBM Endicott Site in the Village of Endicott, Town of Union, Broome County, New York (Site). This FFS report has been prepared by Groundwater Sciences, P.C. (GSPC) and Groundwater Sciences Corporation (GSC) at the request of International Business Machines Corporation (IBM), pursuant to Order on Consent Index #A7-0502-0104 (Order), Site #704014 between the New York State Department of Environmental Conservation (NYSDEC or Department) and IBM, executed on August 4, 2004. This report satisfies requirements for an FFS detailed in the following section of the Order:

> Appendix "C," Description of Operable Units, Operable Unit #1: Railroad Corridor Source Area, and Operable Unit #2: North Street Area.

Preliminary screening of candidate remedial technologies for OU#1 and OU#2 was completed in accordance with the Department-approved OU#1 Supplemental Remedial Investigation (SRI)/FFS Work Plan (OU#1 Work Plan), dated March 1, 2005, and the Department-approved OU#2 SRI/FFS Work Plan (OU#2 Work Plan), dated March 10, 2005. Following approval of these two work plans, the SRI and the FFS activities for OU#1 and OU#2 were combined, with NYSDEC approval, after it was determined that historical information, hydrogeologic data, and environmental data in each of these OUs are pertinent to the other OU with regard to understanding the nature and extent of contamination; understanding contaminant fate and transport mechanisms; screening of candidate technologies; and development, screening, and selection of remedial alternatives.

Results of the combined SRI for OU#1 and OU#2 were included in a report prepared by GSC on behalf of IBM and entitled "Supplemental Remedial Investigation Report, Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area, dated August 28, 2009. This combined SRI report was approved by NYSDEC and the New York State Department of

Health (NYSDOH) (hereinafter collectively referred to as “the Agencies”) on April 12, 2010. Results of preliminary screening of candidate remedial technologies were summarized in an October 15, 2008 technical memorandum[1], approved by the Agencies on August 18, 2009.

1.1 Purpose and Objectives

This report is intended to present the findings and conclusions of a focused feasibility study for OUs #1 and #2 completed in accordance with 6 NYCRR Part 375 – Inactive Hazardous Waste Disposal Sites and applicable NYSDEC guidance[2,3]. The overall intent of the FFS is to propose a remedy to address the remaining presence of volatile organic compounds (VOCs) in soil and groundwater in OUs #1 and #2 after nearly four decades of remedial investigations and interim remedial measures. Specific objectives of this report are to:

- Provide an overview summary of Site conditions and remedial progress in OUs #1 and #2;
- Identify the Remedial Action Objectives (RAOs) that apply to OUs #1 and #2 based on promulgated standards and criteria that are directly applicable or that are relevant and appropriate to the Site conditions in OUs #1 and #2.
- Document the findings of the remedy selection process; and
- Provide a description and justification for the proposed remedy.

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[1] Groundwater Sciences, P.C. and Groundwater Sciences Corporation, October 15, 2008, *Technical Memorandum to Mitch Meyers of IBM, Subject: Preliminary Screening of Candidate Technologies for Source Remediation and/or Flux Control, OU#1 and OU#2, Former IBM Endicott Site, New York.*

[2] New York State Department of Environmental Conservation, May 15, 1990, Selection of Remedial Actions At inactive Hazardous Waste Site, Technical and Administrative Guidance Memorandum (TAGM) 4030.

[3] New York State Department of Environmental Conservation, May 2010, DER-10, Technical Guidance for Site Investigation and Remediation.

1.2 Organization of Report

The remainder of this report is organized in eight additional sections as follows. Section 2 presents pertinent background information and Section 3 provides a summary of the findings of remedial investigations in OUs #1 and #2. Section 4 provides an overview of remedial progress achieved by interim remedial measures, a conceptual Site model based on the remedial progress, and a qualitative human health exposure assessment based on current Site conditions. Section 5 identifies applicable remedial goals and remedial action objectives. Section 6 presents the results of the screening of various remedial technologies for their apparent effectiveness and implementability. Section 7 summarizes the results of development, screening, and analysis of remedial alternatives. Section 8 provides a description and justification for the remedial alternative selected as the proposed remedy. A list of references is presented in Section 9.

2 BACKGROUND

This section provides a summary of pertinent OU#1 and OU#2 background information, including the physical setting of the Site and OUs #1 and #2; an overview of historical ownership and operations; and a summary listing of previous investigations and corrective actions. Much of this information and data is described in more detail within the combined SRI report for OUs #1 and #2 and in annual groundwater monitoring status reports.

2.1 Site Setting

The former IBM Endicott Site is located principally in the central and eastern portions of the Village of Endicott and in the western portion of the Town of Union, Broome County, New York. **Figure 2-1** shows the approximate location of the former IBM Endicott Site on a portion of the Endicott, NY and Maine, NY 7.5-minute United States Geologic Survey topographic quadrangle maps. The former IBM Endicott Site consists of approximately 135 acres that were conveyed by IBM to Huron Real Estate Associates, LLC (Huron) in November 2002. An aerial photographic base map with yellow shading that depicts the parcels that comprise the 135-acre Site is provided as **Figure 2-2**. As shown on **Figure 2-3**, OUs #1 and #2 are located in the central portion of the Site, with OU#1 comprising about 40 acres and OU#2 comprising about 30 acres.

An aerial photographic base map showing the OU#1 and OU#2 portion of the Site and surrounding region is provided as **Figure 2-4**. As shown on this aerial photographic map, OUs #1 and #2 primarily consist of manufacturing buildings and asphalt-paved parking or roadway areas. Lawn areas are generally limited to the southern portion of OU#2 adjacent to buildings that front on North Street and the northern portion of OU#1 in the area of Watson Boulevard. OU#1 and OU#2 are separated by Norfolk Southern railroad tracks (the "Railroad Corridor") and the central portion of each OU is bisected by McKinley Avenue.

The portion of the former IBM Endicott Site that encompasses OUs #1 and #2 is currently zoned industrial. The Site is owned by Huron, a real estate leasing and property management company. Huron leases manufacturing and office space at the Site to a variety of tenants. The type of manufacturing activities in OUs #1 and #2 is dependent on the tenants and is subject to change over time. Many of the buildings in OUs #1 and #2 are currently occupied. An exception is the large building complex, currently abandoned, and located east of McKinley Avenue, north of North Street, and South of the railroad tracks. For the purposes of this report, this building complex is referred to as the "Old Group Buildings".

Areas abutting OUs #1 and #2 to the north are zoned residential, to the south are zoned commercial and multifamily, and to the east and west are zoned industrial. As shown on **Figure 2-4**, the OU#1 portion of the Site is surrounded by Watson Boulevard and residential/commercial properties to the North, Oak Hill Avenue and Huron manufacturing and parking lot facilities to the west, Huron parking lot facilities to the east, and the Norfolk Southern railroad tracks to the south. The OU#2 portion of the Site is surrounded by the Norfolk Southern railroad tracks to the north, Oak Hill Avenue and commercial properties to the west, the former Endicott Forging facility to the east, and Huron parking lot facilities, municipal parking lot facilities, and multiuse or commercial properties to the south.

2.2 Historical Ownership and Operations

The OU#1 and OU#2 portion of the Site was first developed by the Erie-Lackawanna Railroad around 1850 with the remaining area apparently consisting of rural farmland. Additional development occurred in the early 1900s by predecessors to the Endicott-Johnson Corporation (EJ), and by the predecessors to the IBM Corporation. A review of chain-of-title information for parcels within OUs #1 and #2 indicates a complex history of acquisition and sales during the roughly 65 years of EJ predecessor/EJ ownership and roughly 100 years of IBM predecessor/IBM ownership. A detailed summary of property ownership history for the primary businesses within OUs #1 and #2 is provided in a report prepared by GSC on behalf of IBM and entitled *Final Pre-Characterization Technical Memorandum, Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area*, dated July 14, 2006 (PCTM report).

A brief overview of the types of historical Site operations within OUs #1 and #2 is provided below:

- **Railroads** - Property use on the railroad properties in OUs #1 and #2 over the past century primarily consisted of loading/unloading operations adjacent to EJ and IBM buildings, storage of materials such as coal and lumber, and operation of a railyard with a turntable switching operation. Other possible operations within the railyard could have included refueling and maintenance.

- **Endicott-Johnson** - The Endicott-Johnson Company shoe works in Endicott was a thoroughly vertically-integrated business. Based on a review of publicly available EJ-related documents, hides reportedly arrived by the railcar load, were tanned, fashioned into shoes, orders were taken in the sales building, and finished product was shipped to customers from the facility (in boxes manufactured on-Site by the Endicott Lumber & Box Company). There was even a small foundry that made the iron work tables used in the shoe manufacturing factories, and a chemical plant that manufactured the rubber cement used in shoe manufacturing. Solvents reportedly used by EJ as a part of its operations included carbon tetrachloride, trichloroethene (TCE), tetrachloroethene (PCE), 1,1,1-trichloroethane (TCA), methylene chloride, methyl ethyl ketone, toluene, xylene, and mixtures containing aromatics (gasoline, rubber solvent and mineral spirits). EJ operations were located in the portions of OU#1 and OU#2 that are west of McKinley Avenue.

- **IBM and Predecessors** - IBM predecessor and IBM historical operations can be divided into three general periods of manufacturing. The earliest period of operations at the facility consisted of mechanical business machine manufacturing from the 1900s to the 1950's. During World War II, this type of production was apparently shifted temporarily to include military hardware, and the facility received a citation for its contribution to the war effort. From the 1950s to the early 1980s, the facility was engaged primarily in the manufacture of mid-range, mainframe computers. In the early 1980s, operations at the facility primarily shifted to the manufacture of components (circuit cards, circuit panels, and ceramic substrates) in support of other IBM electronics manufacturing activities. The primary solvents used by IBM as part of its mainframe computer and electronic component manufacturing operations include TCE, PCE, TCA, methylene chloride, and Freon 113.

- **Other Property Use History** - On the basis of a review of property ownership records, fire insurance maps, and city directories, other historical operations of interest identified in the areas of OUs#1 and #2 included: vehicle fueling, service, and repair facilities; dry cleaners; paint, photo, and/or print shops; and metal working and manufacturing facilities.

2.3 Previous Investigations and Corrective Actions

On December 14, 1979, IBM determined that a release of approximately 4,200 gallons of methyl chloroform (also referred to as MCF, 1,1,1-trichloroethane, or TCA) had occurred below the ground surface as a result of a leak from a corroded buried pipeline located adjacent to Building 94 (former building in the area of Building 264/268 as shown on **Figure 2-5**), near the northeast corner of Building 18. Upon the discovery of the TCA release, IBM notified NYSDEC and took immediate action to recover the released solvent as quickly as possible, including excavation and removal of contaminated soil down to the water table and product (solvent) recovery from within areas of the excavation. The majority of the soil excavation was completed by the end of January 1980. Groundwater extraction and product recovery from the excavation (Sump-2) and one well (EN-4) began in January 1980. Approximate locations of the soil excavation, Sump-2, Building 94, and well EN-4 are shown on **Figure 2-5**. Photographs taken at the time of the soil excavation are provided in **Appendix A.**

Between January and April 1980, IBM initiated an "emergency spill phase investigation" to locate the contaminant plume from the TCA spill, estimate the approximate limits of the plume and estimate the direction and rate of plume movement. The work identified additional chemicals in the groundwater besides TCA, including TCE, PCE, methylene chloride, Freon 113, and aromatic hydrocarbons. The work also identified an apparent area of recoverable solvent (also referred to as dense non-aqueous phase liquid or DNAPL) that had accumulated on the surface of a lacustrine silt aquitard within an overlying sand & gravel aquifer. This DNAPL accumulation zone was identified in the area between Buildings 18, 41, 45, and 48 in reports by Dames & Moore, dated June 1980 and December 1980. The inferred extent of former DNAPL presence as depicted on a figure in the December 1980 Dames & Moore report is shown on **Figure 2-5**.

In February 1980, groundwater extraction and DNAPL recovery activities began at well EN-25 located north of the railroad tracks between Building 45 and Building 48. In March and April 1980, groundwater extraction and DNAPL recovery operations began at four additional wells located south of the railroad tracks (EN-7, EN-8, EN-9, and EN-11). The work also included laboratory leaching experiments to assess the feasibility of flushing TCA from soil to enhance product recovery efforts. The investigations and corrective action were performed under the oversight of NYSDEC's Division of Water (DOW). The locations of former extraction wells EN-7, EN-8, EN-9, EN-11, and EN-25 are also shown on **Figure 2-5**.

Since the initial investigation and cleanup activities in 1980, the OU#1 and OU#2 portion of the Site has been the subject of numerous additional investigations and remedial activities focused on source reduction, hydraulic containment, and chemical flux control. The investigation and remedial activities have included numerous soil borings, groundwater monitoring well installations, and groundwater recovery (extraction) well installations. As shown on the well location map provided as **Figure 2-6**, more than 100 monitoring and extraction wells have been installed within the limits of OUs #1 and #2. Some of the investigations and corrective actions or remedial measures have included, but are not limited to:

- Supplemental hydrogeologic investigations to further refine the understanding of apparent VOC source areas and VOC groundwater plume areas proximate to the railroad corridor and areas downgradient within OU#2;

- Assessments of the feasibility of soil vapor extraction and air sparging as remedial alternatives to supplement or replace soil excavation and groundwater extraction as remedial measures in portions of OU#1 and/or OU#2;

- Evaluation of the potential impact that man-made structures in OU#1 and OU#2 could have on vertical and lateral contaminant migration;

- Hydrogeologic investigations of the bedrock groundwater plume beneath portions of OU#1 and OU#2;

- Completion of a supplemental groundwater assessment (SGA) and an evaluation of existing corrective measures systems to identify additional corrective actions that could be taken at the Site to accelerate cleanup;

- Modifications and/or enhancements to groundwater recovery operations in the railroad corridor via the installation of additional extraction wells and replacement extraction wells;

- Enhancement to groundwater source control in the area of the railroad corridor by the implementation of vacuum-assist groundwater extraction;

- Enhancement of groundwater flux control in the area of North Street by improvements in the operation of extraction well EN-276, the addition of groundwater extraction well EN-276R near well EN-276, and the addition of vacuum-assist groundwater extraction well EN-284P in the area south of North Street;

- Evaluation of enhanced flux control in the western portion of OU#2 including an assessment for a potential source or sources of the limited VOC presence in groundwater in the western portion of OU#2;

- Pilot testing of clean water injection to enhance reduction in VOC mass from the saturated zone in the northern portion of OU#2, near Building 18 and near the inferred southern extent of former DNAPL presence;

- Multi-phase sampling and removal of sediment from “deep” storm sewer pipelines and manholes near Buildings 18, 41, 46, and 48; and

- Assessment of the vapor intrusion pathway for certain Site buildings and the installation of sub-slab depressurization systems for buildings where vapor intrusion is a potential concern.

3 FINDINGS OF REMEDIAL INVESTIGATIONS

This section provides a summary of the findings of nearly forty years of remedial investigations that are pertinent to the screening of remedial technologies, development and screening of remedial alternatives, and selection of a proposed remedy to address the presence of VOCs in soil and groundwater in OUs #1 and #2.

3.1 Site Geology

The geologic profile in OUs #1 and #2 consists of a vertical-downward sequence of soil fill, late-glacial and post-glacial alluvium, glaciofluvial outwash sand or sand & gravel, glaciolacustrine silt & clay, glacial till; and bedrock. The sequence and contact relationships of the different overburden Site strata reflect a complex history of deposition by ice- and water-dominated processes during glaciation and deglaciation, followed by reworking of glacial deposits by post-glacial streams and erosion.

3.1.1 Soil Profile in OUs #1 and #2

A north-south oriented geologic cross-section that extends through the central portions of OUs #1 and #2 is shown on Plate 3-1. Descriptions of the characteristics and extent of the different soil strata overlying bedrock beneath OUs #1 and #2 are provided below.

- **Soil Fill** - Soil fill is present throughout this area of the Site. In general, the fill appears to consist primarily of reworked sand, sand and gravel or glacial till soils with variable amounts of miscellaneous fill materials such as brick, concrete, wood, coal, cinders, ash, metal, and glass. These miscellaneous materials have been encountered in the fill throughout the Site. The presence of these miscellaneous fill materials is consistent with the complex history of demolition and development by EJ, IBM, and their predecessors. The presence of wood in fill within OU#1 could also be related to former lumber yard activities. The presence of coal is consistent with former coal storage activities in former railyard areas and EJ properties during the 1900s. The presence of cinders and ash is consistent with materials that would typically be used as fill during the earlier stages of Site development. The thickness of soil fill varies from about one foot to nearly twenty feet across the Site. In general, the fill is thicker in areas adjacent to the current manufacturing buildings.

- **Late-Glacial and Post-Glacial Alluvium** - Late-glacial and post-glacial alluvial sediments have been identified beneath soil fill over a large portion of OU#1 and in a few locations adjacent to the railroad corridor in the northern portion of OU#2. These stream and floodplain deposits can generally be subdivided into the following three general soil types:

  - Stiff to very stiff, silt & clay;
  - Medium dense to dense, moderate to well-sorted and stratified, fine sand, silt, and/or clay interbedded with lesser amounts of sand & gravel;
  - Medium dense to dense, poorly to well-sorted sand & gravel with little to trace amounts of silt & clay.

  The first two soil types have been grouped into a fine-grained facies that also includes a localized presence of organic silt or fine-grained peat (swamp deposits). The third soil type is considered to be a coarse-grained facies. Where present, the thickness of these soils typically varies from a few feet to about 10 feet. In portions of OU#1, some of these sediments appear to have been excavated during construction of large manufacturing buildings.

- **Glaciofluvial Outwash Sand & Gravel** - Outwash sand & gravel is present throughout OU#2 and the southern two-thirds of OU#1. This stratum consists of medium dense to very dense, poorly-sorted to well-sorted and stratified, fine sand, fine to medium sand or fine to coarse sand with lesser amounts of gravel. Silty fine sand or fine sand & silt are also present in some locations. The thickness of this stratum in OUs #1 and #2 is generally about 5 to 20 feet with the thinnest areas corresponding to areas of thick soil fill. Where downwarped or collapsed in ice-block depressions, the thickness of this stratum is typically about 25 to 50 feet thick. To the extent that it is saturated (i.e., below the water table), this outwash unit constitutes the Upper Aquifer, which is an unconfined, water table aquifer.

- **Glaciolacustrine Silt & Clay** - This stratum consists of fine-grained glacial lake-bottom deposits, typically varved silt with pink clay seams, but locally grading to silty fine sand. The thickness of this stratum is typically about 30 to 50 feet. This stratum pinches out in the northern portion of OU#1. The top of this unit generally defines the bottom of the Upper Aquifer. Where the lacustrine deposits are absent, the bottom of the Upper Aquifer rests on glacial till. Where the lacustrine deposits are present, they form an effective aquitard between the overlying Upper Aquifer and the underlying glacial till and bedrock.

- **Glacial Till** - This stratum consists of a very dense to dense, poorly-sorted heterogeneous mixture of clay, silt, sand, and gravel. The thickness encountered for this stratum generally ranges from a few feet to about 30 feet. Some post-glacial colluvium derived from reworking (erosion) of the glacial till may be present in the northern portion of OU#1 which corresponds to the northern margin of the valley.

3.1.2 Surficial Geologic Mapping

A surficial geologic map depicting the limits of the different soil types underlying soil fill is provided as **Figure 3-1**. The map shows soil strata located beneath soil fill in the area of OU#1 primarily consists of either glacial till (shown in purple), the fine-grained facies of alluvial soils (shown in light green), the coarse-grained facies of alluvial soils (shown in dark green), or outwash sand & gravel (shown in yellow); whereas in OU#2, the soil strata beneath soil fill primarily consists of outwash sand & gravel. The approximate lateral extent of the alluvial soils is also shown on the geologic cross-section (**Plate 3-1**). The approximate northern limits of the lacustrine silt and the approximate limits of silt in the area of an ice-block depression at well EN-284 are also shown on the map as a dashed orange line.

Overall, the map depicted on **Figure 3-1** indicates fine-grained soils that could have higher moisture content, inhibit storm water infiltration, and inhibit vertical advective and diffusive transport of contaminants are present in broad areas in the southern and central portions of OU#1. However, in areas where buildings are present, some of these fine-grained soils may have been excavated or penetrated by foundation structures such as footings and pilings.

3.1.3 Top of Lacustrine Unit

The top of the lacustrine silt unit defines the bottom of the Upper Aquifer, and the configuration of this surface is important in determining the geometry of the Upper Aquifer. The topographic surface elevation contours and the approximate limits of the lacustrine silt in the area of OUs #1 and #2 are shown on **Figure 3-2**. As depicted on **Figure 3-2**, the surface elevation of the lacustrine silt across much of OU#1 is typically between 815 and 825 feet amsl, while the silt surface elevation across much of OU#2 is typically between 825 and 830 feet amsl. Localized depressions or troughs in the lacustrine silt surface have been identified in both OUs and are inferred to be ice-block depressions or “kettle holes”. Areas where these ice-block depressions have been identified include:

- Beneath the northern portion of Building 47 in OU#1, as defined by an 805 feet amsl elevation contour;
- In the area of extraction well EN-219R in OU#1, as defined by an 820 feet amsl elevation contour;
- In the area of extraction well EN-114T in OU#1, as defined by an 815 feet amsl elevation contour;

- In the area of extraction well EN-276 in OU#2, as defined by an 825 feet amsl elevation contour with the deepest portion of this feature (<800 feet amsl) located west of EN-276, beneath Building 14; and
- In the area of extraction well EN-284P south of OU#2, as defined by an 810 feet amsl elevation contour at the approximate limits of the lacustrine silt.

3.2 Site Hydrogeology

This section presents a discussion of Site-specific hydrogeology for the Upper Aquifer and bedrock which are the two principal water-transmitting units within and in the vicinity of OUs #1 and #2.

3.2.1 Upper Aquifer

An Upper Aquifer groundwater elevation contour map based on August 28, 2018 water levels recorded under pumping conditions is provided as **Figure 3-3**. As shown on the figure, groundwater elevations in the area of OUs #1 and #2 generally ranged from about 840 feet amsl in the northeastern portion of OU#1 to about elevation 810 feet amsl in the large ice-block depression south of OU#2. Apparent groundwater flow directions based on contouring the elevation data reveal that groundwater withdrawals have established two general capture zones consisting of: (1) a northern capture zone north and south of the Norfolk Southern railroad tracks that encompasses current extraction wells EN-114T, EN-428, EN-253, and EN-219R (On-Site Capture Zone); and (2) a southern capture zone in the south-central portion of OU#2 and off-Site areas further to the south that encompasses current extraction wells EN-276, EN-276R, and EN-284P. The saturated thickness of the Upper Aquifer over much of OU#1 is on the order of 5 to 10 feet, while saturated thickness over much of OU#2 is less than 5 feet. Areas with the greatest saturated thickness generally correspond to locations of the deepest ice-block depressions in the lacustrine silt surface.

Hydraulic conductivity values calculated for Upper Aquifer sand or sand & gravel soils as part of the SGA ranged from about two feet per day (ft/day) in silty soils to as high as 865 ft/day. The bulk hydraulic conductivity of the Upper Aquifer is estimated to be about 130 ft/day on the basis of SGA pumping tests, pulse tests, and comparisons with previous investigations performed by others. For OU#1, applying a typical range in saturated thickness of 5 to 10 feet with the bulk hydraulic conductivity of 130 ft/day yields transmissivities ranging from about 700 to 1,300 cubic feet per day (ft^2/day). A similar comparison for OU#2 yields transmissivities ranging from about 130 to 650

ft^2/day. Physical laboratory testing of Upper Aquifer materials collected in the area of the off-Site groundwater plume indicate an average porosity of the Upper Aquifer outwash sand & gravel of approximately 0.35. In the southern half of OU#1 and across much of OU#2 lateral hydraulic gradients are generally estimated to be within the range of approximately 0.001 to 0.01 feet per foot.

Assuming a bulk hydraulic conductivity of 130 ft/day, a range in hydraulic gradient of 0.001 to 0.01 ft/ft, and a porosity of 0.35, the horizontal seepage velocity in the Upper Aquifer sand & gravel in the area of OUs #1 and #2 is estimated to be in the range of approximately 0.4 to 3.7 ft/day. Based on this range in seepage velocity, travel times from central portions of OU#1 and OU#2 toward extraction well pumping centers are inferred to range from 2 to 5 months.

3.2.2 Bedrock Groundwater

The understanding of bedrock hydrogeologic conditions in the area of OU#1 and OU#2 is based on a review of historical groundwater remedial action activities performed since the 1980s, including startup of well EN-CAF as a bedrock extraction well, results of additional remedial investigations completed in 2005 to support siting and design of a replacement for the EN-CAF well, and results of installation and testing of the replacement bedrock extraction well (EN-D49) completed as an interim remedial measure in 2006 and 2007. The bedrock groundwater plume is designated in the Order as “OU#6: Plume Control in Bedrock Groundwater.” NYSDEC issued a Record of Decision (ROD) for OU#6 on March 26, 2009 and selected “No Further Action” as the remedy, contingent on continued operation and maintenance of bedrock extraction well EN-D49 and continued monitoring of bedrock groundwater quality.

As shown on the bedrock potentiometric surface contour map for August 28, 2018, provided as **Figure 3-4**, the operation of extraction well EN-D49 creates a substantial zone of capture within the bedrock aquifer at the Site. The operation of well EN-D49 controls the plume of VOCs in bedrock groundwater, with no detections of VOCs greater than 1 μg/L outside the capture zone at bedrock monitoring wells EN-D10, EN-D35, EN-D36, and EN-D48. The highest concentrations of VOCs in the bedrock VOC plume are found at wells EN-D33, EN-D46, and EN-D47, all within the capture zone of extraction well EN-D49.

3.3 Nature and Extent of Contamination

The nature and extent of contamination described in the combined SRI report for OUs#1 and #2 included an identification of Constituents of Potential Concern (COPCs), an overview of fate and transport mechanisms likely to have influenced the distribution of COPCs in OUs#1 and #2, and a review of analytical chemistry data along with historical features of interest identified in a source area evaluation to support identification of apparent source areas. The following subsections provide a summary of the COPCs, fate and transport mechanisms, and apparent source areas described in the SRI report, followed by summaries of VOC analysis results for OU#1 and OU#2 samples of groundwater, soil, and indoor air.

3.3.1 Constituents of Potential Concern

On the basis of nearly forty years of Upper Aquifer groundwater chemistry data associated with monitoring and groundwater extraction and treatment operations, and soil chemistry data associated with numerous remedial Site investigations, the primary VOCs detected in groundwater and soil within OUs #1 and #2 include:

- Chlorinated ethenes: Tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis12DCE), 1,1-dichloroethene (11DCE), and vinyl chloride (VC).

- Chlorinated ethanes: 1,1,1-Trichloroethane (TCA) and its principal transformation products, 1,1-dichloroethane (11DCA), and chloroethane (CEA) (Note: 11DCE is also a transformation product of TCA by the abiotic elimination reaction).

- Methylene chloride (dichloromethane, DCM): This compound is not observed south of North Street as it degrades both aerobically and anaerobically and is rarely transported beyond the immediate vicinity of any particular source zone. Concentrations of DCM declined rapidly during the early 1980s. Since the mid-1980s, DCM has not been detected in most wells located outside of apparent source areas in the vicinity of the railroad corridor.

- Freon 113 and its transformation product Freon 123a: Similar to DCM, these compounds are not significant constituents in groundwater south of North Street.

- Aromatic hydrocarbons: Benzene, toluene, ethylbenzene, and xylenes. These aromatic hydrocarbons are expected to be localized in areas near the railroad corridor. Aromatic hydrocarbons were present in the area of the railroad tracks and the area east of Building 18 in the early 1980s but declined rapidly by the mid-1980s and are now generally not detected in groundwater.

Of the compounds identified above, the current principal COPCs in OUs #1 and #2 include the chlorinated ethenes, chlorinated ethanes, and Freon 113 and its transformation product Freon 123a.

3.3.2 Fate and Transport Mechanisms

Figure 3-5 summarizes the geology, hydrogeology and fate and transport mechanisms that are essential to understanding the pattern of occurrence and concentrations of COPCs in the various environmental media that have been impacted by historical releases in certain portions of OUs #1 and #2. A detailed description of the various fate and transport processes believed relevant in OUs #1 and #2 is provided in the SRI report. The relative importance of these various processes has likely changed since the time of the historical releases. The current nature and extent of VOC presence are a result of a complex interaction between:

- Complex heterogeneous soil conditions consisting of soil fill, variable textured alluvium, and outwash sand or sand & gravel with variable physical properties;
- The presence of four general hydrogeologic zones including the vadose zone, a dewatered zone, an Upper Aquifer saturated zone, and a saturated glaciolacustrine silt aquitard. The dewatered and Upper Aquifer saturated zones vary with changes in seasonal recharge and groundwater extraction operations;
- The residual presence of DNAPL in discrete soil pores in areas of former DNAPL accumulation zones, such as finer-textured strata in the vadose zone, on the former water table, on finer-textured strata within the saturated zone, and on the surface of the lacustrine silt. Dissolution of DNAPL over a period of about four decades or greater has likely resulted in less remaining residual DNAPL in the saturated zone and top of the lacustrine silt compared to potential accumulation zones in the vadose zone;
- Light non-aqueous phase liquid (LNAPL) seepage and accumulation on the former water table;
- Aqueous transport processes such as infiltration, unsaturated flow of gravitational water, dissolution from NAPL, draining in the dewatered zone, recharge at the water table, lateral advection within the saturated zone, vertical advection into the lacustrine silt, and aqueous diffusion into finer-textured soils;
- Vapor-phase transport processes such as volatilization from the water table, evaporation of NAPL in the vadose zone, and upward vapor diffusion in the vadose zone; and
- Fate processes such as partitioning from soil vapor to pore water in the vadose zone; sorption onto the organic carbon fraction of formation solids; sorption-retarded

intragranular diffusion; and various types of degradation resulting in transformation of parent compounds to daughter products.

The diffusion, sorption, and partitioning fate and transport processes listed above are all reversible. After nearly four decades of remediation, the rates of these reversible processes are currently believed to have the greatest influence on the rate of mass removal (source strength reduction) and chemical flux control in OUs #1 and #2. Preferential pathways, such as subsurface utilities, are another potentially important transport mechanism to be considered in OUs #1 and #2. As such, additional screening and development of remedial alternatives should focus on technologies that accelerate diffusion, desorption, and the overall rate of partitioning from the solid phase to the aqueous and/or gaseous phases while maintaining source control.

3.3.3 Apparent Source Areas

A source area evaluation (SAE) was completed as part of the OU#1 and OU#2 SRI. The SAE included a review of historical documents, maps, and prints for EJ and IBM in an effort to identify historical features of interest that could serve as potential sources of the VOC presence detected in groundwater in the area of OUs #1 and #2. Historical features of interest identified by the SAE include historical locations where hazardous substances, hazardous wastes, or petroleum substances were known or are suspected to have been handled, stored, used, generated, treated, and/or released or disposed. Results of the SAE were described in detail in the PCTM report and the OU#1 and OU#2 SRI report.

The findings of the SAE indicated that the primary areas where solvents were stored and handled by EJ and IBM or their predecessors consist of railroad sidings, loading dock areas adjacent to rail sidings, and exterior above ground storage tanks or tank farms adjacent to the railroad tracks and the EJ and IBM manufacturing buildings. Additional solvent usage, handling, and storage occurred within certain manufacturing and storage buildings adjacent to the railroad tracks. Based on a comparison of information regarding historical Site operations, together with hydrogeologic and contaminant distribution data compiled and recorded as part of the SRI, these historical solvent storage and handling areas also appear to be the primary locations where solvents were likely to have been released to the environment.

As described in the OU#1 and OU#2 SRI report, apparent source areas were identified based on the following general criteria:

- Dissolved groundwater concentrations for one or more COPCs normalized to the parent compound (PCE, TCE, TCA, and/or Freon 113) have been observed within the past twenty years to exceed 1 percent of the solubility for the particular constituent or constituents. For this analysis, the solubility values used are: PCE = 240 milligrams per liter (mg/L), TCE = 1,400 mg/L, TCA = 1,250 mg/L, and Freon 113 = 170 mg/L.
- The areal extent and pattern of dissolved VOC mass in Upper Aquifer groundwater for nearly four decades suggests a continuing DNAPL and/or high soil concentration presence centered on a particular portion of the Site.
- Results of the SAE identified one or more historical features of interest where virgin or waste solvents could have been stored, handled, and/or used (potential sources), consistent with the particular constituent or constituents meeting the two criteria listed above.

On the basis of the above-mentioned criteria, the primary apparent source areas identified in OUs #1 and #2 include:

- The area of the former TCA subsurface pipeline break (December 1979 spill) northeast of Building 18 where DNAPL was historically recovered (for the purposes of this report, this apparent source area is located within an area referred to as the “Central Railroad Corridor Source Area”);
- The exterior pipeline trestle area northeast of Building 18 and northwest of Building 41 that currently includes Buildings 264 and 268. Historical operations in this area included solvent unloading and handling associated with a former solvent storage building (Building 94). Solvent storage in Building 94 consisted of tanks and drums, including a 10,000-gallon TCE AST (this area is also located within the Central Railroad Corridor Source Area);
- The exterior pipeline trestle area north of Building 41 that was the former location of a rail siding and 15,000-gallon AST used to store TCE. Historical operations in this area are inferred to include filling of the AST from railcars located on the rail siding. Concentrations of TCE in groundwater that are indicative of a nearby DNAPL source have been detected in wells located near this area on the opposite side of the railroad tracks, south and southwest of Building 45 (this area is also located within the Central Railroad Corridor Source Area);
- The current Building 45 loading dock area that formerly consisted of an exterior rail siding loading dock with TCA chemical transfer pumps associated with a TCA still area and four 3,000-gallon used TCA solvent tanks in the southern portion of Building 46 (this area is also located within the Central Railroad Corridor Source Area);

- The truck loading dock turnaround area south of Building 47 and east of Building 45 that was formerly a railyard area that included load/unload operations associated with the former Building 47 tank farm near the southeast corner of Building 47 and solvent storage and still operations in the southern portion of Building 47. The primary solvents of concern stored in the former tank farm and handled in the southern portion of Building 47 were TCA and methylene chloride (for the purposes of this report, this apparent source area is located within an area referred to as the "Eastern Railroad Corridor Source Area"); and

- The location of Building 263 and adjacent railroad corridor, northwest of Building 18. Building 263 formerly included waste solvent storage tanks and a PCE storage tank. The highest historical PCE concentrations detected in groundwater within OU#1 and OU#2 have been in monitoring wells EN-50 and EN-51 and in extraction well EN-107 located north and northwest of this location on the opposite side of the railroad tracks (for the purposes of this report, this apparent source area is located within an area referred to as the "Western Railroad Corridor Source Area").

As referenced above and shown on **Figure 3-6**, these apparent sources can be grouped into three separate areas along the railroad corridor within OUs #1 and #2, including:

- **Central Railroad Corridor Source Area** – Primarily consists of TCA and TCE with lesser Freon 113 believed to be sourced from historical features of interest located south and north of the railroad tracks. This area includes the current overhead trestle areas north and northeast of Building 18 and north of Building 41, the Building 45 loading dock area, the southern portion of Building 46, the area between Building 48 and Building 46, and adjacent sections of the Norfolk Southern railroad property.

- **Eastern Railroad Corridor Source Area** – Primarily consists of TCA with lesser TCE and Freon 113 inferred to be sourced from a former solvent storage tank farm and unloading operations southeast and south of Building 47 and still operations in the southwestern portion of Building 47. Possible releases in this area may have extended under a portion of the Norfolk Southern railroad tracks located south of Building 47.

- **Western Railroad Corridor Source Area** – Primarily consists of PCE with lesser amounts of other solvents believed to be sourced by historical solvent and waste solvent storage operations in the area of Building 263. Possible releases from this area are likely to have extended under a portion of the Norfolk Southern railroad tracks located northwest of Building 18.

The dissolved groundwater plumes that developed due to solvent releases in these apparent source areas would have extended to the south in the historical (non-pumping) direction of groundwater flow. As shown on **Figure 3-6**, the approximate limits of these near-source groundwater plume areas are inferred to extend beneath a large segment of the Norfolk Southern railroad tracks, Huron manufacturing buildings 18 and 41, the western portion of the Old Group Buildings, segments of

McKinley Avenue and North Street, and a small portion of the Huron parking lot areas south of North Street. Although these near-source groundwater plume areas are inferred to be outside the primary locations where solvents were released, the historical presence of high VOC concentration groundwater plumes are likely to have resulted in secondary sourcing of VOC mass in these plume areas due to partitioning of VOCs to soils in the saturated zone, the underlying silt/clay, and the overlying vadose zone.

3.3.4 Results of VOC Analyses

This section provides a brief summary of the VOC concentration data collected in OUs #1 and #2 for samples of groundwater, soil, and indoor air. The groundwater VOC concentration data is for samples of Upper Aquifer groundwater collected during the most recent comprehensive monitoring round in August 2018. The soil VOC concentration data are from sampling of the outwash sand & gravel and lacustrine silt conducted as part of the SRI for OUs #1 and #2. The indoor air VOC concentration data are from sampling conducted in 2016 as part of an indoor air assessment of certain buildings at the Site. Overall, the data suggest that after nearly four decades of interim remedial measures, there have been significant reductions in VOC mass in soil and groundwater in OUs #1 and #2.

3.3.4.1 Groundwater

Results of VOC analyses on the Upper Aquifer groundwater samples collected in August 2018 from 82 wells in OUs #1 and #2 are provided in **Appendix B**. **Table B.1** provides a summary of the VOC detections. The chlorinated ethenes present in the August 2018 groundwater samples include: PCE, TCE, cis12DCE, 11DCE, and VC. The chlorinated ethanes present in the August 2018 groundwater samples include: TCA and 11DCA. CEA is also present in samples collected from a few localized areas in OUs #1 and #2. Other notable compounds present in OU#1 and OU#2 groundwater include: Freon 113 and its transformation product Freon 123a, 1,2-DCA, methylene chloride, and the limited presence of certain aromatics.

As indicated in the table, New York State Part 703 groundwater standards are exceeded for one or more VOCs in 66 of the 82 (80%) wells sampled in August 2018. The groundwater sample locations with VOC concentrations above the Part 703 standards are primarily located within the limits of the apparent source areas and near-source groundwater plumes depicted on **Figure 3-6**. The VOCs with the highest concentrations in the August 2018 groundwater samples include TCA, DCA, CEA, and cis12DCE. The VOCs with the highest frequency of detection in the August 2018 groundwater samples include TCA, PCE, TCE, and cis12DCE.

3.3.4.2 Soil

The soil sampling and VOC analyses completed as part of the SRI for OUs #1 and #2 was performed to screen for DNAPL presence, assess the lateral extent of VOC presence in Upper Aquifer outwash sand & gravel soils, and assess the vertical extent of VOC presence in lacustrine silt aquitard soils. The tabulated results of the VOC analyses on the soil samples that were originally included in Appendix F of the SRI report are provided in **Appendix C**. The SRI findings are summarized below:

- **Lateral Extent of Contamination -** Soil sampling and VOC analyses to screen for DNAPL presence and the lateral extent of VOC presence in or near apparent source areas or near-source groundwater plume areas were performed during advancement of soil borings for monitoring well EN-485, proximate to extraction well EN-253, monitoring well EN-508, installed east of Building 18, and monitoring well EN-509, installed northeast of Building 18 in the area of the December 1979 release of TCA. Soil samples for VOC analyses were also collected at soil boring location EN-512 located in the southeastern portion of Building 14. Results of VOC analyses of soil samples for compounds detected in one or more of the samples are provided in **Appendix C** as **Table C.1.1**, and the complete analytical results are provided in **Appendix C** as **Table C.1.2**.

  As shown in **Table C.1.1**, the primary constituents detected in the soil samples include chlorinated ethenes, chlorinated ethanes, Freon 113, and aromatics. None of the soil concentrations detected were indicative of the presence of DNAPL. The TCE, cis12DCE, TCA and 11DCA concentrations detected in soil samples from EN-485 are likely associated with the dissolved-phase presence of these four VOCs in groundwater detected in well EN-485 and nearby extraction well EN-253. Results of soil profile sampling at EN-509 did not identify the presence of a residual source zone. However, the concentration of TCA in the one sand sample collected at the top of the lacustrine silt suggests that some discrete zones of elevated VOCs could be present in soil in the area of the December 1979 release of TCA where initial spill response activities included recovery of DNAPL solvent primarily consisting of TCA.

- **Lacustrine Silt Profile Sampling -** The collection and analysis of the lacustrine silt sample cores were performed to support an evaluation to determine whether: (1) DNAPL solvent penetrated into the silt unit; and (2) reverse diffusion of VOCs from the silt unit upward into the aquifer is likely to prolong remediation efforts in the Upper Aquifer. Results of the

VOC analyses on the silt samples are provided in **Appendix C** as **Tables C.2.1.1 and C.2.1.2**, and the complete analytical results are provided in **Appendix C** as **Table C.2.1.3**.

As indicated in the tables in **Appendix C.2.1**, of the 56 silt core samples collected at six locations, the highest concentration was about 140,000 µg/kg of cis12DCE measured in one sample at location EN-20A. cis12DCE exceeded 50,000 µg/kg in three samples at location EN-20A and one sample from EN-107A and TCE exceeded 50,000 µg/kg in three samples at EN-421A. These data do not appear to indicate that DNAPL solvent is present in the silt unit at the locations tested. Likewise, the patterns of VOC concentrations in the silt sample cores do not indicate that DNAPL solvents migrated from the aquifer downward into the silt. The highest concentrations of VOCs in the silt are found in the lower portions of the sample profiles. Had DNAPL penetrated into the silt unit from the aquifer, some residual DNAPL and correspondingly high VOC concentrations would remain in the upper portion of the profiles. The VOCs found in the silt unit have most likely migrated into the silt unit via downward advection and diffusion, retarded by sorption on the silt solids and possibly transformed by biodegradation.

3.3.4.3 Indoor Air

The indoor air assessment included a review of 12 buildings within the area of OUs #1 and #2 (Buildings 14, 18, 19, 32, 33, 40, 41, 42, 45, 46, 47, and 264/268). The scope of the assessment included a review of the building heating, ventilating, and air conditioning (HVAC) systems, initial screening for VOCs in indoor air using a field gas chromatograph/mass spectrometer, and sampling of indoor air for analytical laboratory analysis to confirm indoor air quality. A location map and the tabulated results of the indoor air quality sampling from the indoor air assessment report[4] are provided in **Appendix D**.

3.4 Access Limitations

The current layout of manmade structures in OUs #1 and #2 includes a complex assemblage of former and existing building foundations, the railroad corridor, and other overhead and subsurface structures. The presence of these manmade structures results in significant access limitations for

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[4] Sanborn, Head Engineering, P.C., September 2016, Indoor Air Assessment Report, Former IBM Endicott Facility, Endicott, New York, prepared for IBM Corporate Environmental Affairs.

certain portions of OUs #1 and #2. Access is further limited by certain land use associated with current Site operations and off-Site property access restrictions.

As required by the Order, the SRI included an evaluation of Site access limitations in portions of OUs #1 and #2 where VOCs have been detected in groundwater. Results of the evaluation are depicted on **Figure 3-7**. The figure includes a high resolution aerial orthophotographic (accurate scale) map with the addition of the approximate limits of apparent source areas and near-source groundwater plume areas, and a corresponding base map at the same scale that has been color-coded based on the apparent degree of access restrictions. For the purposes of the evaluation, access limitations were classified into three categories consisting of severe (orange color code), moderate (yellow color code), and low (green color code), as described below:

- **Severe Access Limitations** - Areas designated as having severe access limitations include portions of OUs #1 and #2 and adjacent areas where access is prohibited or extremely difficult due to existing structures, Site operations, and/or off-Site land use. Although access for short-duration investigation activities may be possible in a few areas, access for longer duration pilot testing or full-scale implementation of a remedial alternative would be prohibited or severely limited. Many of these areas consist of interior portions of the Site with active manufacturing operations and associated vibration-sensitive equipment, limited overhead clearance, limited floor space, and thick foundations. Access in limited further by a high density of sensitive subsurface utilities located near and beneath the manufacturing buildings, within the railroad corridor property, and Village of Endicott high traffic roadway areas.

- **Moderate Access Limitations** - Areas designated as having moderate access limitations include portions of OUs #1 and #2 where access is difficult with possible equipment restrictions due to existing structures and/or Site operations. Limited access for short-duration investigation activities would be possible in some areas. However, access for delineation purposes would be further restricted due to the localized presence of numerous subsurface utilities. Access for longer duration pilot testing or full-scale implementation of a remedial alternative would be severely limited.

- **Low Access Limitations** - Areas designated as having low access limitations include portions of OUs #1 and #2 where access is possible with localized restrictions. Some coordination would be necessary to block off work areas during short-duration investigation activities. Additional coordination and planning would be required for longer duration pilot testing or full-scale implementation of a remedial alternative. However, access for delineation purposes would be further restricted due to the localized presence of numerous subsurface utilities.

As shown on the maps depicted on **Figure 3-7**, access restrictions associated with manmade structures, current Site operations, and off-Site access restrictions are severe within the majority of the apparent source areas and near-source groundwater plume areas due to the presence of Huron manufacturing buildings, Norfolk Southern railroad tracks, and Village of Endicott McKinley Avenue and North Street high-traffic roadways. Given these conditions, screening of remedial technologies and development and analysis of remedial alternatives should rely on technologies that:

- Do not require complete source delineation;
- Can be implemented in areas where access may be severely limited;
- Will not impact the structural integrity of on-Site infrastructure, such as building foundations and subsurface structures/utilities; and
- Will not impact the structural integrity of off-Site infrastructure, such as the Norfolk Southern railroad tracks and railroad bedding/subgrade, the McKinley Avenue viaduct foundation, and the McKinley Avenue and North Street roadways/subgrade/subsurface utilities.

4 OVERVIEW OF REMEDIAL PROGRESS AND QHHEA

This section provides an overview of remedial progress achieved by interim remedial measures, a conceptual Site model based on the remedial progress, and a qualitative human health exposure assessment (QHHEA) based on current Site conditions.

4.1 Remedial Progress

To date, the remedial technologies implemented as part of interim remedial measures in OUs #1 and #2 include:

- **Soil excavation** in accessible portions of the 1979 TCA release area north of Building 18;
- **DNAPL recovery** in the Central Railroad Corridor Source Area;
- **Groundwater extraction** for source reduction and hydraulic control along the railroad corridor and in the area of North Street;
- **Groundwater treatment using aqueous-phase granular activated carbon (GAC)**;
- **Groundwater treatment by air stripping with vapor-phase treatment using GAC**;
- **Sub-slab depressurization** for certain buildings where vapor intrusion is a potential concern;

Other remedial technologies implemented in OUs #1 and #2 as demonstrations or pilot tests that were determined to have feasibility limitations due to Site conditions include: soil vapor extraction; air sparging; *ex situ* chemical oxidation treatment (OZINOX), and clean water injection.

As explained in the SGA Final Report, IBM controlled and removed sources of contamination in portions of OUs #1 and #2 from 1980 to 2003 through the operation of 18 extraction wells in OU#1 and one extraction well in OU#2. Groundwater withdrawals extracted from those wells were conveyed to the B096 Organic Treatment Facility (OTF) located west of OU#1. Beginning in 2004, groundwater extraction operations were enhanced with installation of replacement extraction wells, the installation of new extraction wells and associated conveyance piping, and the addition of vacuum-assist extraction pumping systems. These enhanced extraction activities included:

- The replacement of OU#1 extraction wells EN-25, EN-38, and EN-118 with extraction well EN-428 (A second replacement well EN-428P operated for a short time until well EN-428 was determined to be more successful at source control).
- The replacement of OU#1 extraction well EN-253 with extraction well EN-253R;
- The replacement of OU#1 extraction well EN-219 with vacuum-assist extraction well EN-219R;
- The replacement of OU#1 extraction well EN-107 with extraction well EN-107R, followed by replacement of well EN-107R (which was fouled due to a nearby fuel oil spill) with extraction well EN-114T, where a vacuum-assist extraction pumping system is being considered in 2019;
- The addition of OU#2 extraction well EN-276R to supplement groundwater extraction at extraction well EN-276; and
- The addition of vacuum-assist extraction well EN-284P for control of the groundwater chemical flux that is not captured by operation of the EN-276/276R well pair.

In addition to these enhancements, modifications to the Garfield Avenue Groundwater Treatment Facility (GTF) were constructed to allow for treatment of EN-276/276R and EN-284P groundwater withdrawals, and a new groundwater treatment facility, designated as the Clark Street GTF, was constructed to treat groundwater withdrawals from the OU#1 railroad corridor area. These GTFs have eliminated the need for the Huron B096 OTF to treat groundwater withdrawals from OUs #1 and #2. A map showing locations of the current elements of the extraction well, conveyance piping and treatment systems is provided as **Figure 4-1**.

4.1.1 Source Reduction

Significant reduction of VOC sources has been achieved by a combination of about three years of DNAPL recovery between 1980 and 1982, and thirty-nine years of groundwater extraction. These interim remedial measures have had the overall combined effect of removing significant VOC mass from the three apparent source areas in the railroad corridor, reducing VOC concentrations in the near-source groundwater plumes, and reducing the lateral extent of the near-source groundwater plumes.

4.1.1.1 Mass Removals

VOC mass removed by OU#1 and OU#2 extraction wells operating within the time period of January 1980 through December 2017, along with the VOC mass removed from locations designated "Drums" and "Sump-2" are summarized in **Appendix E**. **Table E.1** provides a breakdown of VOC mass removal by OU#1 and OU#2 areas, **Table E.2** provides a breakdown of VOC mass removal by constituent, determined by analytical laboratory tests, and **Table E.3** provides a breakdown of the groundwater pumping volumes for each of the OU#1 and OU#2 extraction wells. Detailed breakdowns of the VOC mass removals by constituent for the western, central, and eastern railroad corridor source areas and for the North Street area are provided in **Appendix E** as **Tables E.2.1 through E.2.4**.

Overall, the data summarized in **Table E.1** indicate remedial activities over a period of thirty-eight years have been successful in removing about 818,000 pounds or about 74,000 gallons[5] of solvents from OU#1 and OU#2 as either DNAPL or dissolved mass in groundwater. The majority of DNAPL recovery appears to have occurred in the central railroad corridor source area within the initial three-year recovery period between January 1980 and December 1982. The location designated "Drums" in the first row of **Table E.1** indicates that more than 239,000 pounds of DNAPL solvent were recovered from January 1980 to December 1982 and placed in drums. Additional DNAPL solvent is assumed to have been recovered after December 1982 in one or more wells within the central railroad corridor source area, such as EN-4, EN-9, EN-25, EN-38, EN-39, and EN-118. The balance of OU#1 and OU#2 mass removals in the form of dissolved VOC mass in groundwater are a result of thirty-eight years of groundwater withdrawals estimated to total approximately 529 million gallons.

Figure 4-2 is a histogram graph of annual mass removals in OUs #1 and #2, color-coded by the area of mass removal. As shown on the figure, a significant decline in the annual rate of mass removals

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[5] This number assumes a conversion factor of 11 pounds per gallon of solvent recovered based on analytical data that indicates greater than 88% of the mass recovered is 1,1,1-trichloroethane.

occurred in the late-1980s. The majority of mass removals for the first twenty-five years of remedial measures were obtained from the central railroad corridor source area (depicted in blue). However, mass removals from the central railroad corridor source area have declined significantly while enhanced groundwater withdrawals in the eastern and western railroad corridor source areas (depicted in green) have been a greater source of mass removal since the mid- to late-2000s. Mass removals in OU#2 associated with the control of the mass flux crossing North Street (depicted in purple) are a relatively minor component of the overall mass removed.

Figure 4-3 is a histogram graph of annual mass removals in OUs #1 and #2, color-coded by VOC constituent. As shown on the figure, TCA (depicted in blue) is the primary constituent of the mass removed in OUs #1 and #2, accounting for nearly 90% of the mass recovered over a period of thirty-eight years. Since the late 1980s, the relative percentages of TCA, methylene chloride (depicted in orange) and TCE (depicted in green) have declined relative to the amount of other VOC constituents, such as PCE, TCE degradation products, and TCA degradation products**.**

4.1.1.2 Reductions in Upper Aquifer Groundwater Concentrations

Plate 4-1 provides a comparison of isoconcentration contour maps for PCE, TCE, and TCA based on groundwater sampling performed in the area of OUs #1 and #2 in September 1980 and August 2018. The highest concentrations of VOCs are indicated by darker shades of the respective colors – blue for PCE, tan for TCE, and green for 111-TCA. A comparison of the two PCE isoconcentration maps indicates that concentrations greater than 5,000 µg/L in 1980 in the central railroad corridor source area and the western railroad corridor source area have declined by two or more orders of magnitude. Similarly, a comparison of the two TCE isoconcentration maps shows that areas with concentrations greater than 50,000 µg/L in 1980 have declined by three or more orders of magnitude by 2018. In addition, the lateral extent of the PCE and TCE plumes where concentrations are greater than 5 µg/L has greatly diminished.

In the case of 111-TCA, where four areas had concentrations greater than 50,000 µg/L in 1980, significant reductions have occurred. By 2018, the highest 111-TCA concentrations are confined to pumping centers in the central railroad corridor source area and the eastern railroad corridor source area. As with PCE and TCE, the extent of the 111-TCA plume where concentrations are greater than 5 µg/L has greatly diminished by 2018. In particular, the wide area south of North Street between Washington and McKinley Avenues where concentrations of 111-TCA were greater than 500 µg/L in 1980 has been absent since 2006.

As calculated in the combined SRI report for OUs #1 and #2, the temporal changes in Upper Aquifer groundwater chemistry shown on **Plate 4-1** represent a greater than 99% reduction in dissolved mass between 1980 and 2018 for each of the three VOCs – PCE, TCE, and TCA.

4.1.2 Hydraulic Containment and Flux Control

The apparent limits of the northern and southern Upper Aquifer capture zones highlighted on **Figure 3-3** are also shown on the **Plate 4-1** isoconcentration contour maps for 2018. As shown on the 2018 isoconcentration contour maps, operation of extraction wells EN-114T and EN-219R provides an area of hydraulic capture that extends well beyond the current limits of the remaining VOC presence in railroad corridor groundwater. The operation of these two wells maintains hydraulic containment of groundwater and prevents groundwater chemical flux from leaving apparent source areas north and south of the railroad tracks. Operation of extraction wells EN-276 and EN-276R, adjacent to the southwest corner of Building 18, contributes to the control of the remaining near-source groundwater plumes in OU#2. Operation of extraction well EN-284P has intercepted the remaining groundwater chemical flux crossing North Street originating from the remaining near-source groundwater plumes in OU#2, to the extent they are not controlled by extraction wells EN-276 and EN-276R.

4.2 Conceptual Site Model

The results of the source area evaluation, along with nearly four decades of Site investigations, remedial measures, and groundwater monitoring have been used to develop a Conceptual Site Model (CSM) of DNAPL fate and transport in apparent source areas and near-source groundwater plume areas in OUs #1 and #2. The CSM was developed to provide an interpretation of the apparent distribution of VOC mass in groundwater and soil relevant to the screening of remedial technologies and development and screening of remedial alternatives.

As shown on **Figure 4-4**, the CSM provides an interpretation of three stages of DNAPL fate and transport. A description of each stage is provided below.

1) **Stage One: Solvent Releases** – This initial stage corresponds to a broad timeframe of EJ and IBM solvent usage in the 1950s through the 1970s. The TCA pipeline break in 1979 may account for much of the solvent released but incidental spills during historical solvent unloading operations along railroad sidings is also suspected as a possible release mechanism. Stage One on **Figure 4-4**, depicts solvent releases along rail sidings located on both sides of the main railroad tracks. The DNAPL penetration from these releases extends through the vadose zone and saturated zone and accumulates in a depression in the surface of the underlying silt & clay. DNAPL is also depicted as spreading out at certain horizons such as contacts with fine-grained soil strata and at the water table. During this stage, dissolution of DNAPL would have resulted in development of a near-source groundwater plume in the saturated zone that would extend in the direction of groundwater flow. In the vadose zone, VOC mass would have spread beyond the NAPL release areas due to vapor-phase transport processes (such as volatilization from the water table surface, evaporation of NAPL in the vadose, and upward vapor diffusion in the vadose zone), and fate processes (such as partitioning from soil vapor to soil pore water, sorption onto the organic carbon fraction of soil, and sorption-retarded intragranular diffusion). During this timeframe, the overall VOC mass distribution is inferred to be greater in concentration in the saturated zone as compared to the vadose zone.

2) **Stage Two: Residual DNAPL Source Areas** – This stage corresponds to the timeframe of initial DNAPL recovery and groundwater extraction in the early 1980s. Stage Two on **Figure 4-4**, depicts the extent of DNAPL in the vadose zone and saturated zone has diminished somewhat but the lateral extent of VOC mass in the vadose zone has increased due to fate and transport processes. The DNAPL recovery and groundwater extraction operations are depicted as lowering the water table and reversing the direction of groundwater flow beneath the rail siding and building shown on the right-hand side of the figure. VOC mass is also shown as having penetrated into the silt & clay.

3) **Stage Three: Reduction in Residual DNAPL Source Areas** – This stage corresponds to the current inferred Site conditions after nearly four decades since the release of solvents and the start of cleanup activities. Stage Three on **Figure 4-4**, depicts the remaining presence of DNAPL in the vadose zone and saturated zone has diminished greatly. Decades of groundwater extraction, as well as exfiltration from nearby storm and sanitary sewers, is inferred to have resulted in significant dissolution of DNAPL; however, the remaining presence of residual DNAPL in the vadose zone and saturated zone continues to maintain localized near-source groundwater plumes. As depicted, the areas of higher concentration VOC mass are inferred to be more localized to finer-grained soils, especially in the saturated zone.

4.3 Qualitative Human Health Exposure Assessment

A Qualitative Human Health Exposure Assessment (QHHEA) for OUs #1 and #2 was completed based on the findings of the SRI and performance of multiple decades of corrective actions/interim remedial measures. The purpose of the QHHEA was to characterize potential public health and environmental exposures due to the remaining VOC presence in groundwater, soil, and soil vapor in portions of OUs #1 and #2. The assessment was performed in consideration of the available information regarding the chemical character of the groundwater, soil, and soil vapor media and our understanding of human activity within OUs #1 and #2. IBM does not own the property or operate the manufacturing facility located at the Site and therefore does not have control over current and future Site operations and uses. However, based on the current Industrial zoning of the property and IBM's understanding of Site operations, an attempt was made to evaluate possible human activity in OUs #1 and #2.

The QHHEA included a review of the following five elements:

- **Contaminant Source:** The constituents of potential concern consist of chlorinated ethenes, chlorinated ethanes, and Freon 113 and its degradation product Freon 123a. In aggregate, the results of multi-phased Site investigations indicate the mass of these constituents are present in groundwater and soil at depths typically extending 15 to 20 feet below the ground surface.

- **Potential Contaminant Release and Transport Mechanisms:** Potential contaminant release and transport mechanisms include partitioning from soil to groundwater or soil pore water, groundwater plume migration, and volatilization from the water table to the vadose zone.

- **Potential Point of Exposure:** Potential exposure points include: 1) contact with soil, groundwater, and/or VOC vapors associated with construction-related human activities such as groundwater extraction (dewatering) and soil excavation; and 2) contact with VOC vapors in certain routinely occupied buildings due to the potential for vapor intrusion.

- **Potential Route of Exposure:** Potential routes of exposure include ingestion of soil and groundwater, dermal contact with soil and groundwater, and inhalation of vapors volatilized from contaminated soil and groundwater.

- **Potential Receptor Population:** Potential human receptors include on-Site construction workers, and workers within certain buildings in OU#1 and #2.

Overall, the potentially complete exposure pathways identified in OUs #1 and #2 include contact with groundwater and soil by on-Site construction workers, and contact with VOC vapors by on-Site construction workers and workers in certain buildings in OUs #1 and #2. The construction worker exposure pathways should be mitigated by a Site Management Plan that requires work plans for intrusive activities and health and safety plans for Site construction activities. The exposure of workers in certain OU#1 and OU#2 buildings should be mitigated by engineering controls such as HVAC systems and sub-slab depressurization systems that would be monitored/inspected in accordance with a performance monitoring plan.

5 REMEDIAL GOALS AND REMEDIAL ACTION OBJECTIVES

According to Chapter 4 of NYSDEC DER-10 guidance, remedial goals are "…statutory or regulatory remedial action goals for remedial actions…" undertaken pursuant to applicable NYSDEC regulatory programs. Remedial Action Objectives (RAOs) are contaminant targets specific to each medium for protecting human health and the environment based on applicable Standards, Criteria, and Guidelines (SCGs). RAOs specify the following: 1) regulated substances identified as Constituents of Potential Concern (COPCs); 2) exposure routes and receptors; and 3) acceptable level or range of levels for a regulated substance and associated potential exposure route. An example of an RAO for Site groundwater is to reduce or eliminate COPC concentrations that exceed New York State Part 703 Groundwater Standards by some type of treatment technology or a combination of technologies. In this case, groundwater extraction and treatment with discharge to surface water could constitute a general response action for the groundwater RAO.

Since risk can be associated with current or potential future exposures to each medium containing contaminants, development of RAOs that address contamination sources must consider the following hierarchy as presented in Chapter 4 of NYSDEC DER-10 guidance: source removal or treatment, source containment, elimination of exposure, and treatment of source at point of exposure. Potential actions considered to address contamination at this Site are presented in the technology screening and selection process descriptions contained in Section 6.

Preliminary RAOs presented in the SRI report for OUs #1 and #2 were developed based on the analysis and interpretation of data collected or compiled during the Supplemental Groundwater Assessment (SGA). The SGA Final Report identified two principal objectives of the remedial action program. The first relates to the overall goal of attaining New York State groundwater standards, to the extent practicable. The second is to shrink the plumes of VOCs, in particular TCE, to mitigate concentrations of TCE in soil vapor within the limits of ventilation in areas south of North Street. Simply stated, these objectives are as follows:

1. Reduce, as quickly as practicable, groundwater concentrations of VOCs south of North Street to within New York State 6 NYCRR Part 703 groundwater standards in order to reduce potential soil vapor impacts. This will be accomplished by the following actions:

   a. Continue to control the source(s) of groundwater contamination in OU#1 within the On-site Capture Zone and enhance this control as appropriate.
   b. Control and/or treat the groundwater flux crossing North Street within OU#2.
   c. In conjunction with 1.a. and 1.b., accelerate the rate of reduction of the plume south of North Street.
2. The overall objective of these actions will be to reduce the mass of TCE in groundwater within Off-Site Capture Zone A and the Southern Area by 50% in five years and by 80% in ten years.

The enhanced source control activities performed as an IRM in the OU#1 Railroad Corridor Source Area relate specifically to action 1.a. described above. The enhanced containment of the groundwater chemical flux crossing North Street performed as an IRM in the OU#2 North Street Area relates specifically to action 1.b. The implementation of these IRMs in conjunction with enhanced groundwater extraction and clean water injection south of North Street (action 1.c) resulted in the successful remediation of the off-Site groundwater plume in Off-Site Capture Zone A and the Southern Area. Maintaining actions 1.a and 1.b is necessary to maintain the off-Site groundwater plume cleanup. Therefore, the remedial action objectives enumerated above not only remain valid for OU#1 and OU#2, but also strongly suggests that these objectives are attainable goals based on the progress to date.

5.1 Standards, Criteria, and Guidance (SCG) Values

Remedial actions at New York State Inactive Hazardous Waste Disposal Sites (IHWDSs) are governed by Article 27, Title 13 of the Environmental Conservation Law (ECL), by regulations promulgated thereunder in 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites (January 1998) and related statutes and regulations. In accordance with the provisions of these laws and regulations, actions at IHDWSs must appropriately address SCGs as defined in New York State and federal environmental laws, regulations and guidance. Standards and criteria are requirements that are promulgated under New York State or federal law, while guidelines are non-promulgated criteria or guidance that are not legally binding, but should, as appropriate, be considered in the development of the remedial approach. SCGs are generally divided into three categories: chemical-specific, location-specific, and action-specific. Chemical-specific SCGs provide guidance on acceptable or permissible contaminant concentrations in soil, air, and water. Location-specific

SCGs govern activities in critical environments such as floodplains, wetlands, endangered species habitats, or historically significant areas. No location-specific SCGs have been determined to be applicable to the implementation of alternatives evaluated in this report. Action-specific SCGs are technology- or activity-based requirements. SCGs in the chemical- and action-specific categories that may apply to the evaluation of remedial alternatives in OUs #1 and #2 have been identified in the two following subsections.

5.1.1 Chemical-Specific SCGs

This subsection lists the chemical-specific SCGs that apply to the evaluation of the alternatives described in this report. On the basis of over thirty-nine years of groundwater chemistry data associated with monitoring and groundwater extraction and treatment operations, the principal COPCs in OUs #1 and #2 include:

- Chlorinated ethenes: Tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis12DCE), 1,1-dichloroethene (11DCE), and vinyl chloride (VC).
- Chlorinated ethanes: 1,1,1-Trichloroethane (TCA) and its principal transformation products, 1,1-dichloroethane (11DCA), and chloroethane (CEA) (Note: 11DCE is also a transformation product of TCA by the abiotic elimination reaction).
- Freon 113 and its transformation product Freon 123a.

The attainment of cleanup goals for soil to protect groundwater will be based on the attainment of groundwater quality standards, which is a more direct determination of the remedial goal that saturated soil has been remediated to levels that are protective of groundwater.

New York State Drinking Water Standards are listed in Title 10 of the New York Codes, Rules and Regulations (NYCRR), Part 5, Subpart 5-1 Tables (Section 5-1.52). The applicable standards for the COPCs in OUs #1 and #2 are 5 µg/L for TCE, PCE, c12-DCE, 11DCE, TCA, 11DCA, Freon 113, and Freon 123a; the standard for vinyl chloride is 2 µg/L.

New York State Groundwater Standards are listed in Title 6 of the NYCRR, Part 703.5 and are legally enforceable. The aquifer underlying the site has been designated a Class GA groundwater, which is defined in §701.15 as: *"The best usage of Class GA waters is as a source of potable water* *supply. Class GA waters are fresh groundwaters."* Therefore, the Class GA groundwater standards for the COPCs in OUs #1 and #2 are intended to protect human health through the use of the groundwater as a drinking water supply and are equivalent to the drinking water standards of 5 μg/L for TCE, PCE, c12-DCE, 11DCE, TCA, 11DCA, Freon 113, and Freon 123a; the standard for vinyl chloride is 2 μg/L.

New York State Water Guidance Values are provided in the Division of Water Technical and Operational Guidance Series (TOGS 1.1.1, June 1998), which describes ambient groundwater quality standards, guidance values, and groundwater effluent limitations. For the COPCs in OUs #1 and #2, the groundwater standards listed in TOGS 1.1.1 for Class GA waters are identical to those listed in 6 NYCRR Part 703.5.

5.1.2 Activity-Specific SCGs

This subsection provides a list of SCGs that may apply to the evaluation of the remedial alternatives described in this report. To the extent that any of these requirements applies to an action to be taken as part of a particular alternative, an appropriate discussion will be included in the analysis of the alternatives in the event that one or more of these SCGs will not be met.

6 NYCRR Part 257 – Air Quality Standards

Policy DAR-1: Guidelines for the Evaluation and Control of Ambient Air Contaminants under Part 212 (August 2016)

6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes (November 1998)

6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)

6 NYCRR Part 375 – Environmental Remediation Programs (December 2006)

6 NYCRR Part 376 - Land Disposal Restrictions

6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS ("SPDES Regulations")

TAGM 3028 - "Contained-In" Criteria for Environmental Media: Soil Action Levels (August 1997)

TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites

CP-43 - Groundwater Monitoring Well Decommissioning Policy (November 2009)

CP-51 – Soil Cleanup Guidance (October 2010)

NYSDEC Sampling Guidelines and Protocols (March 1991)

DER-10 – Technical Guidance for Site Investigation and Remediation (May 2010)

DER-15 – Presumptive/ Proven Remedial Technologies (February 2007)

DER-31 – Green Remediation (January 2011)

DER-33 – Institutional Controls: A Guide to Drafting and Recording Institutional Controls (December 2010)

29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response

40 CFR Part 144 - Underground Injection Control Program

OSWER Directive 9200.4-17 – Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)

5.2 Remedial Action Objectives (RAOs)

Based on the SCGs listed above and in light of the on-going IRM activities, Site access restrictions, and RAOs previously proposed, RAOs developed for the protection of public health and the environment will apply to the selection and implementation of a remedial action alternative for OUS#1 and #2, as presented below.

5.2.1 RAOs for Public Health

5.2.1.1 Groundwater

The groundwater RAO for Public Health must prevent ingestion and contact by human receptors of groundwater and surface water having concentrations of COPCs exceeding the applicable NYSDOH Drinking Water Standards for TCE, PCE, c12-DCE, 11DCE, vinyl chloride, TCA, 11DCA, Freon 113, and Freon 123a. The applicable standards for the COPCs in OUs #1 and #2 are 5 µg/L for TCE, PCE, c12-DCE, 11DCE, TCA, 11DCA, Freon 113, and Freon 123a; the standard for vinyl chloride is 2 µg/L.

5.2.1.2 Soil

Soil RAOs for Public Health consist of concentration targets for COPCs to be protective of groundwater and COPC targets that are protective of direct contact and ingestion of soil, and inhalation of soil vapors. The soil to groundwater pathway RAO for Public Health is to attain cleanup goals for soil to protect groundwater based on a direct determination of the remedial goal, which is the attainment of groundwater quality standards. According to 6 NYCRR Part 375, Table 375-6.8 (b) – Restricted Use Soil Cleanup Objectives, COPC limits in soil that are protective of groundwater are 0.47 parts per million (ppm) for TCE, 1.3 ppm for PCE, 0.25 ppm for c12-DCE, 0.68 ppm for TCA, 0.27 ppm for 11DCA, 0.33 ppm for 11DCE, and 0.02 ppm for vinyl chloride.

An executed Site Management Plan (SMP) would prevent exposure of human receptors to soil beneath existing building slabs, paved areas, and other areas containing utilities, industrial support structures, and man-made features in OUs #1 and #2. If following removal of these capping and structural measures, the SMP would require a recalculation of risk or hazard levels to determine allowable concentrations of COPCs to remain in those soils. In addition, the executed SMP would prevent ingestion, direct contact, and inhalation of soil and soil vapors containing COPCs by on-Site construction workers during excavation activities in certain areas of OUs #1 and #2. According to 6 NYCRR Part 375, Table 375-6.8 (b) – Restricted Use Soil Cleanup Objectives, COPC limits in soil to prevent direct contact and ingestion of soil for an industrial site consist are 400 ppm for TCE, 300 ppm for PCE, 1,000 ppm for c12-DCE, 1,000 ppm for TCA, 480 ppm for 11DCA, 1,000 ppm for 11DCE, and 27 ppm for vinyl chloride.

5.2.1.3 Soil Vapor

The soil vapor RAO for public health is to attain cleanup goals that prevent exposure of human receptors to vapor intrusion into structures based on a number of considerations in addition to health risks as detailed in the NYSDOH "Final Guidance for Evaluating Soil Vapor Intrusion, October 2006" and subsequent "Updates to Soil Vapor / Indoor Air Decision Matrices, May 2017." The 2017 updates are based on reviews of toxicity data, risk assessments, and soil vapor intrusion data collected in New York State over the past decade. Considering these data, NYSDOH has assigned eight volatile chemicals to three newly revised and renamed Soil Vapor / Indoor Air Decision Matrices. Six of the COPCs in soil vapor in OUs#1 and #2 are contained on the list of the eight recently-assigned volatile chemicals that require mitigation under the following scenarios (all units are in micrograms per cubic meter – µg/m^3):

- TCE, *c*12-DCE, and 11DCE – sub-slab values of 60 µg/m^3 or greater; sub-slab values of 6 µg/m^3 and less than 60 µg/m^3, and an indoor air value of 1 µg/m^3 or above; or a value less than 6 µg/m^3 but an indoor air value of 1 µg/m^3, or above, where resampling confirms that mitigation is needed.

- PCE and 111-TCA – sub-slab values of 1,000 µg/m^3 or greater; sub-slab values of 100 µg/m^3 and less than 1,000 µg/m^3, and an indoor air value of 10 µg/m^3 or above; or a value less than 100 µg/m^3 but an indoor air value of 10 µg/m^3, or above, where resampling confirms that mitigation is needed.

- Vinyl Chloride – sub-slab values of 60 µg/m^3 or greater; sub-slab values of 6 µg/m^3 and less than 60 µg/m^3, and an indoor air value of 0.2 µg/m^3, or above; or a value less than 6 µg/m^3 but an indoor air value of 0.2 µg/m^3, or above, where resampling confirms that mitigation is needed.

On-going IRMs for soil vapor consist of operation of Sub-Slab Depressurization (SSD) systems to control vapors from entering Buildings 42 and 46 on the Huron LLC property.

5.2.2 RAOs for Environmental Protection

5.2.2.1 Groundwater

The groundwater RAO for Environmental Protection will restore groundwater in OUs #1 and #2 to applicable New York State Groundwater Standards for COPCs and reduce mass flux of COPCs from apparent source areas and near-source groundwater plumes in OUs#1 and #2 to the extent practicable, considering access constraints.

5.2.2.2 Soil

According to 6 NYCRR Part 375, soil cleanup objectives for protection of ecological resources do not and/or will not apply to the following: (i) sites or portions of sites where the condition of the land (e.g., paved, covered by impervious surfaces, buildings and other structures) precludes the existence of an ecological resource which constitutes an important component of the environment; (ii) protection of the aquatic environment; or (iii) such non-wild biota as pets or livestock, agricultural or horticultural crops, and landscaping in developed areas. Given the Site conditions and land use, the soil RAO for Environmental Protection is not applicable for OUs #1 and #2.

5.2.2.3 Surface Water

The surface water RAO for Environmental Protection will adhere to SPDES guidelines. Groundwater presently pumped from OUs#1 and #2 is treated to within the limits allowed by the SPDES permit (pH = 6.0 to 9.0 and VOCs less than 10 µg/L each). According to 6 NYCRR Part 930.4, Table 1: “Classification and Standards of Quality and Purity Which are Assigned to the Waters of the Susquehanna River Bordering or Flowing Through the Counties of Tioga, Broome, Chenago, Delaware and Otsego,” the designation for discharge is “Class B.”

6 IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES

The purpose of this section is to document the screening of remedial technologies prior to development of remedial alternatives to address RAOs for the various environmental media in OUs #1 and #2. The preliminary screening of candidate remedial technologies was performed following completion of OU#1 and OU#2 SRI field explorations and testing. Results of screening provided a listing of possible remedial technologies to be considered during this FFS. This preliminary screening step was originally included in the two SRI/FFS Work Plans for OU#1 and OU#2, dated March 1, 2005 and March 10, 2005, respectively. Candidate remedial technologies considered for preliminary screening were also listed in the Final Pre-Characterization Technical Memorandum (PCTM) for OU#1 and OU#2, dated July 14, 2006.

The preliminary screening was performed based on:

- A review of the effectiveness of the candidate remedial technologies at other sites;
- Results of previous OU#1 and OU#2 investigations and source remediation via DNAPL recovery and groundwater extraction;
- Results of SRI field explorations and testing in OU#1 and OU#2; and
- Results of ongoing IRM implementation in OU#1 and OU#2 consisting of source remediation and flux control via vacuum-assisted groundwater extraction.

Results of the preliminary screening of candidate remedial technologies were then summarized in an October 15, 2008 technical memorandum, approved by the NYSDEC and the New York State Department of Health (NYSDOH) on August 18, 2009.

6.1 General Response Actions

General Response Actions (GRAs) consist of broad categories of remedial technologies that have been identified to achieve proposed RAOs. Specific GRAs identified for OUs#1 and #2 include the following:

- No Action – No action alternative with respect to remediation.

- Institutional Controls – Administrative mechanisms, such as environmental covenants, deed restrictions and use designations, and physical actions, such as posting and fencing to restrict Site access and use.

- Monitoring – Sampling and analysis of environmental media to support design of a remedial alternative, assess the effectiveness of a remedial alternative, and/or support risk management decision-making and selection of a remedy.

- Removal – Extraction of contaminated groundwater, extraction and/or enhanced dissolution of DNAPL, vapor extraction and excavation of contaminated soil.

- Disposal – Disposal of groundwater treatment related solids, recovered DNAPL, and contaminated soil at an off-Site facility.

- Containment – Hydraulic control of contaminated groundwater via extraction wells to limit the extent of groundwater plume areas and/or discharge to surface water and capping or chemical fixation to isolate contaminated soil from human and ecological receptors.

- *In situ* Treatment – Remedies that involve processes to contain, destroy, or otherwise reduce the bioavailability or toxicity of contaminants in groundwater and soil. This GRA includes physical, chemical, or biological processes that are conducted on-Site, *in situ*.

- *Ex situ* Treatment – Remedies that involve processes to contain, destroy, or otherwise reduce the bioavailability or toxicity of contaminants in groundwater and soil. This GRA includes physical, chemical, or biological processes that are conducted at on-Site or off-Site treatment facilities.

6.2 Screening of Candidate Remedial Technologies

Remedial technologies were initially screened for proven overall effectiveness at other sites with similar COPCs and similar hydrogeologic conditions with a proven ability to address the COPC presence in the vadose zone, saturated zone, and underlying silt/clay aquitard. Results of this preliminary screening of remedial technologies and process options are summarized below. The list includes the GRAs, remedial technology types, and process options retained for further evaluation in each environmental medium as follows:

Groundwater

- No Action
- Institutional Controls
    - Deed Restrictions/Environmental Covenants

  - Site Management Plan
  - Annual Inspections –surveys/field inspections
  - Vapor barriers for new structures
- Monitoring Options
  - Source Control Effectiveness Monitoring
  - Monitored Natural Attenuation (MNA)
- Removal Technologies
  - Extraction – groundwater extraction with vertical wells or dual-phase extraction equipment
  - Thermally-Enhanced Extraction – ISTD with vapor extraction and electrical resistance heating (ERH) with vapor extraction
  - Enhanced Dissolution – flushing with treated groundwater
- Containment Technologies
  - Hydraulic Control – groundwater extraction with vertical wells or cut-off trenches
- *In situ* Treatment Technologies
  - Biological Treatment – enhanced biodegradation and bioaugmentation
  - Chemical Reduction – using zero-valent iron for abiotic reductive dechlorination of CVOCs
- *Ex situ* Treatment Technologies
  - Physical Treatment – air stripping, aqueous-phase carbon adsorption, and filtration
  - Off-Gas Treatment – air quality dispersion monitoring, off-gas influent and effluent monitoring, and vapor-phase carbon adsorption
- Disposal/Discharge Technologies
  - Discharge to Surface Water – discharge to storm sewer
  - Discharge to Groundwater – injection well

Surface Water

- No Action
- Monitoring Options – SPDES discharge of treated groundwater

Soil

- No Action
- Institutional Controls
    - Deed Restrictions
    - Vapor barriers for new structures
- Removal Technologies
    - Extraction – soil vapor extraction, dual-phase extraction, and sub-slab depressurization systems
    - Excavation – excavation with off-Site disposal

The screening of candidate remedial technologies with potential applicability to Site conditions was conducted in accordance with the technology screening guidance described in the DER-10 (May 2010). As such, the potential remedial technology types and process options identified for each environmental medium at the Site were screened according to Baseline Considerations as described in DER-10, Section 4.1 (d) as follows:

- Protection of Public Health and the Environment
- Hierarchy to address sources of contamination as follows:
    - Removal and/or treatment
    - Containment
    - Elimination of exposure
    - Treatment of source at point of exposure

Table 6-1 presents the results of a detailed evaluation of candidate technologies that contains the following table headings:

- "Implementability" refers to the relative degree of difficulty anticipated in implementing a particular technology for each site hydrogeologic condition.
- "Effectiveness" of the remedial technology types and process options was evaluated based on the ability to protect human health and the environment and to meet RAOs under the conditions and limitations present at the Site. This criterion was used to evaluate the potential effectiveness of technologies with a focus on the following:
    - The ability to handle the estimated areas or volumes of media and to meet remediation goals;
    - The potential impacts to human health and the environment during the construction and implementation phase of the process option; and
    - The experience and reliability of the process option with respect to the conditions at the Site.
- "Cost" is to allow for a rough comparison of relative costs associated with the technology.

Table 6-1 includes the following nine remedial technologies screened for implementability, short- and long-term effectiveness, and potential application to OUs #1 and #2:

Destructive Technologies

1. *In situ* Chemical Oxidation (ISCO)
2. Enhanced Biodegradation with or without Bio-augmentation
3. *In situ* Chemical Reduction (ICR) using Zero Valent Iron (ZVI) with or without *in situ* liquid-activated carbon adsorption

Separation/Treatment Technologies

4. Excavation
5. Soil Vapor Extraction (SVE)
6. Dual-Phase Extraction (DPE)
7. *In situ* Thermal Treatment

Control and Isolation Technologies

8. Groundwater Extraction using Vertical Wells
9. Groundwater Extraction using Cut-Off Trenches

As **Table 6-1** shows, seven of the nine technologies were considered not feasible to implement in OUs #1 and #2, as follows:

1. ***In situ* Chemical Oxidation (ISCO)** – *In situ* treatment of soil and groundwater containing VOCs by adding chemical oxidants such as permanganate or peroxide into source areas. Treatment by this technology is typically used to destroy/reduce source area mass above and below the water table.
    - The location of VOC source(s) cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the large railroad property corridor.
    - TCA is not easily amenable to ISCO; increasing the temperature and pH that is required for the activation of persulfate to oxidize TCA is not feasible in OUs #1 and #2.
    - Mineral oxidation resulting from ISCO in groundwater could result in precipitation of calcium, iron, and manganese in pipes, pumps, valves, and meters resulting in increased operations and maintenance requirements for the existing pumping system infrastructure.
    - The use of high pressure injection to achieve greater coverage in the subsurface from a few accessible injection locations is not feasible due to presence of deep storm and sanitary sewers, and underground utilities.
    - Severe access limitations exist such that delivery of chemical oxidants to strategic locations where contaminant mass resides in the vadose zone and saturated zone is not feasible. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs.
    - In areas where access can be achieved, the radius of influence of the chemical oxidant material being injected is small.
    - The potential VOC reductions in groundwater are reversible due to back diffusion and desorption of VOC mass in soil after the oxidant has been consumed.
2. ***In situ* Chemical Reduction (ICR) using Zero Valent Iron (ZVI) with or without *in situ* liquid-activated carbon adsorption** – Treatment using this technology includes *in-situ* injection of Zero Valent Iron (ZVI) in some form to reduce VOC flux via abiotic reductive dechlorination and the potential stimulation of biotic dechlorination. Nano-scale or micro-scale zero-valent iron (ZVI), bimetallic ZVI, sulfidated ZVI, ZVI-impregnated carbon, or liquid-activated carbon can be delivered into the plume as an emulsion injected via wells or through augers. ZVI is not a source area treatment for unsaturated soil and will only treat the target constituents in dissolved-phase groundwater**.** Theoretically, ZVI particles can be transported short distances downgradient from the point of injection via groundwater flow.

Liquid-activated carbon impregnated with sulfidated iron can be used to slow the mobility and abiotically destroy the target constituents once adsorbed on the surface of the carbon.

- The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the large railroad property corridor.
- Severe access limitations will prevent ZVI from being delivered uniformly to necessary source locations in order to provide meaningful reduction in overall VOC mass in OUs #1 and #2 to attain groundwater RAOs.
- The radius of influence of ZVI material injected into the unsaturated zone, saturated zone, and fine-grained lacustrine silt/clay units is small without using high pressure injection; use of high pressure injection to achieve greater coverage is not feasible in OUs #1 and #2 due to presence of deep storm and sanitary sewers, and underground utilities.
- Passivation or crusting of the ZVI material, uncertain material life expectancy, and need for periodic material replacement provide uncertain performance in OUs #1 and #2.
- ZVI material clogging and chemical changes to the Upper Aquifer from ZVI injection could cause reduced groundwater extraction yields and pipe, pump, meter, and valve fouling of the existing pumping and treatment system infrastructure.
- Activated carbon containing ZVI could act as a VOC contaminant source if not removed once the available adsorption sites on the carbon are occupied and the ZVI is no longer active.

3. **Excavation** – Physical removal of impacted soil in the vadose zone, saturated zone, and silt/clay layer beneath the Upper Aquifer in source areas potentially to depths of 25 to 30 feet bgs. Use of sheet piling and dewatering of groundwater is necessary to provide stable excavations and to protect utilities and buildings/structures. Off-Site disposal of soil to landfill and off-Site treatment of groundwater is needed.

    - The location of VOC source(s) in OUs#1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property.
    - Sheet piling and other shoring installations close to buildings, structures, utilities, storm sewers, and sanitary sewers could cause damage to subsurface infrastructure.
    - Even relatively small excavation footprints would disrupt Site operations given the density of utilities, buildings, structures, and daily worker activities ongoing in OUs #1 and #2 (See photographs in **Appendix A**).

- Potential for worker exposure to VOCs through excavation dewatering, VOC vapor emissions from soil and groundwater, and exposure to noise by workers and third parties.

- Severe access limitations prevent excavation of VOC mass in some vadose zone and saturated zone source areas. Residual VOC mass not accessible by excavation would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs.

- Excavation activities would cause increased truck traffic and noise associated with removal of soil, removal of water, and placement of clean fill for some residents of Endicott and Site workers.

4. **Soil Vapor Extraction (SVE)** – Extraction and treatment of soil vapor containing VOCs in the vadose zone, alone or in combination with air sparging in the saturated zone.

    - The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the large railroad property corridor.

    - Potential for short-circuiting of extracted air flow due to heterogeneous soil texture and density conditions and numerous subsurface utilities in OUs #1 and #2. A feasibility study of SVE in 1989/1990 concluded that it was not an appropriate technology for the railroad corridor based on field tests conducted in the central and eastern railroad corridor sources areas (VAPEX, 1990).

    - Removal of VOCs present in finer textured sandy soils and soils rich in organic carbon would be severely limited by the processes of back or reverse diffusion and desorption.

    - The majority of the VOC mass that would be the target of SVE in vadose zone soils in OUs #1 and #2 is inferred to reside beneath utilities, structures/buildings, and the railroad property where it is inaccessible.

    - In small areas where access is possible, numerous utilities and sewers (storm and sanitary) restrict proper placement of SVE wells, rendering even limited SVE use in OUs #1 and #2 only partially feasible.

    - The saturated thickness of the Upper Aquifer (saturated zone) is typically five feet or less, providing little opportunity for air sparging and vapor collection via SVE from this zone. The fine-grained silt/clay soils underlying the Upper Aquifer are not amenable to this technology.

    - Residual VOC mass in soil that is not accessible would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs.

5. **Dual-Phase Extraction (DPE)** – DPE systems depress the water table and remove mass from above and below the pre-pumping water level. As the water table around the well is lowered by pumping, unsaturated soil is exposed and VOC mass in the newly exposed zone can be removed by vapor extraction. Removal of groundwater and soil vapor is typically accomplished by either a high-vacuum system to remove both groundwater and soil vapor, or by a centrifugal pumping system to collect groundwater coupled with a high vacuum system to extract soil vapor.

    - The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the large railroad property corridor.

    - Potential for short-circuiting of extracted air flow due to heterogeneous soil texture and density conditions and numerous subsurface utilities in OUs #1 and #2.

    - Removal of VOCs present in finer textured sandy soils and soils rich in organic carbon would be severely limited by the processes of back or reverse diffusion and desorption.

    - The majority of the VOC mass that would be the target of DPE in vadose zone soil is inferred to reside beneath utilities, structures/buildings, and the railroad property where it is inaccessible.

    - In some small areas where access is possible, numerous utilities and sewers (storm and sanitary) restrict proper placement of DPE wells, rendering even limited DPE use in OUs #1 and #2 only partially feasible.

    - Noise of the blower system may be of potential concern for implementation in the short-term and long-term.

    - Inaccessible residual VOC mass in soil would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs.

6. ***In situ* Thermal Treatment** – *In situ* treatment via thermal conductive heating above and below the water table with multi-phase extraction of groundwater and soil vapor.

    - Closely-spaced multi-phase extraction wells are required to limit potential short-circuiting of steam and VOC vapors towards buildings; however, the majority of VOC mass in vadose soil is inaccessible for heater/SVE wells and multi-phase extraction wells.

    - The location of VOC source(s) to be targeted for thermal treatment cannot be determined precisely due to the presence of underground utilities, structures and the lack of accessibility within the large railroad property corridor.

    - Relocation of subsurface utilities damaged during thermal treatment operations would disrupt operations for Site occupants.

  - Heat would likely damage utilities adjacent to active remediation areas. Thermal treatment would cause nuisance issues with nearby structures (e.g., heating of basement and water lines).

  - Heat would damage the structural integrity of the soil bedding beneath the railroad tracks through soil desiccation and steam generation. Based on discussions with Norfolk Southern during the planning stages for the thermal treatment IRM in OU#5, this technology would not be allowed by Norfolk Southern within or near their railroad property corridor.

  - Severe access limitations would prohibit treatment in locations where VOC mass resides in the vadose zone and saturated zone. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs.

  - In areas where access can be achieved, the radius of influence of the thermal desorption heater wells or the thermal resistance wells/sheet piles would be limited in lateral extent.

7. **Groundwater Extraction Using Cut-Off Trenches** – Installation of trenches or drains with sumps installed at strategic locations to collect VOC-containing groundwater to be pumped to a surface treatment facility.

   - The majority of VOC mass in the saturated zone is inaccessible for excavation using trenches to the required depth to make this technology effective.

   - In some small areas at a few locations where groundwater collection via trenching would be possible to reduce VOC mass flux, numerous utilities and sewers (storm and sanitary) exist such that trenching is not feasible.

   - In order to install deep trenches, sheet piling and other shoring installation is needed close to buildings, structures, utilities, storm sewers, and sanitary sewers and could cause damage to subsurface infrastructure during installation.

   - Inaccessible residual VOC mass will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs.

   - Groundwater extraction using vertical wells has already been successfully demonstrated as a source and flux control technology at the Site for nearly four decades.

6.3 Retained Candidate Remedial Technologies

As shown on **Table 6-1**, the following two candidate remedial technologies were carried forward for development of remedial alternatives.

1. **Enhanced Biodegradation (with or without Bioaugmentation)** is the treatment of soil and groundwater containing VOCs by adding amendments to enhance on-going anaerobic biodegradation by reductive dechlorination. Bioaugmentation consists of adding non-indigenous bacteria (such as KB-1 or dehalococcoides (DHC)) along with amendments to soil and groundwater to increase and enhance existing microbial populations responsible for on-going reductive dechlorination in OUs #1 and #2. Bio-degradation most likely would be used as a flux control/reduction technology and for limited source area treatment in vadose and saturated zones. Selection of this remedial technology for further screening as a remedial alternative is based on the following:

    - Technology has a proven long-term effectiveness at reducing VOC mass in soil and groundwater at numerous solvent release sites.
    - Potentially implementable within OUs #1 and #2.
    - Protective of human health and the environment by potentially meeting RAOs in groundwater within OUs #1 and #2.
    - No apparent adverse short-term impacts to construction workers, Site workers, and the community.
    - Technology can be successfully applied using a limited number of widely-spaced vertical wells in areas of severe access limitations.

    The following limitations could reduce the effectiveness of enhanced biodegradation in OUs #1 and #2:

    - Heterogeneous soil texture conditions could limit uniform delivery of injected amendments to the saturated zone soils.
    - Water table fluctuations that expose the upper saturated soil to air and natural recharge of oxygenated precipitation would make maintaining reducing conditions in the unconfined Upper Aquifer difficult.
    - Influx of oxygenated water due to uncontrollable exfiltration from deep storm and sanitary sewers in portions of OUs #1 and #2 would make maintaining reducing conditions that are needed for dechlorination difficult.
    - Potential for incomplete biodegradation resulting in accumulation of cis12DCE and vinyl chloride that are more difficult to treat with GAC.
    - Potential to impact the integrity of the groundwater extraction and treatment systems currently in place to maintain the cleanup of Off-Site Capture Zone A and the OU#3 Southern Area by increasing the degree of biological fouling/plugging in the Upper Aquifer, the extraction well screens, the pumping and conveyance piping systems, and the groundwater treatment systems.

- Reduction of VOC mass in the saturated zone has a limited indirect effect on reducing VOC mass in the vadose zone.

2. **Enhanced Groundwater Extraction using Vertical Wells** – Installation of vertical wells to extract Upper Aquifer groundwater at accessible locations within apparent source areas or near-source groundwater plume areas. This technology could include vacuum-enhanced groundwater extraction pumping systems in areas with sufficient saturated thickness. Serves as both a source reduction/control technology and a plume reduction/mass flux control technology.

    - Technology has a proven long-term effectiveness at hydraulically containing source areas and reducing VOC mass in soil and groundwater at numerous solvent release sites.

    - Technology has a long history of effectiveness and implementability in the OUs #1 and #2 portions of the Site.

    - Protective of human health and the environment by potentially meeting RAOs in groundwater within OUs #1 and #2.

    - No apparent adverse short-term impacts to construction workers, Site workers, and the community.

    - Technology can be successfully applied over large areas using a limited number of widely-spaced vertical wells in areas of severe access limitations.

    The following limitations could reduce the effectiveness of enhanced groundwater extraction using vertical wells in OUs #1 and #2:

    - Heterogeneous soil texture conditions could limit the rate of mass transfer from finer-textured soils that are likely to contain a greater percentage of the remaining VOC presence in the saturated zone.

    - Influx of oxygenated water due to exfiltration from deep storm and sanitary sewers in portions of OU #1 and #2 would potentially increase the rate of fouling of extraction well screens, pumping systems, conveyance piping, and treatment system components.

    - Reduction of VOC mass in the saturated zone has a limited indirect effect on reducing VOC mass in the vadose zone.

7 DEVELOPMENT AND ANALYSIS OF ALTERNATIVES

This section presents the development, detailed analysis, and comparative analysis of remedial alternatives that incorporate the technologies retained in Section 6 to address RAOs for the various environmental media in OUs #1 and #2.

7.1 Description of Alternatives

Three possible remedial alternatives for OUs #1 and #2 were developed using the technologies retained for further evaluation:

- Alternative #1: No Further Action with Site Management
- Alternative #2: Enhanced Groundwater Extraction
- Alternative #3: Enhanced Biodegradation

Descriptions of each of these remedial alternatives are described in the following subsections.

7.1.1 Alternative #1: No Further Action with Site Management

The No Further Action with Site Management alternative recognizes that the interim remedial measures implemented over the past thirty-nine years have successfully remediated OUs #1 and #2 such that institutional controls and certain engineering controls are sufficient to protect human health and the environment. The institutional controls include: the Order, an environmental easement, a Site Management Plan, and restrictions to Site access via fencing, roadway gates, and Huron security protocols. The engineering controls consist of HVAC systems and sub-slab depressurization systems for certain buildings in OUs #1 and #2.

Elements of the Site Management Plan would include:

- An Excavation Work Plan and Health and Safety Plan for intrusive activities in certain portions of OUs #1 and #2;
- A Performance Monitoring Plan for monitoring of engineering controls in place to eliminate the potential vapor intrusion pathway for certain occupied buildings in OUs #1 and #2;

- A Site Contingency Plan for emergency response actions in OUs #1 and #2;
- A Site Monitoring Plan to guide sampling of certain media to evaluate the performance and effectiveness of the remedy for OUs #1 and #2; and
- Reporting of periodic inspections/certifications to verify that the elements of the remedy remain in place.

7.1.2 Alternative #2: Enhanced Groundwater Extraction

The Enhanced Groundwater Extraction alternative consists of groundwater extraction, with vacuum-assist pumping systems where appropriate, as an engineering control in OUs #1 and #2 to:

1. Continue to control the source(s) of groundwater contamination within the railroad corridor source area (On-Site Capture Zone) and potentially enhance this control, as appropriate.
2. Control the groundwater flux crossing North Street within OU#2.

This alternative provides hydraulic control of groundwater chemical flux emanating from apparent sources within the railroad corridor and provides hydraulic capture of groundwater chemical flux crossing North Street that would otherwise result in redevelopment of an off-Site groundwater plume that has been eliminated by enhanced extraction and clean water injection operations in Off-Site Capture Zone A and the OU#3 Southern Area. This alternative also provides a degree of mass removal that is directly proportional to the rate of dissolution of VOCs from the apparent source zones. Enhancement of the groundwater withdrawals in source areas and near-source groundwater plume areas should improve the rate of source reduction while maintaining sufficient capture of groundwater chemical flux. This alternative also includes the institutional and engineering controls specified for Alternative #1.

7.1.3 Alternative #3: Enhanced Biodegradation

The enhanced biodegradation alternative contains the elements of Alternative #2 with the addition of enhanced biodegradation via the injection of amendments and possibly injection of cultures of microorganisms (bioaugmentation) in OUs #1 and #2 to reduce the natural oxidizing conditions of the Upper Aquifer, such that biotic reductive dechlorination can occur. The enhancement activities would include injection of lactate, molasses, vegetable oils, or another organic carbon source for microorganisms that dechlorinate VOCs. Injection would be performed using wells or direct-push borings. A type of applicable bacterial culture could also be added to supplement existing microorganism populations, where needed. This alternative attempts to accelerate the rate of VOC mass removal from soil and groundwater in the saturated zone by changing the natural oxidizing conditions in the Upper Aquifer to reducing conditions. This alternative also includes the institutional and engineering controls specified for Alternative #1 and the enhanced groundwater extraction engineering control specified in Alternative #2.

7.2 Detailed Analysis of Alternatives

Each of the alternatives developed during the screening process was analyzed relative to the first seven of the nine remedy selection evaluation criteria listed below, as set forth in Section 4.2 of NYSDEC DER-10.

1. Overall protectiveness of public health and the environment.
2. Compliance with standards, criteria, and guidance (SCGs).
3. Long-term effectiveness and permanence.
4. Reduction of toxicity, mobility, or volume of contamination through treatment.
5. Short-term impact and effectiveness.
6. Implementability.
7. Cost effectiveness.
8. Land use.
9. Community acceptance.

The first two criteria are referred to as threshold criteria, as they must be satisfied in order for the proposed remedial alternative to be selected. The next six criteria are referred to as balancing criteria as they are evaluated to allow for comparison of the relative positive and negative aspects of the proposed remedial alternatives.

The results of the detailed analysis of the remedial alternatives relative to the remedy selection evaluation criteria are summarized in **Table 7-1**. The table provides a description of each alternative including the technologies to be applied to specific environmental media, the action-specific SCGs that will apply to its implementation, and an analysis and discussion of the first seven criteria listed above as each applies to that alternative. Criterion eight, Land Use, is not included in **Table 7-1**, as all three alternatives assume the zoning of the OU#1 and OU#2 portions of the Site will remain Industrial. The ninth criterion, Community Acceptance, is evaluated by the NYSDEC after the public review of the proposed remedy.

7.2.1 Alternative #1: No Further Action with Site Management

As presented on **Table 7-1**, Alternative #1: No Further Action with Site Management would meet the overall goal of protection of public health and the environment by mitigating potential exposure pathways via the use of institutional controls, such as deed restrictions in the form of an environmental easement, Site Management Plan procedures/protocols, and engineering controls in the form of HVAC systems and sub-slab depressurization (SSD) systems. However, this alternative has no active remediation components focused on reducing the VOC presence in groundwater, soil, and soil vapor within the apparent source areas and near-source groundwater plume areas in OUs #1 and #2.

This alternative screens relatively low in its ability to meet applicable SCGs for groundwater, soil, and soil vapor as it does not include active Site remediation activities that could reduce VOC mass concentrations in groundwater, soil, and soil vapor. Given the lack of active remediation, this alternative would not meet the RAOs of controlling groundwater in apparent source areas in the railroad corridor and controlling VOC mass flux crossing North Street. Discontinuing groundwater extraction could also result in the need to reassess the potential vapor intrusion pathway in certain buildings in OUs #1 and #2. However, the use of a performance monitoring plan as an institutional control with HVAC and SSD systems as engineering controls could still result in acceptable mitigation of the vapor intrusion pathway and achievement of VOC indoor air quality guidance values. The timeframe for concentrations for COPCs to decline to applicable Part 703 groundwater standards and Part 375 soil cleanup objectives would increase from current projected timeframes due to the shutdown of groundwater extraction operations.

The long-term effectiveness of this alternative is high as it would effectively mitigate potential exposure pathways to VOC presence in soil and groundwater in apparent source areas and near-source groundwater plume areas. The restrictions would remain on the deed for the property in the case of a change in ownership. This alternative does not reduce the toxicity, mobility, or volume of the COPCs in apparent source areas and near-source groundwater plume areas.

The short-term effectiveness of this alternative is high. Implementation of this proposed remedy would result in no short-term risks to the community, workers, and the environment as there would be no active remediation activities and disruption to Site operations. This proposed remedy would achieve the RAOs for protection of public health upon its implementation by mitigating exposure of human receptors to unacceptable levels of COPCs in soil and groundwater.

This alternative is technically and administratively feasible. Use of deed restrictions is a common and effective institutional control for mitigating potential exposure pathways and unacceptable risk to human health and the environment. A Site Management Plan that is acceptable to NYSDEC, IBM, and the current property owner should be administratively feasible and implementable.

The projected costs for this alternative are $75,000 for one-time capital expenditures and $87,500 for annual costs to comply with the requirements of the Site Management Plan and maintain the SSD systems. A present worth analysis of these costs over a period of thirty years yields a total present worth cost estimate of about $1.8 million.

7.2.2 Alternative #2: Enhanced Groundwater Extraction

As presented on **Table 7-1**, Alternative #2: Enhanced Groundwater Extraction with the institutional and engineering controls specified in Alternative #1, would meet the overall goal of protection of public health and the environment by mitigating potential exposure pathways via the use of institutional controls and engineering controls.

This alternative screens relatively low in its ability to meet applicable SCGs for groundwater and soil due to severe access limitations to effectively remediate VOC mass in vadose zone and saturated zone soils impacted by past industrial activity in the railroad corridor and the historical development of near-source groundwater plumes. The operation of enhanced groundwater extraction systems is unlikely to result in attainment of soil and groundwater clean-up requirements within the next ten years. However, consistent with the significant remedial progress achieved over the past thirty-nine years, the enhanced groundwater extraction operations in OUs #1 and #2 are anticipated to continue to provide meaningful reductions in VOC concentrations in groundwater, soil, and soil vapor. This alternative would achieve the RAOs of controlling groundwater in apparent source areas in the railroad corridor and controlling VOC mass flux crossing North Street. The use of a performance monitoring plan as an institutional control with HVAC and SSD systems as engineering controls results in acceptable mitigation of the vapor intrusion pathway allowing achievement of VOC indoor air quality guidance values. The timeframe for concentrations for COPCs to decline to applicable Part 703 groundwater standards and Part 375 soil cleanup objectives is expected to be reduced under this remedial alternative due to the enhancement to the groundwater extraction operations.

The long-term effectiveness of this alternative is high as it would effectively mitigate potential exposure pathways to VOC presence in soil and groundwater in apparent source areas and near-source groundwater plume areas. The restrictions to prevent complete exposure pathways would remain on the deed for the property in the case of a change in ownership. This alternative would reduce the mobility and volume of the COPCs in apparent source areas and near-source groundwater plume areas. The mobility and volume would be reduced by groundwater capture, and using air stripping and activated vapor-phase carbon to remove VOCs from the groundwater withdrawals. The toxicity of VOCs would be eliminated via carbon regeneration where the VOCS are destroyed by thermal means.

The short-term effectiveness of this alternative is high. Implementation of this remedial alternative would result in no short-term risks to the community, workers, and the environment. This alternative should not disrupt Site operations as the majority of the active remediation infrastructure and operations are already in place as interim remedial measures. This proposed remedy would achieve the RAOs for protection of public health upon its implementation by mitigating exposure of human receptors to unacceptable levels of COPCs in soil and groundwater.

This alternative is technically and administratively feasible. Use of deed restrictions is a common and effective institutional control for mitigating potential exposure pathways and unacceptable risk to human health and the environment. Enhanced groundwater extraction has a long proven history of implementability within OUs #1 and #2 with operable run times for individual extraction wells that are typically greater than 98%. A Site Management Plan that is acceptable to NYSDEC, IBM, and the current property owner should be administratively feasible and implementable.

The projected costs for this alternative are about \$545,000 for one-time capital expenditures and \$450,000 for annual costs to comply with the requirements of the Site Management Plan, maintain the groundwater extraction and treatment systems, and maintain the SSD systems. A present worth analysis of these costs over a period of thirty years yields a total present worth cost estimate of about \$9.3 million.

7.2.3 Alternative #3: Enhanced Biodegradation

As presented on **Table 7-1**, Alternative #3: Enhanced Biodegradation with the institutional and engineering controls specified in Alternative #2 would meet the overall goal of protection of public health and the environment by mitigating potential exposure pathways via the use of institutional controls and engineering controls.

This alternative screens relatively low in its ability to meet applicable SCGs for groundwater and soil due to severe access limitations to effectively remediate VOC mass in vadose zone and saturated zone soils impacted by past industrial activity in the railroad corridor and the historical development of near-source groundwater plumes. Enhanced biodegradation is unlikely to result in attainment of soil and groundwater cleanup requirements within the next ten years. The enhanced biodegradation operations in OUs #1 and #2 may provide some limited reductions in VOC concentrations in groundwater, soil, and soil vapor but those reductions would be limited to areas where there is access for injection and where the natural oxidizing conditions can be successfully shifted to reducing conditions.

The enhanced groundwater portion of this alternative would achieve the RAOs of controlling groundwater in apparent source areas in the railroad corridor and controlling VOC mass flux crossing North Street. However, the biodegradation portion of this remedial alternative could adversely impact the extent of the control of the railroad corridor source areas and the VOC mass flux crossing North Street due to fouling of the Upper Aquifer soils and the well screens of the extraction wells. The use of a performance monitoring plan as an institutional control with HVAC and SSD systems as engineering controls results in acceptable mitigation of the vapor intrusion pathway, allowing achievement of VOC indoor air quality guidance values. The timeframe for concentrations for COPCs to decline to applicable Part 703 groundwater standards and Part 375 soil cleanup objectives is expected to be reduced under this remedial alternative.

The long-term effectiveness of this alternative is low to moderate. The restrictions to prevent complete exposure pathways would remain on the deed for the property in the case of a change in ownership. The groundwater extraction component of this alternative is a proven technology with a long history of effectiveness that would effectively mitigate potential exposure pathways to VOC presence in soil and groundwater in apparent source areas and near-source groundwater plume areas. However, some uncertainty exists in the long-term effectiveness of the biodegradation component of this remedy due to (1) severe access limitations that restrict where injection can be implemented, limiting the locations where the biodegradation portion of this alternative can be applied; (2) potential difficulties in changing the natural redox conditions in the aquifer; (3) potential difficulties in maintaining reducing conditions due to exfiltration of oxygenated water from sewers in the railroad corridor area; (4) the potential for incomplete biodegradation resulting in accumulation of cis12DCE and vinyl chloride; and (4) the potential for significant operational shutdowns of the extraction and treatment systems due to fouling of well screens, pumping systems, conveyance piping, and treatment system components. Clogging of the Upper Aquifer soils could also change the long-term effectiveness of the groundwater extraction portion of this alternative.

This alternative would reduce the mobility and volume of the COPCs in apparent source areas and near-source groundwater plume areas. The mobility and volume would be reduced by groundwater capture, with air stripping and activated vapor-phase carbon to remove VOCs from the groundwater withdrawals. The toxicity of VOCs would be eliminated by a combination of *in situ* destruction of VOCs by the microorganisms and by vapor-phase carbon regeneration where the VOCs sorbed onto vapor-phase carbon during groundwater treatment are destroyed by thermal means. However, the toxicity could be enhanced if incomplete dechlorination results in the accumulation of greater concentrations of degradation products, such as vinyl chloride.

The short-term effectiveness of this alternative is moderate. Implementation of this remedial alternative would result in no short-term risks to the community, workers, and the environment. This alternative could result in some disruption to Site operations during installation of injection points and/or wells, hauling and disposal of drilling wastes, short-term noise events, and work in high-density utility corridors. Periodic injection of amendments and possibly microorganisms could also cause temporary minor disruptions to Site operations. No other disruptions to Site operations should occur as the other components of the active remediation infrastructure and operations are already in place as interim remedial measures. This proposed remedy would achieve the RAOs for protection of public health upon its implementation by mitigating exposure of human receptors to unacceptable levels of COPCs in soil and groundwater.

This alternative is technically and administratively feasible. Use of deed restrictions is a common and effective institutional control for mitigating potential exposure pathways and unacceptable risk to human health and the environment. Enhanced groundwater extraction has a long proven history of implementability within OUs #1 and #2 with operable run times typically greater than 98%. Biodegradation has been proven to be implementable at other sites but its implementability has yet to be tested within OUs #1 and #2. A Site Management Plan that is acceptable to NYSDEC, IBM, and the current property owner should be administratively feasible and implementable.

The projected costs for this alternative are $1,688,000 for one-time capital expenditures and $720,750 for annual costs to comply with the requirements of the Site Management Plan, maintain the groundwater extraction and treatment systems, maintain the SSD systems, and implement enhanced biodegradation injection and monitoring. A present worth analysis of these costs over a period of thirty years yields a total present worth cost estimate of about $15.6 million.

7.3 Comparative Analysis of Alternatives

All three alternatives are able to achieve the overall goal of protection of public health and the environment by eliminating potential exposure pathways. All three alternatives will likely not achieve New York State SCGs for groundwater and soil in the short- and long-term. However, achieving SCGs for groundwater, soil, and soil vapor is currently impractical due to severe access restrictions imposed by Site and off-Site (railroad property) infrastructure, Site and off-Site operations, and the nature and extent of the remaining VOC mass in vadose zone and saturated zone soils after nearly four decades of remedial measures.

The long-term effectiveness of Alternatives #1 and #2 are rated higher than Alternative #3 due to concerns with severe access limitations that limit the areas where the biodegradation component of Alternative #3 can be applied, the oxidizing conditions in the Upper Aquifer groundwater and the potential for the biodegradation component of the alternative to affect the integrity of the groundwater extraction and treatment systems. Alternative #2 is considered to be more favorable than Alternative #1 as it also has a long history of successful operation at reducing VOC mass and controlling VOC mass flux in OUs #1 and #2.

Alternative #1 does not reduce the toxicity, mobility, or volume of the COPCs in apparent source areas and near-source groundwater plume areas, whereas Alternatives #2 and #3 will decrease the toxicity, mobility, and volume of VOCs in the long-term. Alternative #2 is considered to be more favorable for this criterion since generation of more toxic constituents due to incomplete dechlorination is a concern for Alternative #3.

The short-term effectiveness for Alternatives #1 and #2 is high, while the short-term effectiveness for Alternative #3 is moderate. Alternative #3 is rated lower since it includes remedial construction activities and other field activities that could result in limited disruption of Site operations and possible remediation worker exposure to noise and chemicals. Although Alternatives #1 and #2 are rated high, they also have a limited component of field work for maintaining the SSD systems (Alternatives #1 and #2) and the groundwater extraction systems (Alternative #2) that could result in possible remediation worker exposure to noise and chemicals.

The implementability of all three alternatives is expected to be technically and administratively feasible, although groundwater conditions would favor enhanced groundwater extraction without enhanced biodegradation as a potential remedial alternative. The relative costs are highest for Alternative #3 and lowest for Alternative #1.

8 PROPOSED REMEDY

Based on the results of the detailed and comparative analyses presented in Section 7, Alternative #2, Enhanced Groundwater Extraction, is the proposed remedy to address the presence of VOCs in groundwater, soil, and soil vapor in OUs #1 and #2. Elements of the proposed remedy include the following institutional controls, engineering controls, monitoring, *ex situ* treatment technologies, and treated effluent discharge technologies:

- ***Institutional Controls***
    - Consent Order between NYSDEC and IBM
    - Environmental Easement/Deed Restriction
    - Site Management Plan with Excavation Work Plan and Health & Safety Plan, Performance Monitoring Plan, Contingency Plan, Monitoring Plan, Periodic inspections/certifications, and periodic reporting
    - Site Access Restrictions – fencing, gated roadways, property owner security protocols
- ***Engineering Controls***
    - HVAC systems and SSD systems for certain occupied buildings
    - Groundwater extraction wells with or without vacuum-assist pumping systems, double-walled conveyance piping systems, and groundwater treatment facilities
- ***Monitoring***
    - Source Containment and Flux Control Effectiveness Monitoring
    - SPDES discharge of treated groundwater
- ***Ex situ Treatment Technologies***
    - Physical Treatment – air stripping, aqueous-phase carbon adsorption, and filtration
    - Off-Gas Treatment – air quality dispersion monitoring, off-gas influent and effluent monitoring, and vapor-phase carbon adsorption
- ***Discharge Technologies***
    - Discharge to Surface Water – discharge to storm sewer

The justification for the selection of Alternative #2 is as follows:

1. It meets the overall goal of protection of public health and the environment by mitigating potential exposure pathways via the use of institutional controls and engineering controls.

2. It is the most favorable alternative to meet the RAOs of controlling groundwater in apparent source areas in the railroad corridor and controlling VOC mass flux crossing North Street that are critical to maintaining the Off-Site groundwater plume cleanup achievements.

3. It rates higher for long-term and short-term effectiveness when compared to the other active remediation alternative of enhanced biodegradation. It has a long 39-year history of successful operation in OUs #1 and #2 at reducing VOC mass and controlling VOC mass flux without significant disruption of Site operations or exposure of Site workers to noise and chemicals.

4. It is the most favorable alternative for reduction in toxicity, mobility, and volume of the COPCs.

5. It is a technically and administratively feasible remedial alternative that is proven to be reliable under the severe access limitations within OUs #1 and #2. It can be successfully applied over large areas using a limited number of widely-spaced vertical wells in areas of severe access limitations, whereas the enhanced biodegradation alternative has limitations with regard to where it can be applied.

9 REFERENCES

Dames & Moore, June 1980, Draft Report, Ground Water Studies, Accidental Spill of Methyl Chloroform on December 14, 1979, IBM Endicott Plant, Endicott, New York, prepared for the IBM Corporation.

Dames & Moore, December 5, 1980, Report, Groundwater Investigation, IBM Corporation, IBM Endicott Plant, Endicott, New York, prepared for the IBM Corporation.

Geraghty & Miller, Inc., April 1993, Results of the Air Sparging Demonstration Test, IBM Corporation, Endicott, New York.

Groundwater Sciences, P.C., April 30, 2004, Evaluation of Existing Corrective Measures Systems, Village of Endicott / Town of Union, Broome County, New York, prepared for IBM Corporation.

Groundwater Sciences, P.C., May 17, 2004, Supplemental Groundwater Assessment Final Report, Village of Endicott / Town of Union, Broome County, New York, prepared for IBM Corporation.

Groundwater Sciences Corporation and Groundwater Sciences, P.C., March 1, 2005, Supplemental Remedial Investigation and Focused Feasibility Study Work Plan, Order on Consent Index #A7-0502-0104, Site #704014, Operable Unit #1: Railroad Corridor Source Area, prepared for IBM Corporation.

Groundwater Sciences Corporation and Groundwater Sciences, P.C., March 10, 2005, Supplemental Remedial Investigation and Focused Feasibility Study Work Plan, Order on Consent Index #A7-0502-0104, Site #704014, Operable Unit #2: North Street Area, prepared for IBM Corporation.

Groundwater Sciences Corporation, July 14, 2006, Final Pre-Characterization Technical Memorandum, Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area, Order on Consent Index #A7-0502-0104, Site #704014, prepared for IBM Corporation.

Groundwater Sciences Corporation, August 8, 2006, Revised Petition to Modify the Description of Site Number 704014, Village of Endicott/Town of Union, Broome County, New York, Order on Consent Index #A7-0502-0104, Site #704014, prepared for IBM Corporation.

Groundwater Sciences, P.C. and Groundwater Sciences Corporation, October 15, 2008, Technical Memorandum to Mitch Meyers of IBM, Subject: Preliminary Screening of Candidate Technologies for Source Remediation and/or Flux Control, OU#1 and OU#2, Former IBM Endicott Site, New York.

Groundwater Sciences Corporation, August 28, 2009, revised January 29, 2010, Supplemental Remedial Investigation Report, Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area, Village of Endicott/Town of Union, Broome County, New York, Order on Consent Index #A7-0502-0104, Site #704014, prepared for IBM Corporation.

Groundwater Sciences, P.C. and Groundwater Sciences Corporation, March 26, 2010. Interim Remedial Measures Work Plan for Groundwater Re-Injection, Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area, Village of Endicott/Town of Union, Broome County, New York, Order on Consent Index #A7-0502-0104, Site #704014, prepared for IBM Corporation.

Groundwater Sciences Corporation, September 26, 2012, Storm Sewer Sediment Sampling Analysis, and Removal Report, Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area, Village of Endicott/Town of Union, Broome County, New York, Order on Consent Index #A7-0502-0104, Site #704014, prepared for IBM Corporation.

IBM Corporation, December 20, 2013, Letter from Mitchell E. Meyers of the IBM Corporation to Alex Czuhanich of the New York State Department of Environmental Conservation, Subject: Storm Sewer Manhole Inspection and Sediment Sampling, Operable Unit #1: Railroad Corridor Source Area, Village of Endicott/Town of Union, Broome County, New York, Order on Consent Index #A7-0502-0104, Site #704014.

IBM Corporation, January 12, 2015, Letter from Mitchell E. Meyers of the IBM Corporation to Alex Czuhanich of the New York State Department of Environmental Conservation, Subject:

Storm Sewer Manhole Inspection and Sediment Sampling, Operable Unit #2: North Street Area, Village of Endicott/Town of Union, Broome County, New York, Order on Consent Index #A7-0502-0104, Site #704014.

New York State Department of Environmental Conservation, May 3, 2010, DER-10 Technical Guidance for Site Investigation and Remediation.

Sanborn, Head Engineering, P.C., September 2016, Indoor Air Assessment Report, Former IBM Endicott Facility, Endicott, New York, prepared for IBM Corporate Environmental Affairs.

Vapex Environmental Technologies, Inc., June 1989, Report on the Soil Vapor Extraction Feasibility Assessments at IBM facility; Endicott, NY, Phase I – Soil Gas Survey, prepared for Ground Water Associates and IBM Corporation.

Vapex Environmental Technologies, Inc., June 1990, Report on the Soil Vapor Extraction Feasibility Assessments at IBM facility; Endicott, NY, Phase III – Field Investigation, prepared for Ground Water Associates and IBM Corporation.

TABLE 6-1
SCREENING OF POTENTIALLY APPLICABLE REMEDIAL TECHNOLOGIES

FFS Report for OUs #1 and #2
Former IBM Endicott Site, Endicott, New York

POTENTIALLY APPLICABLE TECHNOLOGY	**IMPLEMENTABILITY RELATIVE TO SITE HYDROGEOLOGIC CONDITIONS**			**EFFECTIVENESS in Protecting Human Health and Environment**		**POTENTIAL APPLICATION TO OU#1 AND OU#2 AT ENDICOTT SITE AND RELATIVE COST**
	Vadose zone (0 to 19 ft. bgs) containing PCE, TCE, and TCA	**Saturated zone (19 to 24 ft. bgs) containing PCE, TCE, and TCA**	**Silt/Clay (24 to 29 ft. bgs) containing PCE, TCE, and TCA**	**Short-term (Includes Potential Impacts to Workers and Community)**	**Long-term (Effectiveness at Meeting Remedial Action Objectives)**	
DESTRUCTION TECHNOLOGIES						
***InSitu* Chemical Oxidation (ISCO)** *In-Situ* treatment of soil and groundwater containing VOCs by adding chemical oxidants such as permanganate or peroxide into source areas. Treatment by this technology is typically used to destroy/reduce source area mass above and below the water table.	**Partially Feasible.** Oxidant demand likely to be highly variable; increasing the temperature and pH that is required for the activation of persulfate to oxidize TCA is not feasible at the Site. Severe access limitations exist to properly deliver chemical oxidants uniformly within the target area. The location of VOC source(s) cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property.	**Not Feasible.** TCA is not easily amenable to ISCO; increasing the temperature and pH that is required for the activation of persulfate to oxidize TCA is not feasible in OUs #1 and #2. Mineral oxidation resulting from ISCO in groundwater could result in precipitation of calcium, iron, and manganese in pipes, pumps, valves, and meters resulting in increased operations and maintenance requirements for the existing groundwater extraction system infrastructure. The use of high pressure injection to achieve greater coverage in the subsurface from a few accessible injection locations is not feasible due to presence of deep storm and sanitary sewers, and underground utilities. Severe access limitations exist making delivery of chemical oxidants to strategic locations in apparent source areas and near-source groundwater plume areas not feasible.	**Not Feasible.** Potential limitations exist in delivery of oxidants in fine-grained silt/clay soils; the use of high pressure injection to achieve greater coverage in the subsurface from a few accessible injection locations is not feasible due to presence of deep storm and sanitary sewers, and underground utilities.	**Low –** Proven method for short-term reduction in PCE and TCE concentrations in similar hydrogeologic settings but unproven method for short-term reduction of TCA concentrations in similar hydrogeologic settings. ISCO will not effectively reach existing VOC mass of target constituents diffused within and sorbed on or within fine-grained soils. Potential issues/concerns limited to workers handling chemicals and public perception of chemical injection.	**Low** – Severe access limitations exist such that delivery of chemical oxidants to strategic locations where contaminant mass resides in the vadose zone and saturated zone is not feasible. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs. Therefore, long-term effectiveness is low. This technology would have unacceptable effect on flux control of TCA. The duration of required oxidant injection is uncertain. Ability to meet groundwater cleanup standards in active and passive remediation area is “low” due severe access limitations; inability to oxidize TCA; and potential rebound effects in vadose and saturated zones due to diffusion from finer textured sandy soils and silt/clay.	**Exclude from further consideration** as a separate remedial alternative or in combination with other technologies due to concerns with implementability in source zones, near-source groundwater plume areas, and silt/clay soils, and inability to oxidize TCA. The location of VOC source(s) cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Mineral oxidation resulting from ISCO in groundwater could result in precipitation of calcium, iron, and manganese in pipes, pumps, valves, and meters resulting in increased operations and maintenance requirements for the existing groundwater extraction system infrastructure. Therefore, this technology cannot be used as a stand-alone or in combination with other technologies to meet RAOs. **Relative Cost: Moderate**
Enhanced Biodegradation with or without Bio-augmentation Treatment of soil and groundwater containing VOCs by adding amendments to enhance on-going anaerobic biodegradation by reductive dechlorination. Bioaugmentation consists of adding non-indigenous bacteria (such as KB-1 or dehalococcoides (DHC)) along with amendments to soil and groundwater to increase and enhance existing microbial populations responsible for on-going reductive dechlorination in OUs #1 and #2. Bio-degradation would be most likely used as a flux control/reduction technology and for limited source area treatment in saturated zones.	**Not Feasible.** Not applicable to this zone because very difficult to create and maintain reducing conditions within the vadose zone. Reduction of VOC mass in the saturated zone has a limited indirect effect on reducing VOC mass in the vadose zone.	**Partially Feasible.** Technology can be successfully applied using a limited number of widely-spaced vertical wells in areas of severe access limitations, although the ability to create widespread reducing conditions would be unlikely without greater Site access. Heterogeneous soil texture conditions could limit uniform delivery of injected amendments to the saturated zone soils. Potential for incomplete biodegradation resulting in accumulation of cis12DCE and vinyl chloride that are more difficult to treat with GAC.	**Not Feasible.** Reduction of VOC mass in the saturated zone has a limited indirect effect on reducing VOC mass in the silt/clay layer at the base of the Upper Aquifer.	**Moderate –**Proven method for reduction of VOC concentrations in hydrogeologic settings similar to the saturated zone (19-24 ft. bgs). Will not meet RAOs in vadose zone source areas. Natural oxidizing conditions and the influx of oxygenated water from the storm and sanitary sewers would make maintaining reducing conditions for optimal dechlorination difficult. No apparent adverse short-term impacts to construction workers, Site workers, and/or the community.	**Moderate –** Technology has a proven long-term effectiveness at reducing VOC mass in soil and groundwater at numerous solvent release sites. Implementable or potentially implementable within the saturated zone in OUs #1 and #2. Would stimulate reductive dechlorination in certain areas of the Site near the injection points. Protective of human health and the environment by potentially meeting RAOs in groundwater within OUs #1 and #2. Heterogeneous soil texture conditions could limit uniform delivery of injected amendments to the saturated zone soils. Amendment injected into the saturated zone could clog wells.	**Retain for further consideration** in combination with other technologies for application to the saturated zone to reduce VOC mass flux. Implementable or potentially implementable within OUs #1 and #2. Reduction of VOC mass in the saturated zone has a limited indirect effect on reducing small amount of VOC mass in the vadose zone and silt/clay layer beneath the Upper Aquifer. Technology can be successfully applied using a limited number of widely-spaced vertical wells in areas of severe access limitations, although the ability to create widespread reducing conditions would be unlikely without greater Site access. Heterogeneous soil texture conditions could limit uniform delivery of injected amendments to the saturated zone soils. Protective of human health and the environment by potentially meeting

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POTENTIALLY APPLICABLE TECHNOLOGY	**IMPLEMENTABILITY RELATIVE TO SITE HYDROGEOLOGIC CONDITIONS**			**EFFECTIVENESS in Protecting Human Health and Environment**		**POTENTIAL APPLICATION TO OU#1 AND OU#2 AT ENDICOTT SITE AND RELATIVE COST**
	Vadose zone (0 to 19 ft. bgs) containing PCE, TCE, and TCA	**Saturated zone (19 to 24 ft. bgs) containing PCE, TCE, and TCA**	**Silt/Clay (24 to 29 ft. bgs) containing PCE, TCE, and TCA**	**Short-term (Includes Potential Impacts to Workers and Community)**	**Long-term (Effectiveness at Meeting Remedial Action Objectives)**	
					and portions of the Upper Aquifer causing increased O&M for the on-going groundwater extraction system. Potential for incomplete biodegradation resulting in accumulation of cis12DCE and vinyl chloride that are more difficult to treat with GAC.	RAOs in groundwater within OUs #1 and #2. No apparent adverse short-term impacts to construction workers, Site workers, and/or the community. Influx of oxygenated water due to exfiltration from deep storm and sanitary sewers in portions of OUs #1 and #2 would make maintaining reducing conditions for optimal dechlorination more difficult. Amendment injected into the saturated zone could clog wells and portions of the Upper Aquifer causing increased O&M for the on-going groundwater extraction system. Potential for incomplete biodegradation resulting in accumulation of cis12DCE and vinyl chloride that are more difficult to treat with GAC. **Relative Cost: Moderate to High**
***In-Situ* Chemical Reduction (ICR) using Zero Valent Iron (ZVI) with or without *in-situ* liquid-activated carbon adsorption** Treatment using this technology includes *In-Situ* injection of Zero Valent Iron (ZVI) in some form to reduce VOC flux via abiotic reductive dechlorination and the potential stimulation of biotic dechlorination. Nano-scale or micro-scale zero-valent iron (ZVI), bimetallic ZVI, sulfidated ZVI, ZVI-impregnated carbon, or liquid-activated carbon can be delivered into the plume as an emulsion injected via wells or through augers. ZVI is not a source area treatment for unsaturated soil and will only treat the target constituents in dissolved-phase groundwater. Theoretically, ZVI particles can be transported short distances down-gradient from the point of injection via groundwater flow. Liquid-activated carbon impregnated with sulfidated iron	**Not Feasible.** The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. The radius of influence of ZVI material injected into the unsaturated zone is small without using high pressure injection; use of high pressure injection to achieve greater coverage is not feasible in OUs #1 and #2 due to presence of deep storm and sanitary sewers, and underground utilities. Severe access limitations will prevent ZVI from being delivered uniformly to necessary source locations in order to provide meaningful reduction in overall VOC mass in the vadose zone in OUs #1 and #2.	**Partially Feasible.** The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely. Severe access limitations will prevent ZVI from being delivered uniformly to necessary source locations in order to provide meaningful reduction in overall VOC mass in OUs #1 and #2. The radius of influence of ZVI material injected into the Upper Aquifer at the site requires the use of high pressure injection; use of high pressure injection to achieve greater coverage is not feasible in OUs #1 and #2 due to presence of deep storm and sanitary sewers, and underground utilities.	**Not Feasible.** The radius of influence of ZVI material injected into the fine-grained lacustrine silt/clay unit is small without using high pressure injection; use of high pressure injection to achieve greater coverage is not feasible in OUs #1 and #2 due to presence of deep storm and sanitary sewers, and underground utilities.	**Low –** Effective in some hydrogeologic settings to destroy constituents such as PCE, TCE, and TCA using abiotic processes and by stimulating anaerobic microbial dechlorination. ZVI material clogging and chemical changes to the Upper Aquifer from ZVI injection could cause reduced groundwater extraction yields and pipe, pump, meter, and valve fouling of the existing pumping and treatment system infrastructure in short and long terms. Both access and technology limitations prevent full-scale use of ICR in required areas. No significant adverse short-term impacts to site workers or the Community.	**Low –** The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. The radius of influence of ZVI material injected into the unsaturated zone, saturated zone, and fine-grained lacustrine silt/clay units is small without using high pressure injection; use of high pressure injection to achieve greater coverage is not feasible in OUs #1 and #2 due to presence of deep storm and sanitary sewers, and underground utilities. Severe access limitations will prevent ZVI from being delivered uniformly to necessary source locations in order to provide meaningful reduction in overall VOC mass in OUs #1 and #2 to attain groundwater RAOs. Passivation or crusting of the ZVI material, uncertain material life expectancy, and need for periodic material replacement provide uncertain performance in OUs #1	**Exclude from further consideration.** Severe access limitations will prevent ZVI from being delivered uniformly to necessary source locations in order to provide meaningful reduction in overall VOC mass in OUs #1 and #2 to attain groundwater RAOs. If access limitations were removed, this technology could be used in combination with other technologies for application to the saturated zone to reduce VOC mass flux. ZVI cannot be a stand-alone technology because severe access limitations will prevent ZVI from being delivered uniformly to necessary source locations in order to provide meaningful reduction in overall VOC mass in OUs #1 and #2 to attain groundwater RAOs. RAOS would not be met in soil or groundwater in OUs #1 and #2 using this technology. **Relative Cost: Moderate**

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	Vadose zone (0 to 19 ft. bgs) containing PCE, TCE, and TCA	**Saturated zone (19 to 24 ft. bgs) containing PCE, TCE, and TCA**	**Silt/Clay (24 to 29 ft. bgs) containing PCE, TCE, and TCA**	**Short-term (Includes Potential Impacts to Workers and Community)**	**Long-term (Effectiveness at Meeting Remedial Action Objectives)**	
can be used to slow the mobility and abiotically destroy the target constituents once adsorbed on the surface of the carbon.					and #2 over the long term. Activated carbon containing ZVI could act as a VOC contaminant source if not removed once the available adsorption sites on the carbon are occupied and the ZVI is no longer active. ZVI material clogging and chemical changes to the Upper Aquifer from ZVI injection could cause reduced groundwater extraction yields and pipe, pump, meter, and valve fouling of the existing pumping and treatment system infrastructure.	
SEPARATION/ TREATMENT TECHNOLOGIES						
Excavation Physical removal of impacted soil in the vadose zone, saturated zone, and silt/clay layer beneath the Upper Aquifer in source areas potentially to depths of 25 to 30 feet bgs. Use of sheet piling and dewatering of groundwater is necessary to provide stable excavations and to protect utilities and buildings/structures. Off-Site disposal of soil to landfill and off-Site treatment of groundwater is needed.	**Partially Feasible.** The majority of the mass of VOCs is in vadose zone soil in the OUs #1 and #2 railroad corridor. The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Severe access limitations prevent excavation of VOC mass in some vadose zone source areas. Residual VOC mass not accessible by excavation would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs. Even relatively small excavation footprints would disrupt Site operations given the density of utilities, buildings, structures, and daily worker activities ongoing in OUs #1 and #2.	**Not Feasible.** The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. This zone would likely be a target for “hot spot” excavation since the majority of the mass of VOCs is in vadose zone soil. Regardless, severe access limitations prevent excavation of VOC mass in many saturated zone source areas. Residual VOC mass not accessible by excavation would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs.	**Not Feasible.** This zone would not be a target for excavation since the majority of the mass of VOCs is in vadose zone and some saturated zone soil.	**Low –** Proven method for short-term reduction in VOC concentrations in similar hydrogeologic settings. The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Sheet piling and other shoring installation in close proximity to buildings, structures, utilities, storm sewers, and sanitary sewers could cause damage to subsurface infrastructure. Even relatively small excavation footprints would disrupt Site operations given the density of utilities, buildings, structures, and daily worker activities ongoing in OUs #1 and #2. Potential for worker exposure to VOCs through excavation dewatering, VOC vapor emissions from soil and groundwater, and exposure to noise by workers and third-parties.	**Moderate –** Proven method for long-term reduction in VOC concentrations in soil, groundwater and soil vapor after removal of impacted soil in source areas. Severe access limitations prevent excavation of VOC mass in some vadose zone and saturated zone source areas. Residual VOC mass not accessible by excavation would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs.	**Exclude from further consideration** as a separate remedial alternative or in combination with other technologies. The location of VOC source(s) in OUs#1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Severe access limitations prevent excavation of VOC mass in some vadose zone and saturated zone source areas. Residual VOC mass not accessible by excavation would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs. Sheet piling and other shoring installation in close proximity to buildings, structures, utilities, storm sewers, and sanitary sewers could cause damage to subsurface infrastructure. Even relatively small excavation footprints would disrupt Site operations given the density of utilities, buildings, structures, and daily worker activities ongoing in OUs #1 and #2. Potential for worker exposure to VOCs through excavation dewatering, VOC vapor emissions from soil and groundwater, and exposure to noise by workers and third-parties. Excavation activities would cause increased truck traffic and noise associated with removal of soil, removal

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	Vadose zone (0 to 19 ft. bgs) containing PCE, TCE, and TCA	**Saturated zone (19 to 24 ft. bgs) containing PCE, TCE, and TCA**	**Silt/Clay (24 to 29 ft. bgs) containing PCE, TCE, and TCA**	**Short-term (Includes Potential Impacts to Workers and Community)**	**Long-term (Effectiveness at Meeting Remedial Action Objectives)**	
				Excavation activities would cause increased truck traffic and noise associated with removal of soil, removal of water, and placement of clean fill for some residents of Endicott and Site workers.		of water, and placement of clean fill for some residents of Endicott and Site workers. Excavation is not feasible and cannot meet RAOs. **Relative Cost: High**
Soil Vapor Extraction (SVE) Extraction and treatment of soil vapor containing VOCs in the vadose zone, alone or in combination with air sparging in the saturated zone.	**Partially Feasible.** The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property**.** Potential for short-circuiting of extracted air flow due to heterogeneous soil texture and density conditions and numerous subsurface utilities in OUs #1 and #2. A feasibility study in 1989/1990 concluded SVE is not an appropriate technology for the railroad corridor based on field tests. Removal of VOCs present in finer textured sandy soils and foc-rich soils would be limited by diffusion and sorption. The majority of the VOC mass that would be the target of SVE in vadose zone soil in OUs #1 and #2 is inferred to reside beneath utilities, structures/buildings, and the railroad property where it is inaccessible. In small areas where access is possible, numerous utilities, and sewers (storm and sanitary) restrict proper placement of SVE wells rendering even limited SVE use in OUs #1 and #2 only partially feasible.	**Not Feasible.** The saturated thickness of the Upper Aquifer (saturated zone) is typically five feet or less providing little opportunity for air sparging and vapor collection via SVE from this zone. The fine-grained silt/clay soils, underlying the Upper Aquifer is not amenable to this technology. Residual VOC mass in soil that is not accessible would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs.	**Not Feasible.** Fine-textured silt and clay soils would inhibit ability for VOC mass removals via air-sparging and SVE.	**Low –** The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Potential for short-circuiting of extracted air flow due to heterogeneous soil texture and density conditions and numerous subsurface utilities in OUs #1 and #2. The majority of the VOC mass that would be the target of SVE in vadose zone soil in OUs #1 and #2 is inferred to reside beneath utilities, structures/buildings, and the railroad property where it is inaccessible. In small areas where access is possible, numerous utilities, and sewers (storm and sanitary) restrict proper placement of SVE wells rendering even limited SVE use in OUs #1 and #2 only partially feasible. Significant numbers of utilities exist in many areas of OUs #1 and #2 making installation of SVE infrastructure potentially harmful for construction workers. No significant adverse short-term impacts to Site workers or the community.	**Low –** The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property**.** The majority of the VOC mass that would be the target of SVE in vadose zone soil in OUs #1 and #2 is inferred to reside beneath utilities, structures/buildings, and the railroad property where it is inaccessible**.** Residual VOC mass in soil that is not accessible would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs. Potential exists for rebound effect due to back diffusion and desorption from finer textured and foc-rich soils.	**Exclude from further consideration** as a separate remedial alternative or in combination with other technologies. The majority of the VOC mass that would be the target of SVE in vadose zone soil in OUs #1 and #2 is inferred to reside beneath utilities, structures/buildings, and the railroad property where it is inaccessible. Removal of VOCs present in finer textured sandy soils and foc-rich soils would be limited by diffusion and sorption. Potential for short-circuiting of extracted air flow due to heterogeneous soil texture and density conditions and numerous subsurface utilities in OUs #1 and #2. The saturated thickness of the Upper Aquifer (saturated zone) is typically five feet or less providing little opportunity for air sparging and vapor collection via SVE from this zone. The fine-grained silt/clay soils, underlying the Upper Aquifer is not amenable to this technology. Residual VOC mass in soil that is not accessible would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs. **Relative Cost: Moderate**

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	Vadose zone (0 to 19 ft. bgs) containing PCE, TCE, and TCA	**Saturated zone (19 to 24 ft. bgs) containing PCE, TCE, and TCA**	**Silt/Clay (24 to 29 ft. bgs) containing PCE, TCE, and TCA**	**Short-term (Includes Potential Impacts to Workers and Community)**	**Long-term (Effectiveness at Meeting Remedial Action Objectives)**	
Dual-Phase Extraction (DPE) DPE systems depress the water table and remove mass from above and below the pre-pumping water level. As the water table around the well is lowered by pumping, unsaturated soil is exposed and VOC mass in the newly exposed zone can be removed by vapor extraction. Removal of groundwater and soil vapor is typically accomplished by either a high-vacuum system to remove both groundwater and soil vapor, or by a centrifugal pumping system to collect groundwater coupled with a high vacuum system to extract soil vapor.	**Partially Feasible.** The location of VOC source(s) in OUs #1 and #2 vadose zone cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Potential for short-circuiting of extracted air flow due to heterogeneous soil texture and density conditions and numerous subsurface utilities in OUs #1 and #2**.** The majority of the VOC mass that would be the target of DPE in vadose zone soil is inferred to be residing beneath utilities, structures/buildings, and the railroad property where it is inaccessible**.** In some small areas where access is possible, numerous utilities, and sewers (storm and sanitary) restrict proper placement of DPE wells rendering even limited DPE use in OUs #1 and #2 only partially feasible. Residual VOC mass in soil that is not accessible would continue to impact the Upper Aquifer groundwater by maintaining concentrations RAOs.	**Partially Feasible.** The location of VOC source(s) in OUs #1 and #2 saturated zone cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Potential for short-circuiting of extracted air flow due to heterogeneous soil texture and density conditions and numerous subsurface utilities in OUs #1 and #2. The majority of the VOC mass that would be the target of DPE in saturated zone soil is inferred to be residing beneath utilities, structures/buildings, and the railroad property where it is inaccessible. In some small areas where access is possible, numerous utilities, and sewers (storm and sanitary) restrict proper placement of DPE wells rendering even limited DPE use in OUs #1 and #2 saturated zone only partially feasible**.**	**Not Feasible.** Fine-textured silt and clay soils would inhibit VOC mass removal via DPE.	**Low –** The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. The majority of the VOC mass that would be the target of DPE in vadose zone soil is inferred to be residing beneath utilities, structures/buildings, and the railroad property where it is inaccessible. Noise of the blower system may be of potential concern for implementation in the short-term and long-term. No significant adverse short-term impacts to Site workers or the community.	**Low –** The location of VOC source(s) in OUs #1 and #2 cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Removal of VOCs present in finer textured sandy soils and foc-rich soils would be limited by diffusion and sorption. Residual VOC mass in soil that is not accessible would continue to impact the Upper Aquifer groundwater by maintaining concentrations RAOs. DPE will not achieve RAOs in the vadose, saturated, or silt/clay zones over the long term.	**Exclude from further consideration** as a separate remedial alternative or in combination with other technologies. The majority of the VOC mass that would be the target of SVE in vadose zone soil in OUs #1 and #2 is inferred to reside beneath utilities, structures/buildings, and the railroad property where it is inaccessible. Potential for short-circuiting of extracted air flow due to heterogeneous soil texture and density conditions and numerous subsurface utilities in OUs #1 and #2. The fine-grained silt/clay soils, underlying the Upper Aquifer is not amenable to this technology. Residual VOC mass in soil that is not accessible would continue to impact the Upper Aquifer groundwater by maintaining concentrations above RAOs. DPE has severe limitations in the ability to remove sufficient VOC mass in source areas and near-source groundwater plume areas in OUs #1 and #2. **Relative Cost: Moderate**
***In-Situ* Thermal Treatment** *In-Situ* treatment via thermal conductive or resistive heating above and below the water table with multi-phase extraction of groundwater and soil vapor.	**Not Feasible.** The location of VOC source(s) to be targeted for thermal treatment cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Closely-spaced multi-phase extraction wells are required to limit potential short-circuiting of steam and VOC vapors towards buildings; however, the majority of VOC mass in vadose soil is inaccessible for heater/SVE wells and multi-phase extraction wells.	**Not Feasible.** The same restrictions for vadose zone soils apply to the saturated zone in OUs #1 and #2. Severe access limitations would prohibit treatment in locations where VOC mass resides in the vadose zone and saturated zone. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs.	**Not Feasible.** The same feasibility issues as apply to the vadose and saturated zones.	**Low –** The location of VOC source(s) to be targeted for thermal treatment cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property. Heat would likely damage buildings and utilities adjacent to active remediation area(s). Heat would also damage the structural integrity of the soil bedding beneath the railroad tracks. Thermal treatment would cause nuisance issues with nearby structures (heating of basement and water lines).	**Low** – Technology reportedly has been effective in significantly reducing VOC concentrations in soil and groundwater in similar hydrogeologic settings. However, severe access limitations would prohibit treatment in locations where VOC mass resides in the vadose zone and saturated zone. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs. Will not meet long-term RAOs due to inaccessibility to VOC source areas.	**Exclude from further consideration** as a separate remedial alternative or in combination with other technologies. The location of VOC source(s) to be targeted for thermal treatment cannot be determined precisely due to the presence of underground utilities, structures and the lack of accessibility within the railroad property. Severe access limitations would prohibit treatment in locations where VOC mass resides in the vadose zone and saturated zone. Heat would damage on-Site and off-Site infrastructure. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs. Closely-

TABLE 6-1
SCREENING OF POTENTIALLY APPLICABLE REMEDIAL TECHNOLOGIES

FFS Report for OUs #1 and #2
Former IBM Endicott Site, Endicott, New York

POTENTIALLY APPLICABLE TECHNOLOGY	IMPLEMENTABILITY RELATIVE TO SITE HYDROGEOLOGIC CONDITIONS			EFFECTIVENESS in Protecting Human Health and Environment		POTENTIAL APPLICATION TO OU#1 AND OU#2 AT ENDICOTT SITE AND RELATIVE COST
	Vadose zone (0 to 19 ft. bgs) containing PCE, TCE, and TCA	**Saturated zone (19 to 24 ft. bgs) containing PCE, TCE, and TCA**	**Silt/Clay (24 to 29 ft. bgs) containing PCE, TCE, and TCA**	**Short-term (Includes Potential Impacts to Workers and Community)**	**Long-term (Effectiveness at Meeting Remedial Action Objectives)**	
				Relocation of subsurface utilities damaged during thermal treatment operations would disrupt operations for Site occupants.		spaced multi-phase extraction wells are required to limit potential short-circuiting of steam and VOC vapors towards buildings; however, the majority of VOC mass in vadose soil is inaccessible for heater/SVE wells and multi-phase extraction wells. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs. **Relative Cost: High**
CONTROL AND ISOLATION TECHNOLOGIES						
Groundwater Extraction using Vertical Wells and Enhanced by Vacuum Pumping Installation of vertical wells to extract Upper Aquifer groundwater at accessible locations within apparent source areas or near-source groundwater plume areas. This technology could include vacuum-enhanced groundwater extraction pumping systems in areas with sufficient saturated thickness. Serves as both a source reduction/control technology and a plume reduction/mass flux control technology.	**Feasible**. Reduction of VOC mass in the saturated zone has a limited indirect effect on reducing VOC mass in the vadose zone.	**Feasible.** Technology has a long history of implementability in the saturated zone of OUs #1 and #2. Technology can be successfully applied using a limited number of widely-spaced vertical wells in areas of severe access limitations.	**Feasible.** Reduction of VOC mass in the saturated zone has a limited indirect effect on reducing VOC mass in the silt/clay zone.	**High –** Technology has a proven long-term effectiveness at hydraulically containing source areas and reducing VOC mass in soil and groundwater at numerous solvent release sites. Technology has a long history of implementability in OUs #1 and #2. No apparent adverse short-term impacts to construction workers, Site workers, and/or the community.	**High –** Protective of human health and the environment by potentially meeting RAOs in groundwater within OUs #1 and #2. Technology has a long history of implementability in OUs #1 and #2. Technology can be successfully applied using a limited number of widely-spaced vertical wells in areas of severe access limitations. Influx of oxygenated water due to exfiltration from deep storm and sanitary sewers in portions of OUs #1 and #2 would potentially increase the rate of fouling of extraction well screens, pumping systems, conveyance piping, and treatment system components**.**	**Retain for further consideration** as a separate remedial alternative or in combination with other technologies. Technology has a long history of implementability in OUs #1 and #2 and can be successfully applied using a limited number of widely-spaced vertical wells in areas of severe access limitations. Heterogeneous soil texture conditions could limit the rate of mass transfer from finer-textured soils that are likely to contain a greater percentage of the remaining VOC presence in the saturated zone. Influx of oxygenated water due to exfiltration from deep storm and sanitary sewers in portions of OUs #1 and #2 would potentially increase the rate of fouling of extraction well screens, pumping systems, conveyance piping, and treatment system components. Protective of human health and the environment by potentially meeting RAOs in groundwater within OUs #1 and #2. No apparent adverse short-term impacts to construction workers, Site workers, and/or the community. **Relative Cost: High**

TABLE 6-1
SCREENING OF POTENTIALLY APPLICABLE REMEDIAL TECHNOLOGIES

FFS Report for OUs #1 and #2
Former IBM Endicott Site, Endicott, New York

POTENTIALLY APPLICABLE TECHNOLOGY	**IMPLEMENTABILITY RELATIVE TO SITE HYDROGEOLOGIC CONDITIONS**			**EFFECTIVENESS in Protecting Human Health and Environment**		**POTENTIAL APPLICATION TO OU#1 AND OU#2 AT ENDICOTT SITE AND RELATIVE COST**
	Vadose zone (0 to 19 ft. bgs) containing PCE, TCE, and TCA	**Saturated zone (19 to 24 ft. bgs) containing PCE, TCE, and TCA**	**Silt/Clay (24 to 29 ft. bgs) containing PCE, TCE, and TCA**	**Short-term (Includes Potential Impacts to Workers and Community)**	**Long-term (Effectiveness at Meeting Remedial Action Objectives)**	
Groundwater Extraction using Cut-Off Trenches Installation of trenches or drains with sumps installed at strategic locations to collect VOC-containing groundwater to be pumped to a surface treatment facility.	**Not Feasible** Not applicable to this zone. Excavation is required through this zone to install proposed groundwater collection trenches. The location of VOC source(s) in the saturated zone cannot be determined precisely due to the presence of underground utilities, structures, and the lack of accessibility within the railroad property.	**Not Feasible** The majority of VOC mass in the saturated zone is inaccessible for excavation using trenches to the required depth to make this technology effective. In some small areas at a few locations where groundwater collection via trenching would be possible to reduce VOC mass flux, numerous utilities and sewers (storm and sanitary) exist such that trenching is not feasible. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs.	**Not Feasible.** The majority of VOC mass in the silt/clay zone is un-impacted using this technology.	**Low –** The majority of VOC mass in the saturated zone is inaccessible for excavation using trenches to the required depth to make this technology effective. In some small areas at a few locations where groundwater collection via trenching would be possible to reduce VOC mass flux, numerous utilities and sewers (storm and sanitary) exist such that trenching is not feasible. In order to install deep trenches, sheet piling and other shoring installation is needed in close proximity to buildings, structures, utilities, storm sewers, and sanitary sewers and could cause damage to subsurface infrastructure during installation. Potential trench side-wall stability issues would need to be addressed to protect foundations of nearby structures. OSHA excavation requirements and potential trench side-wall stability issues would require sheet-piling. Potential for worker and resident exposure to noise, and vapor/odor emissions.	**Low –** The majority of VOC mass in the saturated zone is inaccessible for excavation using trenches to the required depth to make this technology effective. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs over the long term.	**Exclude from further consideration** as a separate remedial alternative or in combination with other technologies. The majority of VOC mass in the saturated zone is inaccessible for excavation using trenches to the required depth to make this technology effective. In order to install deep trenches, sheet piling and other shoring installation is needed in close proximity to buildings, structures, utilities, storm sewers, and sanitary sewers and could cause damage to subsurface infrastructure during installation. In some small areas at a few locations where groundwater collection via trenching would be possible to reduce VOC mass flux, numerous utilities and sewers (storm and sanitary) exist such that trenching is not feasible. Residual VOC mass not accessible will continue to impact Upper Aquifer groundwater by maintaining concentrations above RAOs. Groundwater extraction using vertical wells has already been successfully demonstrated as a source and flux control technology at the Site for nearly four decades. **Relative Cost: Low**

NOTE: This table is intended to summarize results of screening of remedial technologies with potential application to OUs #1 and #2. Each technology is screened relative to OUs #1 and #2-specific hydrogeologic conditions and potential short-term and long-term effectiveness. See the report text for additional details.

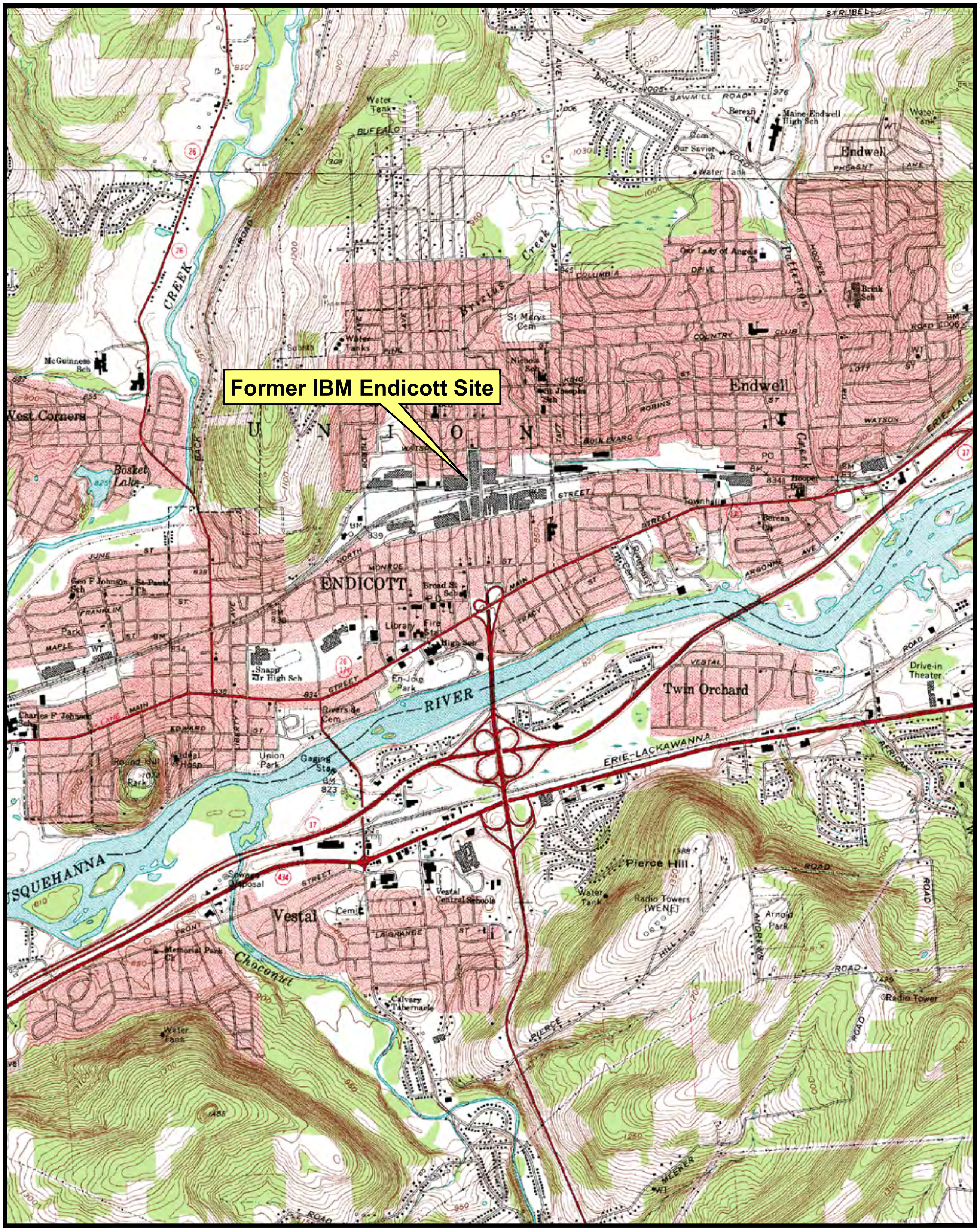
TABLE 7-1
DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES
FFS Report for OUs #1 and #2
Former IBM Endicott Site, Endicott, New York

REMEDIAL ALTERNATIVE	Overall Protection of Human Health and the Environment	Compliance with New York State SCGs (Attainment of Remedial Action Objectives)	Long-Term Effectiveness	Reduction in Toxicity, Mobility, and Volume	Short-Term Effectiveness	Implementability	Cost
NO FURTHER ACTION with SITE MANAGEMENT							
Alternative #1: **No Further Action with Site Management** – The No Further Action with Site Management alternative recognizes that the interim remedial measures implemented over the past thirty-nine years have successfully remediated OUs #1 and #2 such that institutional controls and certain engineering controls are sufficient to protect human health and the environment. The institutional controls include: the Order, an environmental easement, a Site Management Plan, and restrictions to Site access via fencing, roadway gates, and Huron security protocols. The engineering controls consist of HVAC systems and sub-slab depressurization systems for certain buildings in OUs #1 and #2. Elements of the Site Management Plan would include the following: • Excavation Work Plan, • Performance Monitoring Plan, • Site Contingency Plan, • Site Monitoring Plan, and • Periodic Inspections/Certifications.	**Low** – Meets the overall goal of protection of public health and the environment by mitigating potential exposure pathways via the use of institutional controls, such as deed restrictions in the form of an environmental easement and Site Management Plan procedures, and engineering controls in the form of HVAC systems and sub-slab depressurization systems. ***Soil*** – Institutional controls will exist to prevent access to impacted soil by site workers and construction workers that could be exposed to soil containing VOCs through dermal contact, ingestion, and inhalation. Infiltration of water through soil containing VOCs will continue to impact the Upper Aquifer at rates above RAOs. ***Soil Vapor*** – Continued operation of HVAC systems, and where appropriate sub-slab depressurization (SSD) systems, will prevent vapors from entering occupied buildings at rates that are not protective of human health and the environments. ***Groundwater*** – Discontinuing groundwater extraction could result in the need to reassess the potential vapor intrusion pathway in certain buildings in OUs #1 and #2.	**Low –** This alternative screens relatively low in its ability to meet applicable SCGs for groundwater, soil, and soil vapor as it does not include active Site remediation activities that could reduce VOC mass concentrations in groundwater, soil, and soil vapor in apparent source areas and near-source groundwater plume areas. Given the lack of active remediation, this alternative would not meet the RAOs of controlling groundwater in apparent source areas in the railroad corridor and controlling VOC mass flux crossing North Street. ***Soil*** – Alternative #1 will not achieve SCGs and RAOs in soil in OUs #1 and #2 per 6 NYCRR Part 375, Table 375-6.8 (b) – Restricted Use Soil Cleanup Objectives. ***Soil Vapor*** –Operation of HVAC systems, and where appropriate SSD systems, will prevent vapors entering occupied buildings above NYSDOH Guidance Values. ***Groundwater*** – The timeframe for concentrations for COPCs to decline to applicable NYS Part 703 groundwater standards would increase from current projected timeframes due to the shutdown of groundwater extraction operations.	**High –** The long-term effectiveness of this alternative is high as it would effectively mitigate potential exposure pathways to VOC presence in soil and groundwater in apparent source areas and near-source groundwater plume areas. The restrictions would remain on the deed for the property in the case of a change in property ownership.	**Low –** This alternative does not reduce the toxicity, mobility, or volume of the VOCs in apparent source areas and near-source groundwater plume areas.	**High –** Implementation of this proposed remedy would result in no short-term risks to the community, workers, and the environment as there would be no active remediation activities and disruption to Site operations.	Technically and administratively feasible. Use of deed restrictions is a common and effective institutional control for mitigating potential exposure pathways and unacceptable risk to human health and the environment. A Site Management Plan that is acceptable to NYSDEC, IBM, and the current property owner should be administratively feasible and implementable.	Capital Cost: $75,000 Total Cost: $1,769,268

REMEDIAL ALTERNATIVE	**Overall Protection of Human Health and the Environment**	**Compliance with New York State SCGs (Attainment of Remedial Action Objectives)**	**Long-Term Effectiveness**	**Reduction in Toxicity, Mobility, and Volume**	**Short-Term Effectiveness**	**Implementability**	**Cost**
ENHANCED GROUNDWATER EXTRACTION							
Alternative #2: **Enhanced Groundwater Extraction**– The Enhanced Groundwater Extraction alternative consists of groundwater extraction, with vacuum-assist pumping systems, where appropriate, as an engineering control in OUs #1 and #2 to perform the following: 1. Continue to control the source(s) of groundwater contamination within the railroad corridor source area (On-Site Capture Zone). 2. Control the groundwater flux crossing North Street within OU#2. This alternative provides hydraulic control and a degree of mass removal that is directly proportional to the rate of dissolution of VOCs from the apparent source zones. Enhancement of the groundwater withdrawals in source areas and near-source groundwater plume areas should improve the rate of source reduction while maintaining sufficient capture of groundwater chemical flux. This alternative also includes the institutional and engineering controls specified for Alternative #1.	**High** – Meets the overall goal of protection of public health and the environment by mitigating potential exposure pathways via the use of institutional controls and engineering controls. ***Soil*** –Institutional controls will be implemented to prevent exposure to OUs #1 and #2 soils. ***Soil Vapor*** –Current operation of HVAC systems, and where appropriate SSD systems, prevents vapors containing VOCs from entering occupied buildings at rates that are not protective of human health and the environment. ***Groundwater*** – Institutional controls will be implemented to prevent exposure to OUs #1 and #2 groundwater via dermal contact, ingestion, and inhalation by Site workers and construction workers. Public Water is supplied by the Village of Endicott.	**Low –** This alternative screens relatively low in its ability to meet applicable SCGs for groundwater and soil due to severe access limitations to effectively remediate VOC mass in vadose zone and saturated zone soils impacted by past industrial activity in the railroad corridor and the historical development of near-source groundwater plumes. This alternative would achieve the RAOs of controlling groundwater in apparent source areas in the railroad corridor and controlling VOC mass flux crossing North Street. The timeframe for concentrations for COPCs to decline to applicable NYS Part 703 groundwater standards and Part 375 soil cleanup objectives is expected to be reduced under this remedial alternative. ***Soil*** – Exposure to impacted soil will be controlled by institutional controls until SCGs are met. ***Soil Vapor*** – Operation of HVAC systems, and where appropriate SSD systems, will prevent vapors entering occupied buildings above NYSDOH Guidance Values. ***Groundwater*** – The timeframe for concentrations for COPCs to decline to applicable NYS Part 703 groundwater standards would decrease from Alternative #1. ***Surface Water*** – RAOs are met for groundwater currently being pumped from OUs #1 and #2 and treated to within the limits allowed by the SPDES permit (pH = 6.0 to 9.0 and VOCs less than 10 µg/L, each) for a "Class B" receiving stream.	**High –** Groundwater extraction would effectively mitigate potential exposure pathways to VOC presence in soil and groundwater in apparent source areas and near-source groundwater plume areas. The restrictions would remain on the deed for the property in the case of a change in property ownership. The operation of enhanced groundwater extraction systems is unlikely to result in attainment of soil and groundwater clean-up requirements within the next ten years. However, consistent with the significant remedial progress achieved over the past thirty-nine years, the enhanced groundwater extraction operations in OUs #1 and #2 are anticipated to provide meaningful reductions in VOC concentrations in groundwater, soil, and soil vapor over the next ten years.	**High –** This alternative would reduce the mobility and volume of the COPCs in apparent source areas and near-source groundwater plume areas. The mobility and volume would be reduced by groundwater capture, and using air stripping and activated vapor-phase carbon to remove VOCs from the groundwater withdrawals. The toxicity of VOCs would be eliminated via carbon regeneration where the VOCs are destroyed by thermal means.	**High –** Implementation of this remedial alternative would result in no short-term risks to the community, workers, and the environment. This alternative should not disrupt Site operations as the majority of the active remediation infrastructure and operations are already in place as interim remedial measures. This proposed remedy would achieve the RAOs for protection of public health upon its implementation by mitigating exposure of human receptors to unacceptable levels of COPCs in soil and groundwater.	This alternative is technically and administratively feasible. Use of deed restrictions is a common and effective institutional control for mitigating potential exposure pathways and unacceptable risk to human health and the environment. Enhanced groundwater extraction has a long proven history of implementability within OUs #1 and #2 with operable run times typically greater than 98%. A Site Management Plan that is acceptable to NYSDEC, IBM, and the current property owner should be administratively feasible and implementable.	Capital Cost: $543,000 Total Cost: $9,266,058

TABLE 7-1
DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES
FFS Report for OUs #1 and #2
Former IBM Endicott Site, Endicott, New York

REMEDIAL ALTERNATIVE	Overall Protection of Human Health and the Environment	Compliance with New York State SCGs (Attainment of Remedial Action Objectives)	Long-Term Effectiveness	Reduction in Toxicity, Mobility, and Volume	Short-Term Effectiveness	Implementability	Cost
ENHANCED BIODEGRADATION							
Alternative #3: **Enhanced Biodegradation–** Enhanced biodegradation contains the elements of Alternative #2 with the addition of enhanced biodegradation via the injection of amendments and possibly injection of cultures of microorganisms (bioaugmentation) in OUs #1 and #2 to reduce the natural oxidizing conditions of the Upper Aquifer, such that biotic reductive dechlorination can occur. The enhancement activities would include injection of lactate, molasses, vegetable oils, or another organic carbon source for microorganisms that dechlorinate VOCs. Injection would be performed using wells or direct-push borings. A type of applicable bacterial culture could also be added to supplement existing microorganism populations, where needed. This alternative attempts to accelerate the rate of VOC mass removal from soil and groundwater in the saturated zone by changing the natural oxidizing conditions in the Upper Aquifer to reducing conditions. This alternative also includes the institutional and engineering controls specified for Alternative #1 and the enhanced groundwater extraction engineering control specified in Alternative #2.	**High –** Enhanced Biodegradation with the institutional and engineering controls specified in Alternative #2, would meet the overall goal of protection of public health and the environment by mitigating potential exposure pathways via the use of the institutional controls and engineering controls included in Alternative #2. ***Soil*** **–**Institutional controls will be implemented to prevent exposure to OUs #1 and #2 soils. ***Soil Vapor*** – Current operation of HVAC systems, and where appropriate SSD systems, prevents vapors containing VOCs from entering occupied buildings at rates that are not protective of human health and the environment. ***Groundwater*** – Institutional controls will be implemented to prevent exposure to OUs #1 and #2 groundwater via dermal contact, ingestion, and inhalation by Site workers and construction workers. Public Water is supplied by the Village of Endicott.	**Low –** This alternative screens relatively low in its ability to meet applicable SCGs for groundwater and soil due to severe access limitations to effectively remediate VOC mass in vadose zone and saturated zone soils impacted by past industrial activity in the railroad corridor and the historical development of near-source groundwater plumes. Enhanced biodegradation is unlikely to result in attainment of soil and groundwater clean-up requirements within the next ten years. However, the timeframe for concentrations for COPCs to decline to applicable NYS Part 703 groundwater standards and Part 375 soil cleanup objectives is expected to be reduced under this remedial alternative. ***Soil*** – Enhanced biodegradation is unlikely to result in attainment of soil and groundwater clean-up requirements within the next ten years. ***Soil Vapor*** – Operation of HVAC systems, and where appropriate SSD systems, will prevent vapors entering occupied buildings above NYSDOH Guidance Values. ***Groundwater*** – Enhanced biodegradation is unlikely to result in attainment of groundwater clean-up requirements within the next ten years. The enhanced groundwater extraction portion of this alternative would achieve the RAOs of controlling groundwater in apparent source areas in the railroad corridor and controlling VOC mass flux crossing North Street. However, the biodegradation portion of this remedial alternative could adversely impact the extent of the control of the railroad corridor source areas and the VOC mass flux crossing North Street due to fouling of the Upper Aquifer soils and the well screens of the extraction wells. ***Surface Water*** – RAOs are met for groundwater currently being pumped from OUs #1 and #2.	**Low/Moderate –** The restrictions would remain on the deed for the property in the case of a change in property ownership. The groundwater extraction component of this alternative is a proven technology with a long history of effectiveness that would effectively mitigate potential exposure pathways to VOC presence in soil and groundwater in apparent source areas and near-source groundwater plume areas. This alternative has low to moderate long-term effectiveness due to the potential difficulties in changing the natural oxidizing conditions in the Upper Aquifer to be reducing conditions and then maintaining those reducing conditions over a long period of time.	**Moderate –** This alternative would reduce the mobility and volume of the COPCs in apparent source areas and near-source groundwater plume areas. The mobility and volume would be reduced by groundwater capture, and using air stripping and activated vapor-phase carbon to remove VOCs from the groundwater withdrawals. The toxicity of VOCs would be eliminated by a combination of in-situ destruction of VOCs by the microorganisms and via vapor phase carbon regeneration where the VOCs sorbed onto vapor phase carbon during groundwater treatment are destroyed by thermal means. This alternative screens lower than Alternative #2 due to the potential for incomplete biodegradation resulting in accumulation of daughter products that are more difficult to treat and, in the case of vinyl chloride, more toxic.	**Moderate –** Implementation of this remedial alternative would result in no short-term risks to the community, workers, and the environment. This alternative could result in some disruption to Site operations during installation of injection points and/or wells, hauling and disposal of drilling wastes, short-term noise events, and work in high-density utility corridors. Periodic injection of amendments and possibly microorganisms could also cause temporary minor disruptions to Site operations. No other disruptions to Site operations should occur as the other components of the active remediation infrastructure and operations are already in place as interim remedial measures. This proposed remedy would achieve the RAOs for protection of public health upon its implementation by mitigating exposure of human receptors to unacceptable levels of COPCs in soil and groundwater.	This alternative is technically and administratively feasible. Use of deed restrictions is a common and effective institutional control for mitigating potential exposure pathways and unacceptable risk to human health and the environment. Enhanced groundwater extraction has a long proven history of implementability within OUs #1 and #2 with operable run times typically greater than 98%. Biodegradation has been proven to be implementable at other sites but its implementability has yet to be tested within OUs #1 and #2. A Site Management Plan that is acceptable to NYSDEC, IBM, and the current property owner should be administratively feasible and implementable.	Capital Cost: $1,688,000 Total Cost: $15,643,925



Portion of the Endicott, NY and Maine, NY
7.5-minute USGS Quadrangles
(2000)

Approximate

Scale
0 1500' 3000'

Figure 2-1

Former IBM Endicott Site
Site #704014

Site Location Map

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22007-008-H4 / 12-13-2018

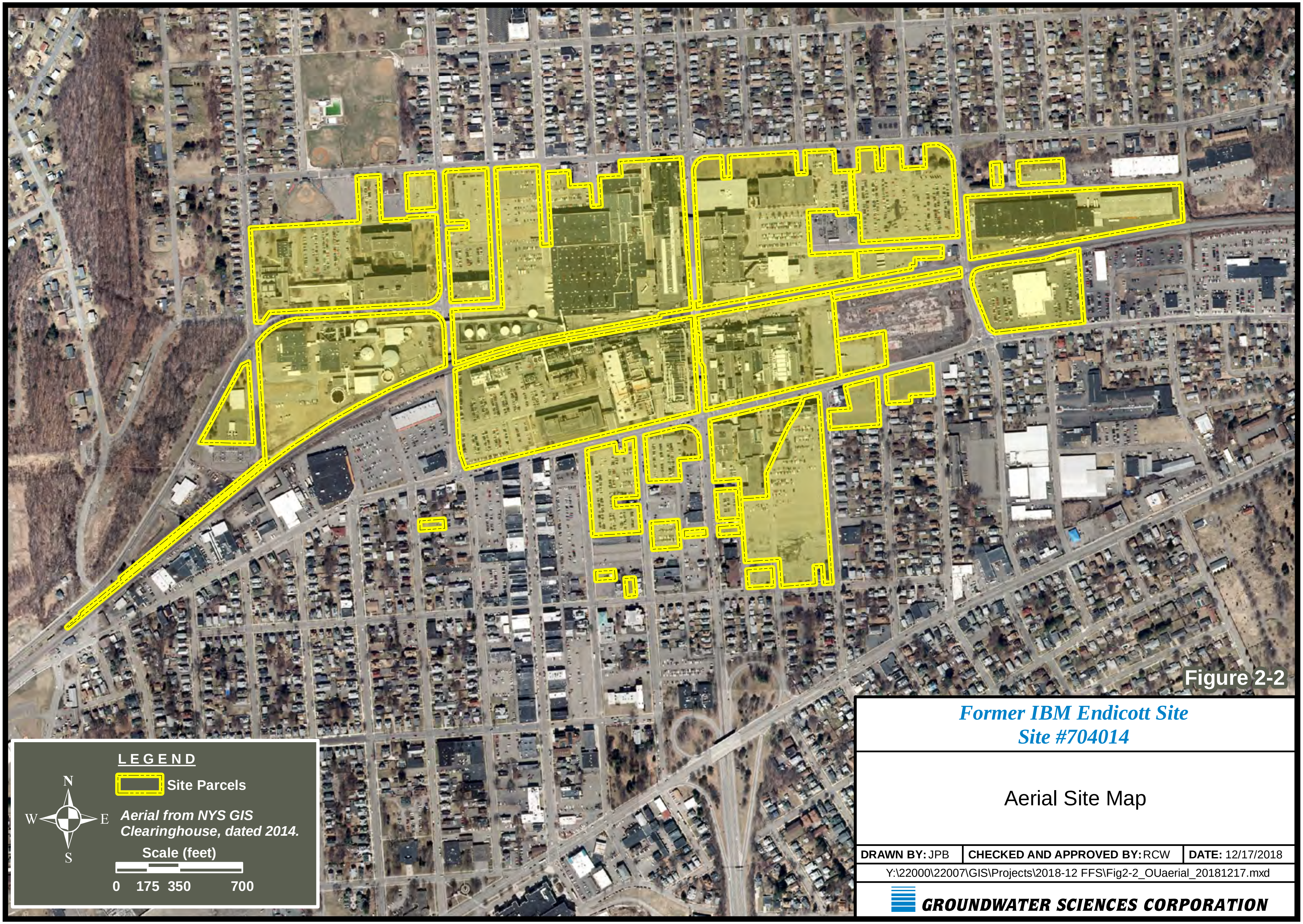

Figure 2-2

Former IBM Endicott Site
Site #704014

Aerial Site Map

DRAWN BY: JPB | **CHECKED AND APPROVED BY:** RCW | **DATE:** 12/17/2018

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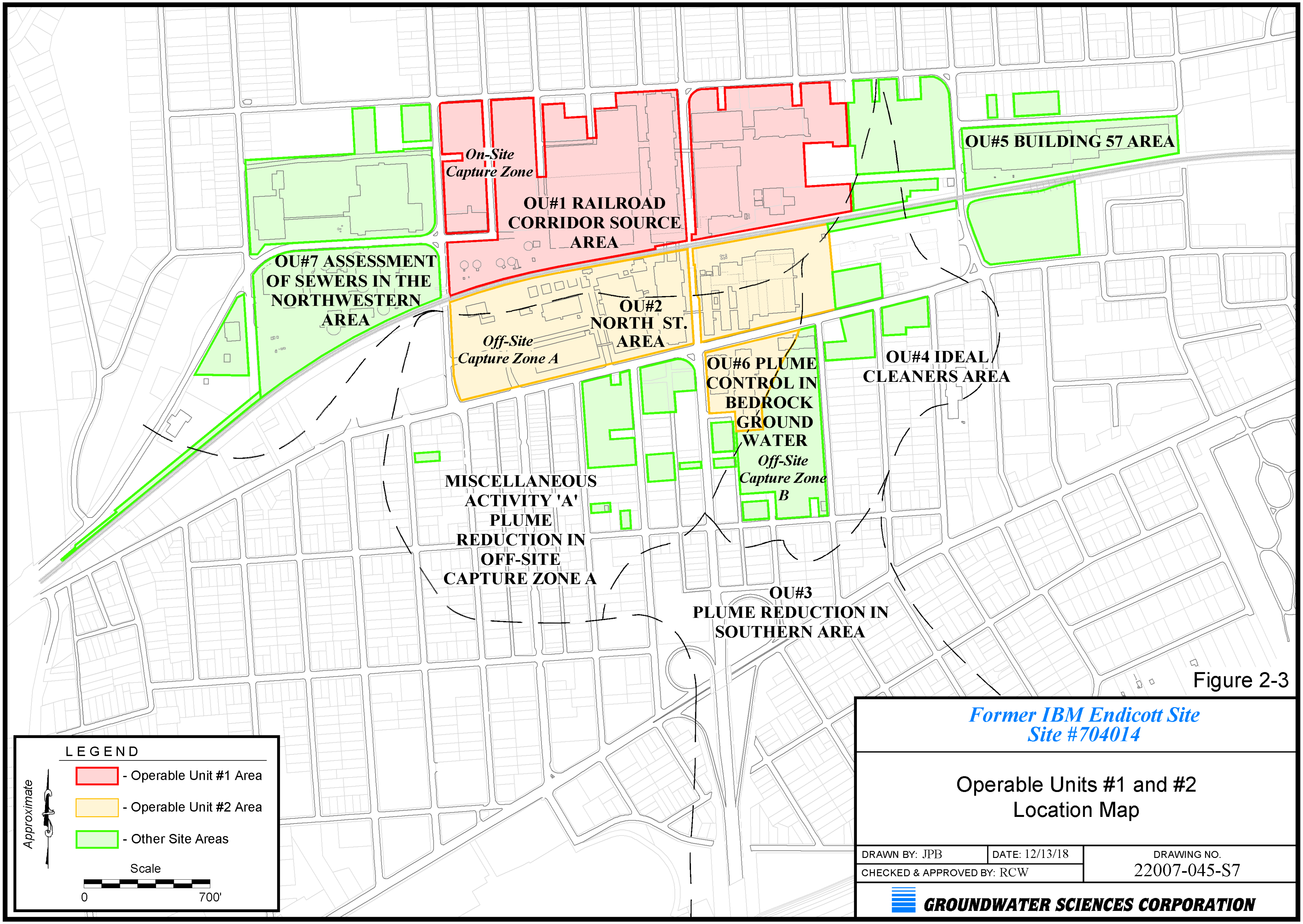
GROUNDWATER SCIENCES CORPORATION



LEGEND

🟥 - Operable Unit #1 Area

🟨 - Operable Unit #2 Area

🟩 - Other Site Areas

Figure 2-3

Former IBM Endicott Site
Site #704014

Operable Units #1 and #2
Location Map

DRAWN BY: JPB	DATE: 12/13/18	DRAWING NO.
CHECKED & APPROVED BY: RCW		22007-045-S7

GROUNDWATER SCIENCES CORPORATION

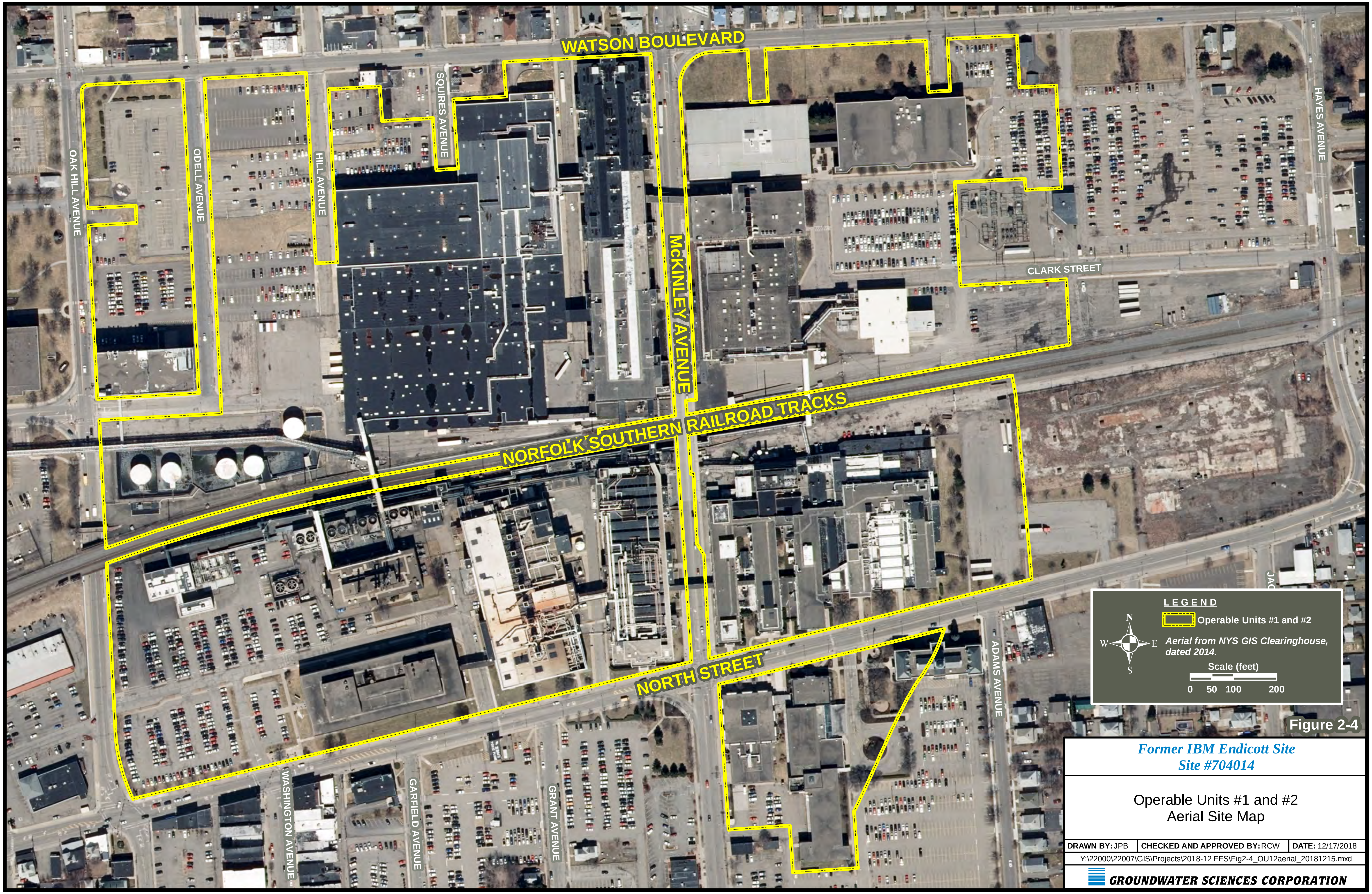


Figure 2-4

Former IBM Endicott Site
Site #704014

Operable Units #1 and #2
Aerial Site Map

DRAWN BY: JPB | **CHECKED AND APPROVED BY:** RCW | **DATE:** 12/17/2018

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GROUNDWATER SCIENCES CORPORATION

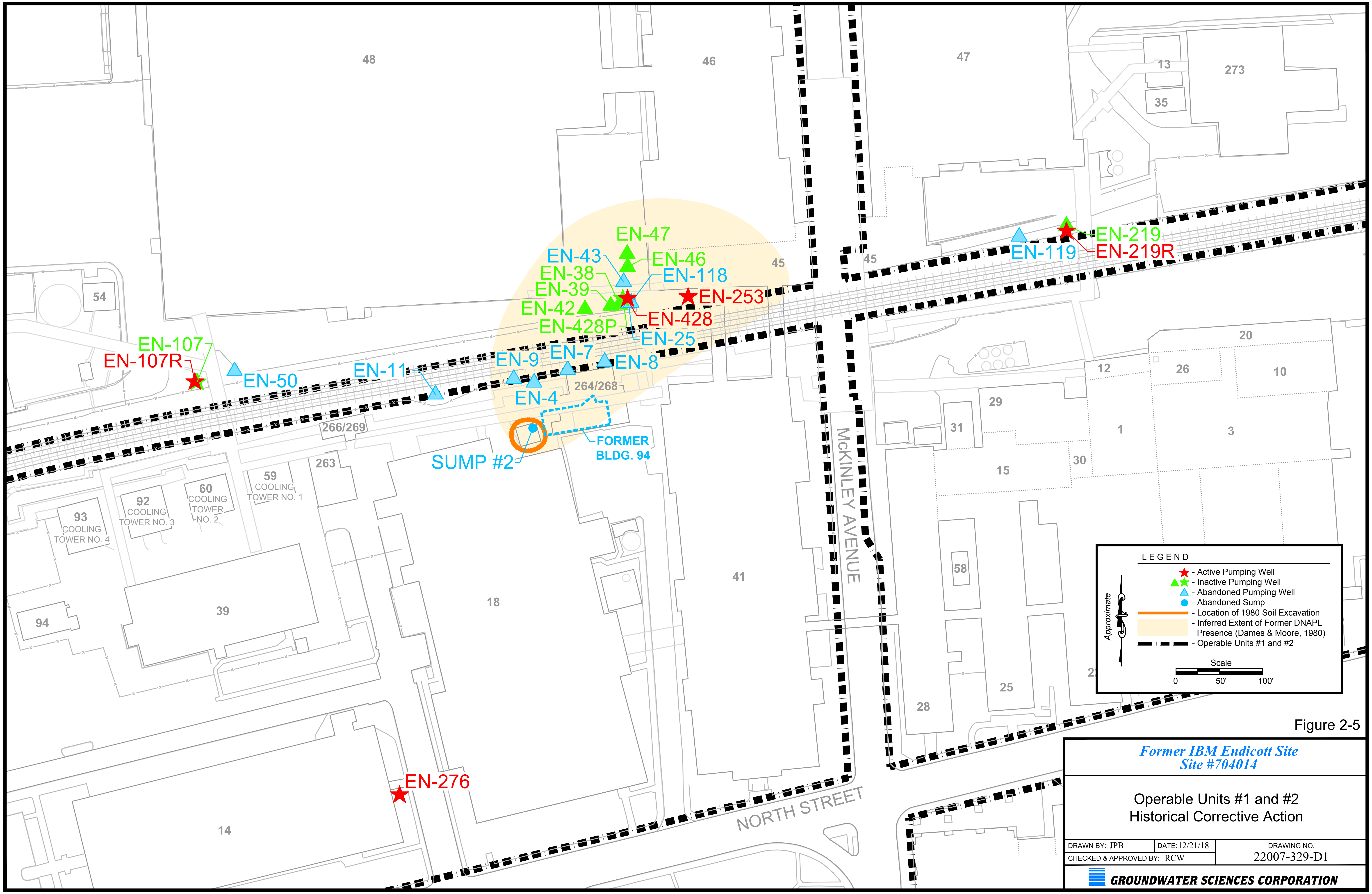

Figure 2-5

Former IBM Endicott Site
Site #704014

Operable Units #1 and #2
Historical Corrective Action

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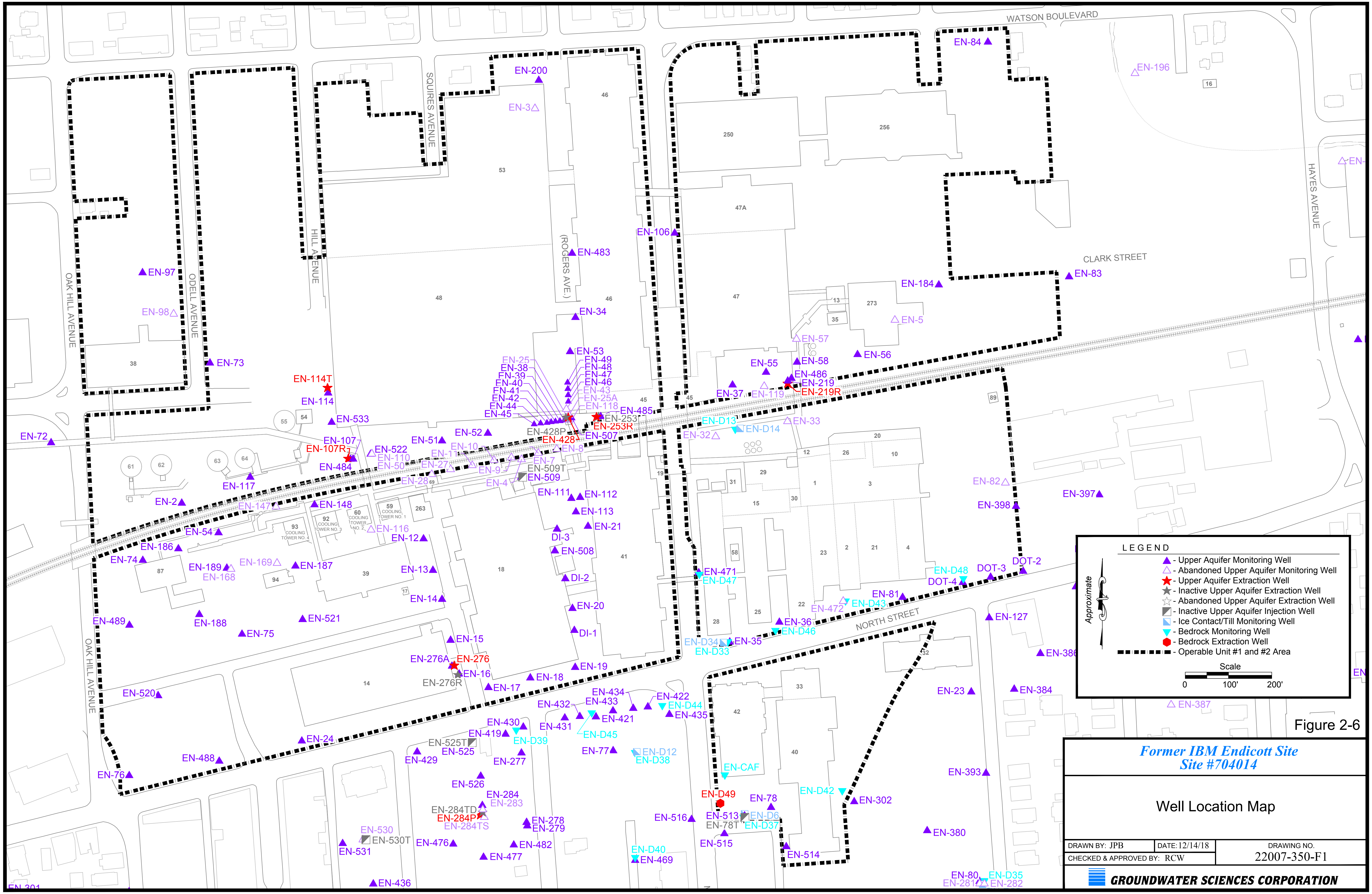

LEGEND

- ▲ - Upper Aquifer Monitoring Well
- △ - Abandoned Upper Aquifer Monitoring Well
- ★ - Upper Aquifer Extraction Well
- ★ - Inactive Upper Aquifer Extraction Well
- ☆ - Abandoned Upper Aquifer Extraction Well
- ◪ - Inactive Upper Aquifer Injection Well
- ◪ - Ice Contact/Till Monitoring Well
- ▼ - Bedrock Monitoring Well
- ⬢ - Bedrock Extraction Well
- ▪▪▪ - Operable Unit #1 and #2 Area

Figure 2-6

Former IBM Endicott Site
Site #704014

Well Location Map

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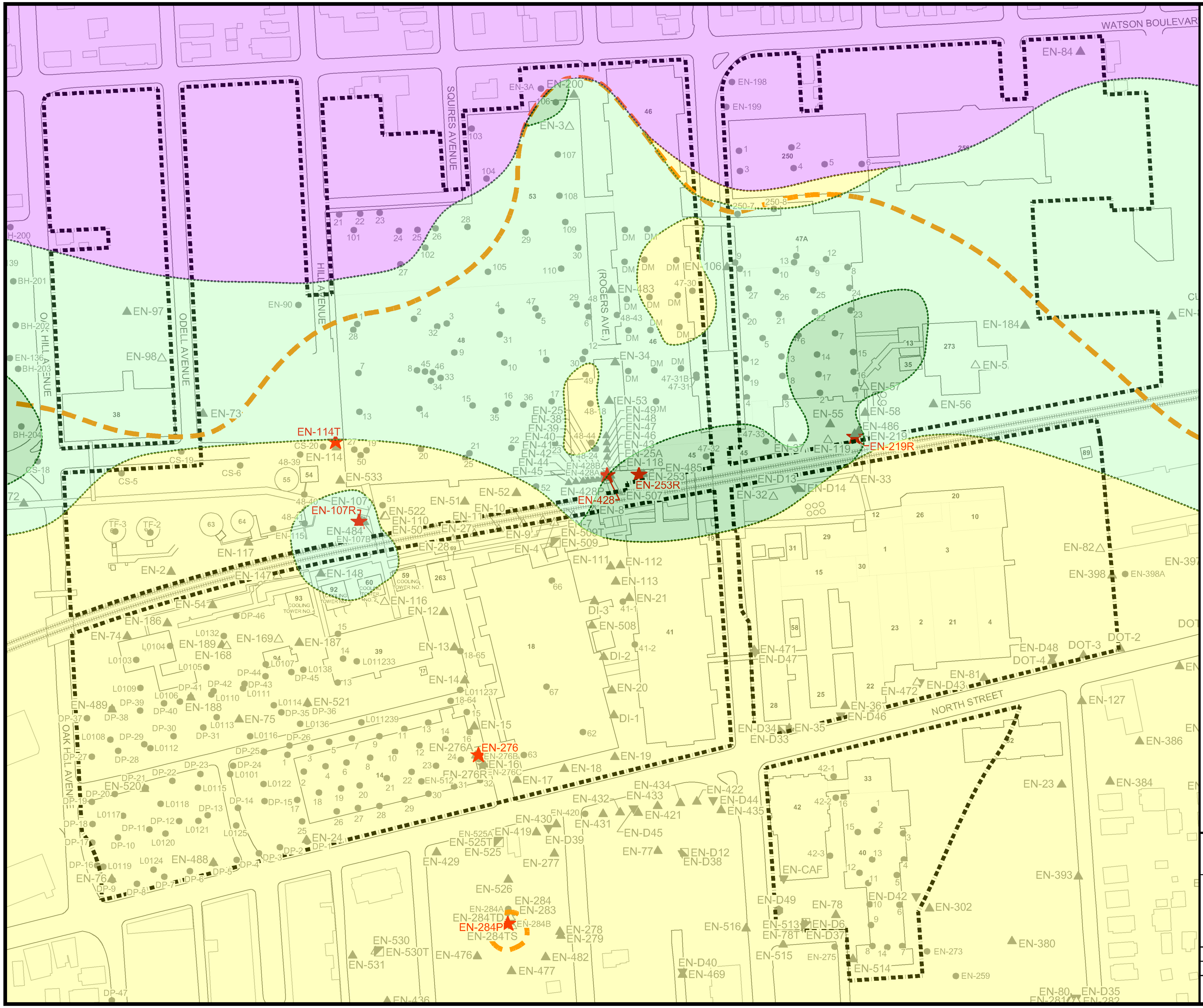

LEGEND

- ▲ - Upper Aquifer Monitoring Well
- △ - Abandoned Upper Aquifer Monitoring Well
- ★ - Upper Aquifer Extraction Well
- ★ - Inactive Upper Aquifer Extraction Well
- ☆ - Abandoned Upper Aquifer Extraction Well
- ◩ - Inactive Upper Aquifer Injection Well
- ◪ - Ice Contact/Till Monitoring Well
- ▼ - Bedrock Monitoring Well
- ⬢ - Bedrock Extraction Well
- ● - Soil Boring
- ▪ ▪ ▪ - Operable Unit #1 and #2 Area
- – – - Approximate Limits of Lacustrine Silt Unit

MAP EXPLANATION

Late-glacial to post-glacial Alluvium

🟩	Fine-grained facies: Typically stiff to very stiff, silt & clay or medium dense to dense, moderate to well-sorted and stratified fine sand, silt, and/or clay interbedded with lesser amounts of sand and gravel. A portion of this facies includes a localized presence of organic matter (organic silt or fine-grained peat).
🟩	Coarse-grained facies: Typically medium dense to dense, poorly to well-sorted sand & gravel with little to trace amounts of silt and clay.

Glaciofluvial Outwash Sand & Gravel

🟨	Medium dense to very dense, poorly-sorted to well-sorted and stratified, sand or sand & gravel with little to trace amounts of silt and trace amounts of clay. This stratum is described predominantly as fine or medium to fine sand to silty fine sand.

Glacial Till and post-glacial Colluvium

🟪	Very dense to dense, poorly-sorted heterogeneous mixture of clay, silt, sand, and gravel. The colluvium is locally stratified and is interpreted to be derived from glacial till.

Figure 3-1

Former IBM Endicott Site
Site #704014

Site Surficial Geologic Map

DRAWN BY: JPB	DATE:12/13/18	DRAWING NO. 22007-330-C1
CHECKED & APPROVED BY: RCW		

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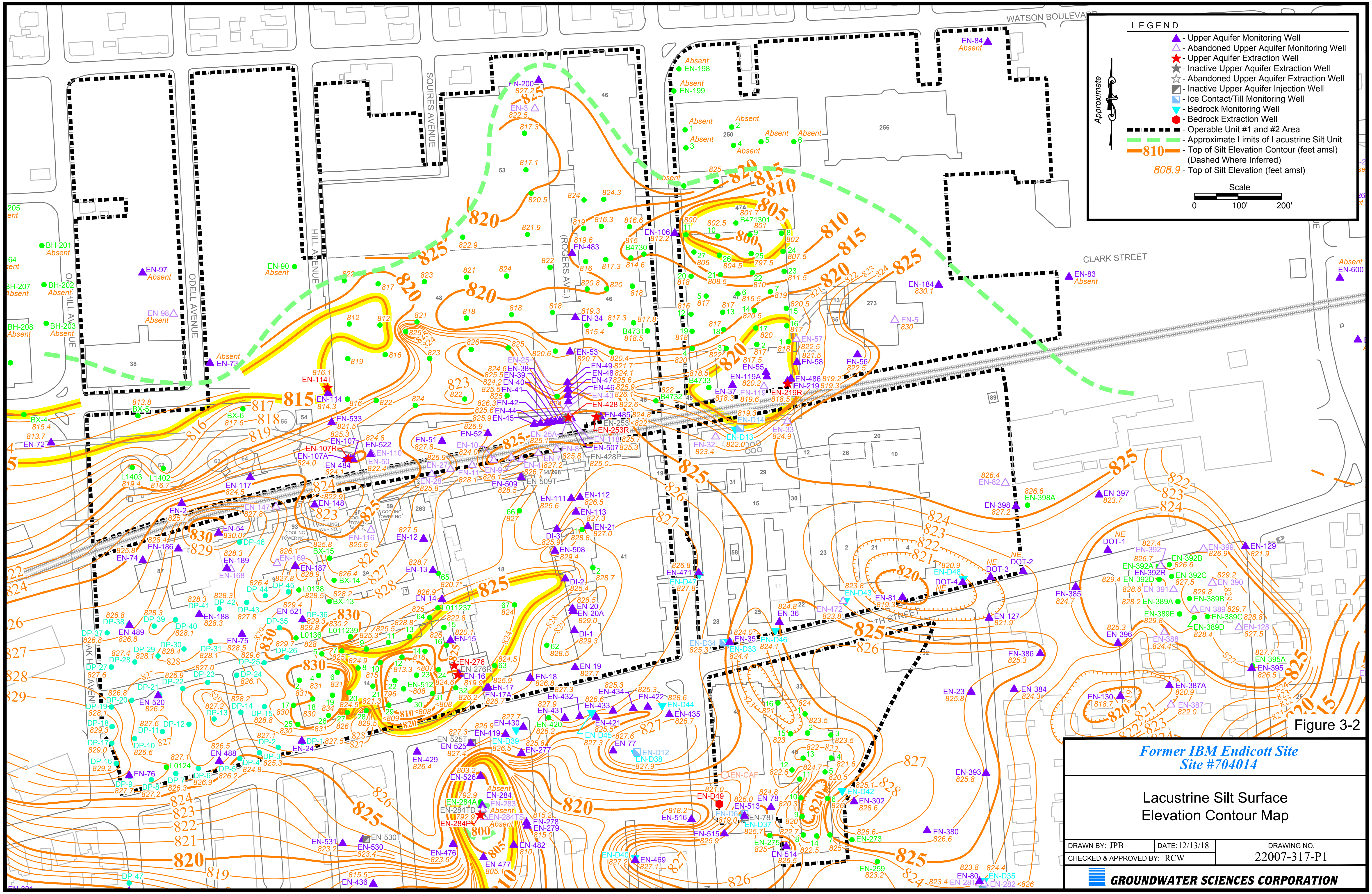


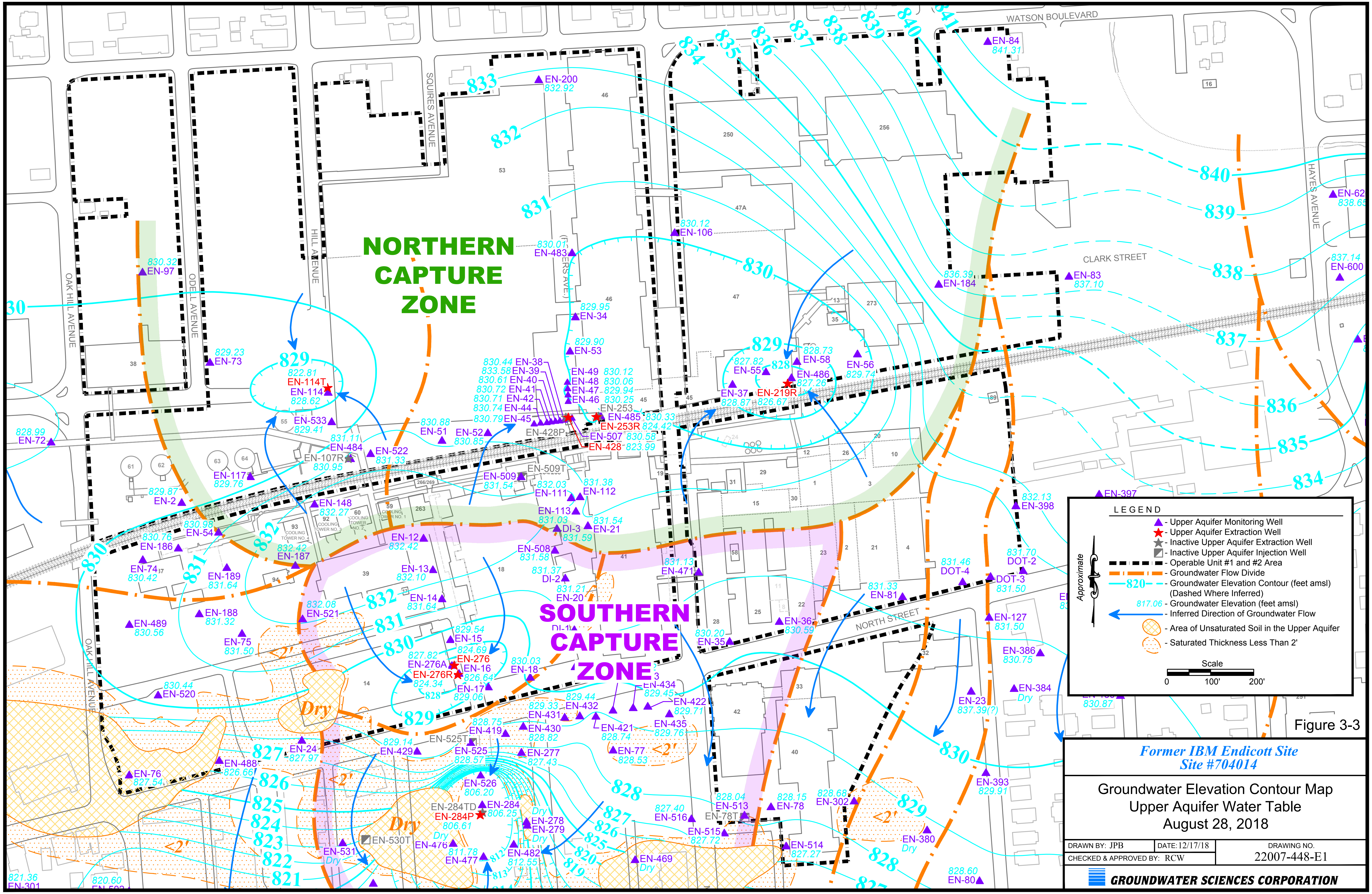
Figure 3-2

Former IBM Endicott Site
Site #704014

Lacustrine Silt Surface
Elevation Contour Map

DRAWN BY: JPB	DATE: 12/13/18	DRAWING NO.
CHECKED & APPROVED BY: RCW		22007-317-P1

GROUNDWATER SCIENCES CORPORATION



LEGEND

- ▲ - Upper Aquifer Monitoring Well
- ★ - Upper Aquifer Extraction Well
- ★ - Inactive Upper Aquifer Extraction Well
- ▨ - Inactive Upper Aquifer Injection Well
- ▬ ▬ - Operable Unit #1 and #2 Area
- ▬ · ▬ - Groundwater Flow Divide
- 820 - Groundwater Elevation Contour (feet amsl) (Dashed Where Inferred)
- 817.06 - Groundwater Elevation (feet amsl)
- ← - Inferred Direction of Groundwater Flow
- ▨ - Area of Unsaturated Soil in the Upper Aquifer
- ▨ - Saturated Thickness Less Than 2'

Scale
0 100' 200'

Figure 3-3

Former IBM Endicott Site
Site #704014

Groundwater Elevation Contour Map
Upper Aquifer Water Table
August 28, 2018

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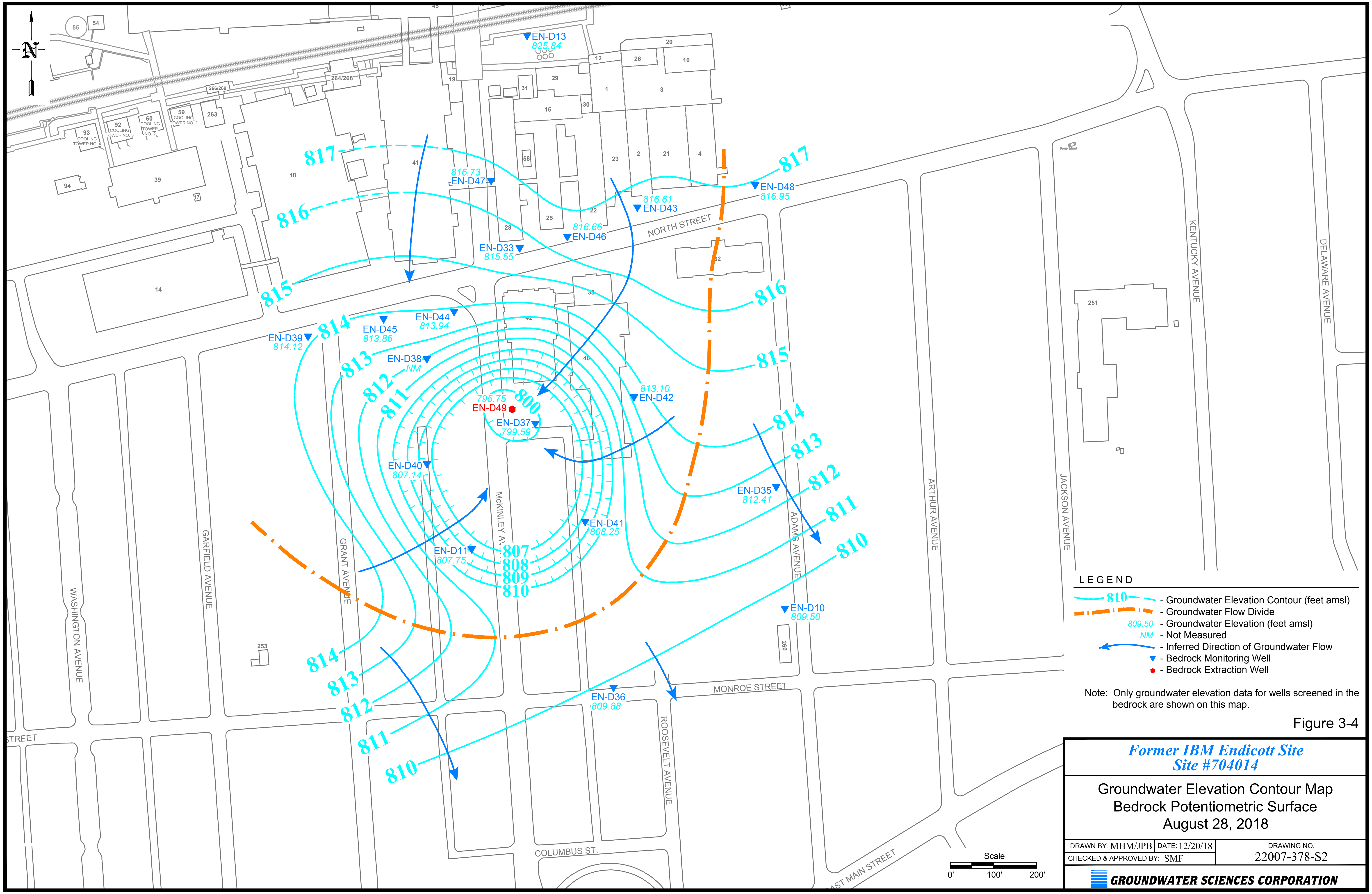
CHECKED & APPROVED BY: RCW		22007-448-E1

GROUNDWATER SCIENCES CORPORATION



LEGEND

- 810 - Groundwater Elevation Contour (feet amsl)
- Groundwater Flow Divide
- 809.50 - Groundwater Elevation (feet amsl)
- NM - Not Measured
- Inferred Direction of Groundwater Flow
- ▼ - Bedrock Monitoring Well
- ● - Bedrock Extraction Well

Note: Only groundwater elevation data for wells screened in the bedrock are shown on this map.

Figure 3-4

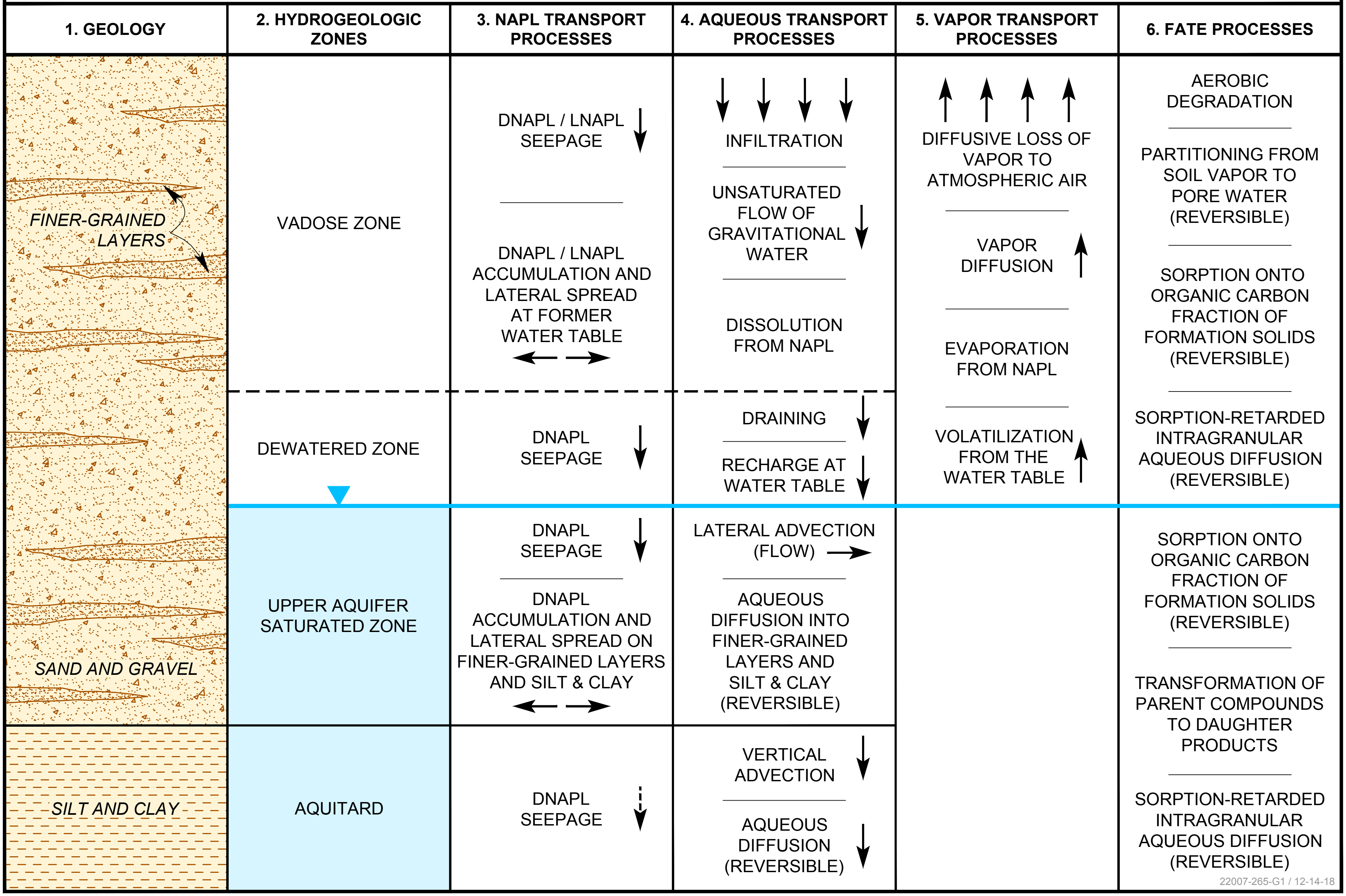
Former IBM Endicott Site
Site #704014

Groundwater Elevation Contour Map
Bedrock Potentiometric Surface
August 28, 2018

DRAWN BY: MHM/JPB	DATE: 12/20/18	DRAWING NO.
CHECKED & APPROVED BY: SMF		22007-378-S2

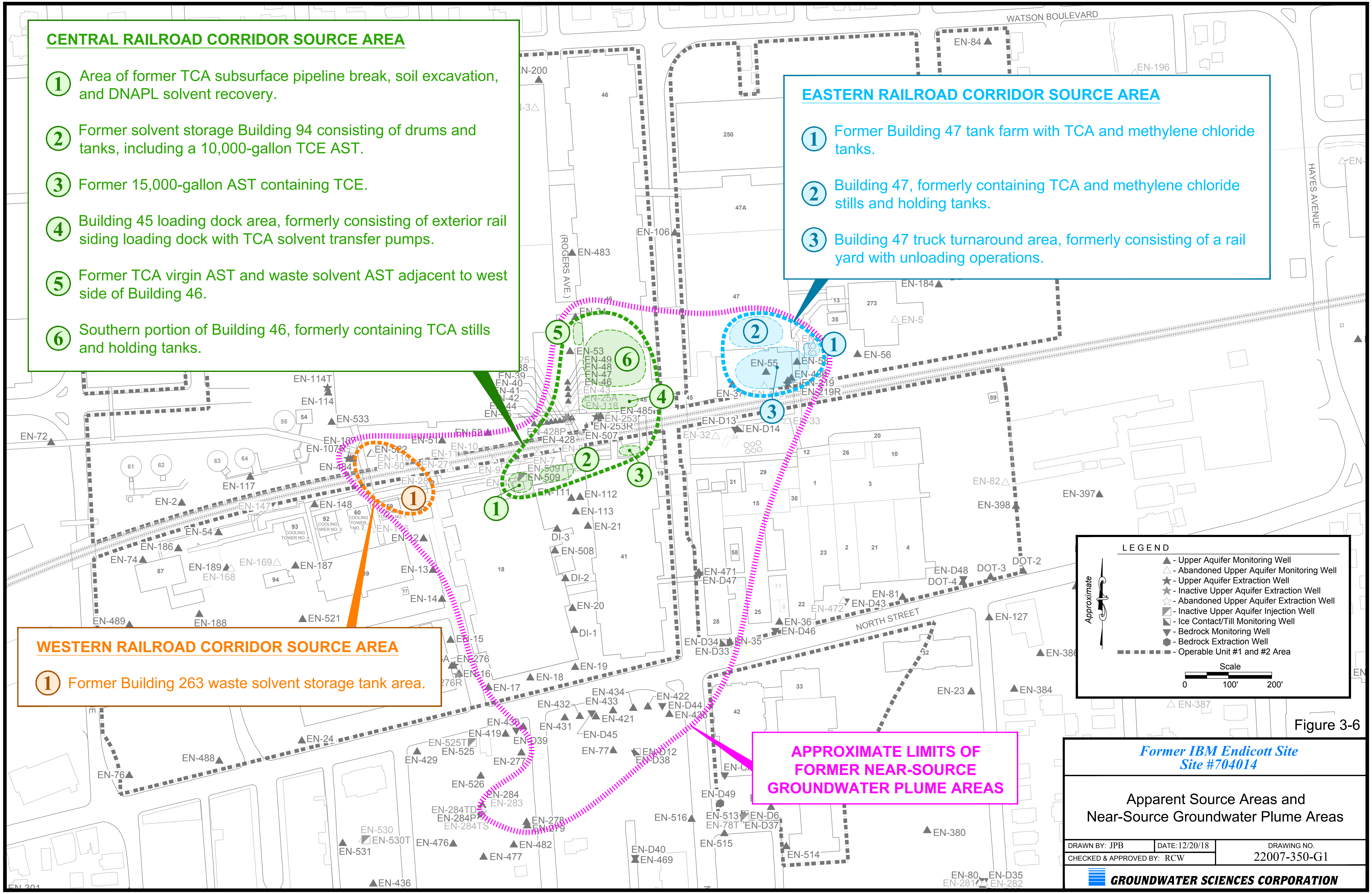
GROUNDWATER SCIENCES CORPORATION

Figure 3-5 - Overview of Fate and Transport Mechanisms



1. GEOLOGY	2. HYDROGEOLOGIC ZONES	3. NAPL TRANSPORT PROCESSES	4. AQUEOUS TRANSPORT PROCESSES	5. VAPOR TRANSPORT PROCESSES	6. FATE PROCESSES
FINER-GRAINED LAYERS	VADOSE ZONE	DNAPL / LNAPL SEEPAGE ↓ DNAPL / LNAPL ACCUMULATION AND LATERAL SPREAD AT FORMER WATER TABLE ← →	↓ ↓ ↓ ↓ INFILTRATION UNSATURATED FLOW OF GRAVITATIONAL WATER ↓ DISSOLUTION FROM NAPL	↑ ↑ ↑ ↑ DIFFUSIVE LOSS OF VAPOR TO ATMOSPHERIC AIR VAPOR DIFFUSION ↑ EVAPORATION FROM NAPL VOLATILIZATION FROM THE WATER TABLE ↑	AEROBIC DEGRADATION PARTITIONING FROM SOIL VAPOR TO PORE WATER (REVERSIBLE) SORPTION ONTO ORGANIC CARBON FRACTION OF FORMATION SOLIDS (REVERSIBLE) SORPTION-RETARDED INTRAGRANULAR AQUEOUS DIFFUSION (REVERSIBLE)
	DEWATERED ZONE	DNAPL SEEPAGE ↓	DRAINING ↓ RECHARGE AT WATER TABLE ↓		
SAND AND GRAVEL	UPPER AQUIFER SATURATED ZONE	DNAPL SEEPAGE ↓ DNAPL ACCUMULATION AND LATERAL SPREAD ON FINER-GRAINED LAYERS AND SILT & CLAY ← →	LATERAL ADVECTION (FLOW) → AQUEOUS DIFFUSION INTO FINER-GRAINED LAYERS AND SILT & CLAY (REVERSIBLE)		SORPTION ONTO ORGANIC CARBON FRACTION OF FORMATION SOLIDS (REVERSIBLE) TRANSFORMATION OF PARENT COMPOUNDS TO DAUGHTER PRODUCTS SORPTION-RETARDED INTRAGRANULAR AQUEOUS DIFFUSION (REVERSIBLE)
SILT AND CLAY	AQUITARD	DNAPL SEEPAGE ↓	VERTICAL ADVECTION ↓ AQUEOUS DIFFUSION (REVERSIBLE) ↓		

22007-265-G1 / 12-14-18



CENTRAL RAILROAD CORRIDOR SOURCE AREA

① Area of former TCA subsurface pipeline break, soil excavation, and DNAPL solvent recovery.

② Former solvent storage Building 94 consisting of drums and tanks, including a 10,000-gallon TCE AST.

③ Former 15,000-gallon AST containing TCE.

④ Building 45 loading dock area, formerly consisting of exterior rail siding loading dock with TCA solvent transfer pumps.

⑤ Former TCA virgin AST and waste solvent AST adjacent to west side of Building 46.

⑥ Southern portion of Building 46, formerly containing TCA stills and holding tanks.

EASTERN RAILROAD CORRIDOR SOURCE AREA

① Former Building 47 tank farm with TCA and methylene chloride tanks.

② Building 47, formerly containing TCA and methylene chloride stills and holding tanks.

③ Building 47 truck turnaround area, formerly consisting of a rail yard with unloading operations.

WESTERN RAILROAD CORRIDOR SOURCE AREA

① Former Building 263 waste solvent storage tank area.

APPROXIMATE LIMITS OF FORMER NEAR-SOURCE GROUNDWATER PLUME AREAS

LEGEND

▲ - Upper Aquifer Monitoring Well
△ - Abandoned Upper Aquifer Monitoring Well
★ - Upper Aquifer Extraction Well
★ - Inactive Upper Aquifer Extraction Well
☆ - Abandoned Upper Aquifer Extraction Well
▨ - Inactive Upper Aquifer Injection Well
◪ - Ice Contact/Till Monitoring Well
▼ - Bedrock Monitoring Well
⬢ - Bedrock Extraction Well
■ ■ ■ - Operable Unit #1 and #2 Area

Scale
0 100' 200'

Figure 3-6

Former IBM Endicott Site
Site #704014

Apparent Source Areas and
Near-Source Groundwater Plume Areas

DRAWN BY: JPB	DATE: 12/20/18	DRAWING NO.
CHECKED & APPROVED BY: RCW		22007-350-G1

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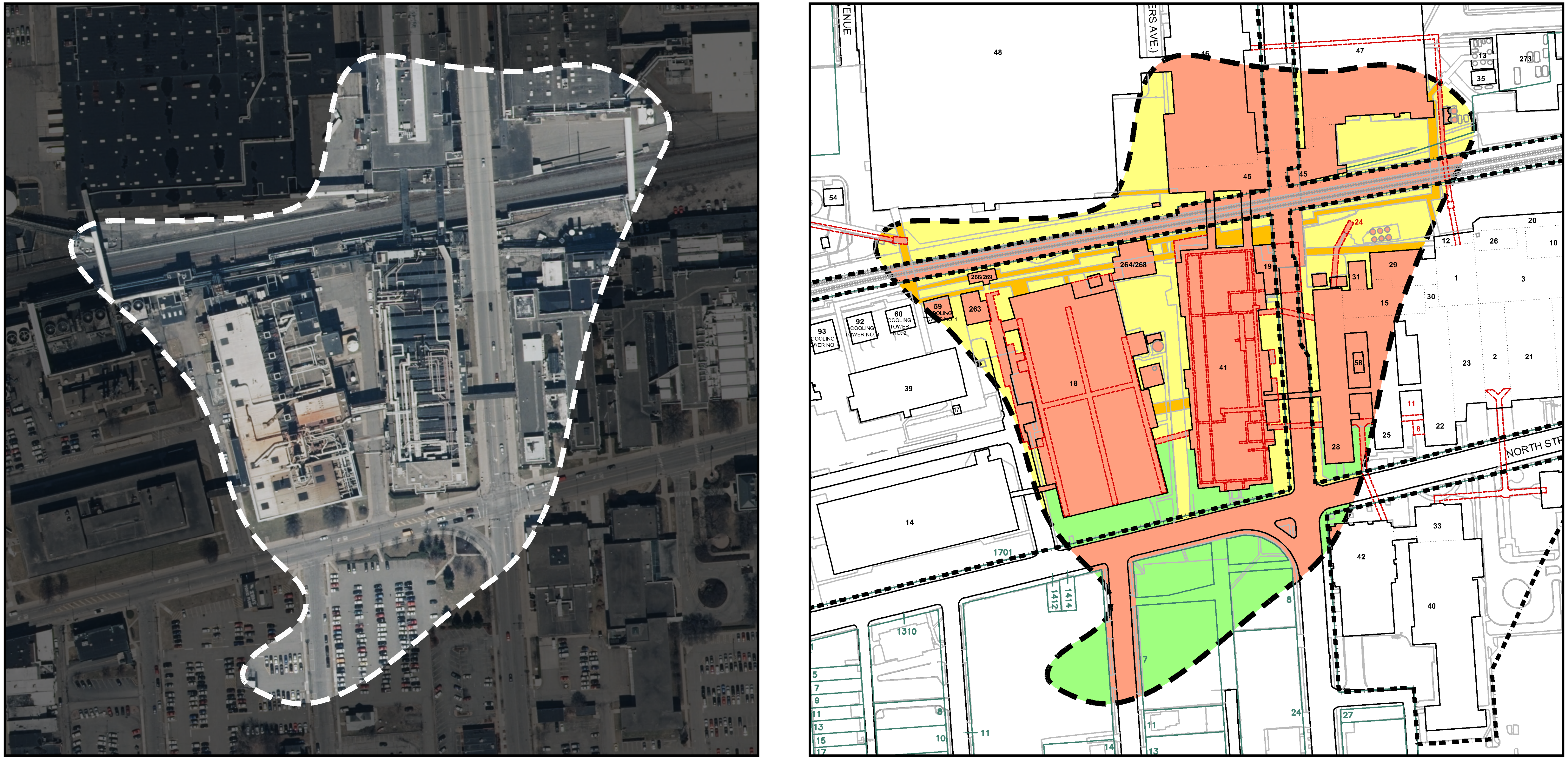

Figure 3-7

LEGEND

▬ ▪ ▬ - Operable Units #1 and #2
🟥 - Area with Severe Limitations
▭ - Area with Severe Limitations (Tunnel/Basement)
🟨 - Area with Moderate Limitations
🟧 - Area with Moderate Limitations (Pipeline Trestle/Walkway)
🟩 - Area with Low Limitations
― - Parcel / Lot Line

Aerial from NYS GIS Clearinghouse, dated 2014.

Approximate

Scale
0 100' 200'

Former IBM Endicott Site
Site #704014

Comparison of Apparent Source Areas
and Near-Source Groundwater Plume Areas
with Access Limitations

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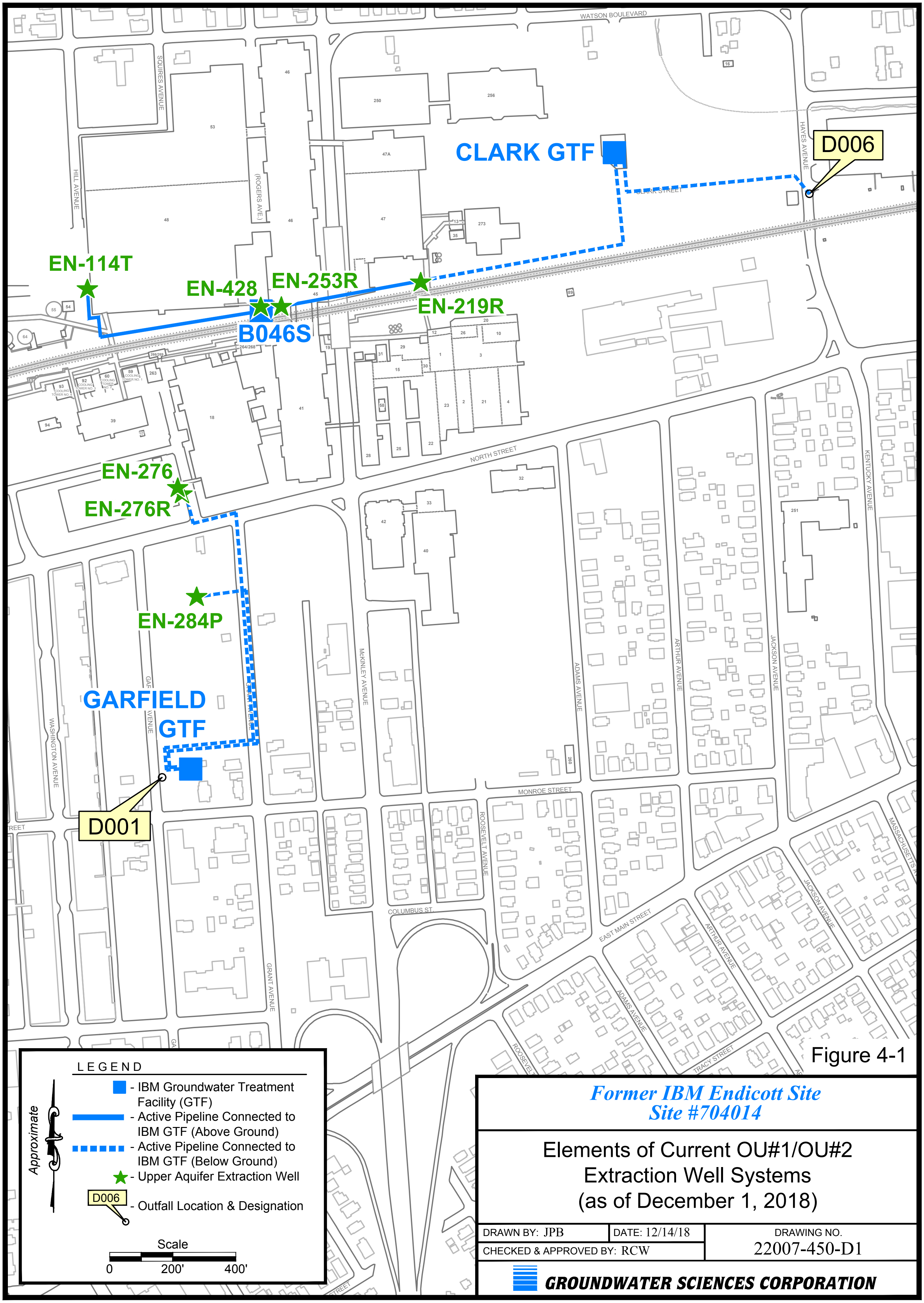

Figure 4-1

Former IBM Endicott Site
Site #704014

Elements of Current OU#1/OU#2
Extraction Well Systems
(as of December 1, 2018)

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CHECKED & APPROVED BY: RCW		22007-450-D1

GROUNDWATER SCIENCES CORPORATION

Figure 4-2: VOC Mass Removed by Area
OU#1 and OU#2, 1980-2017

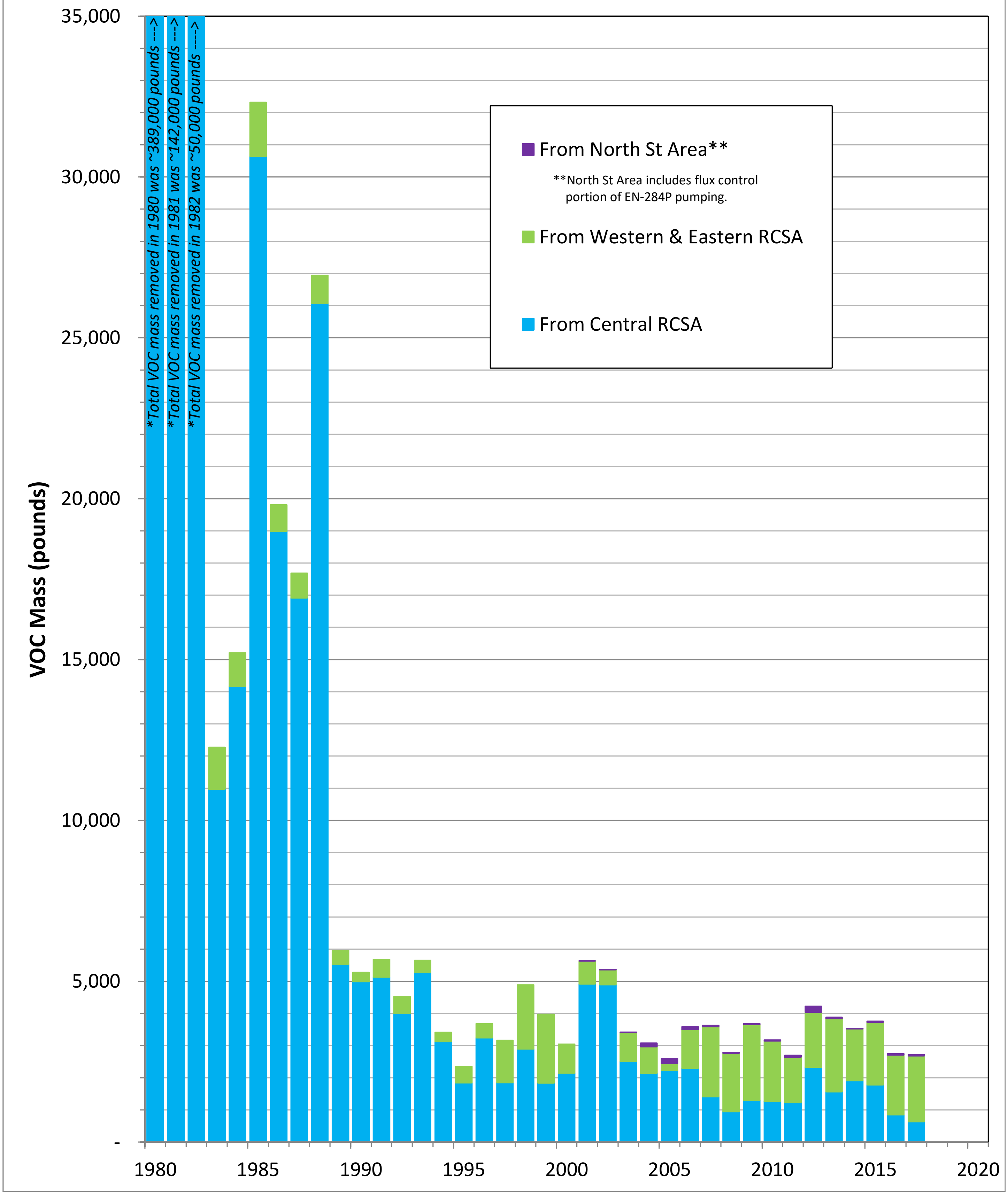
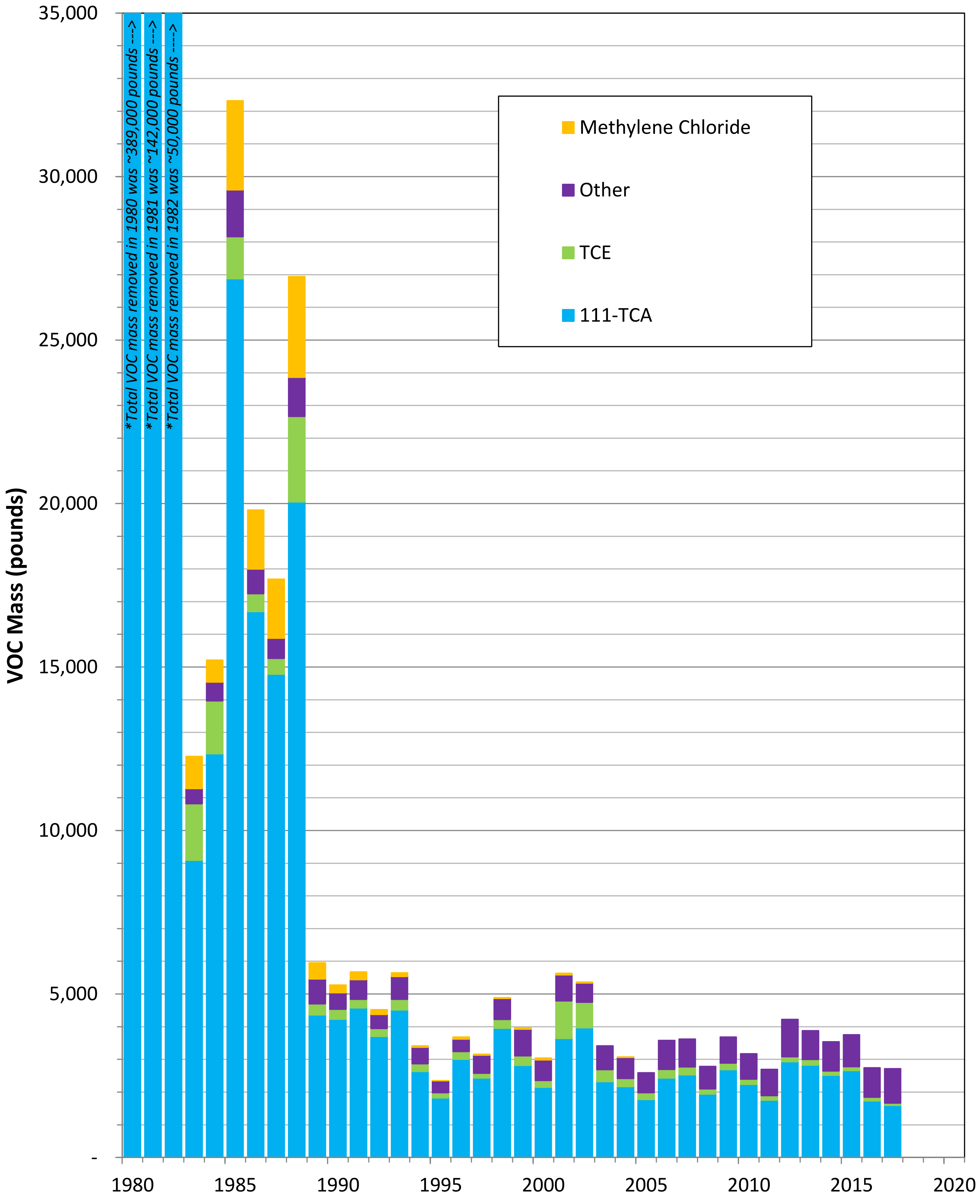
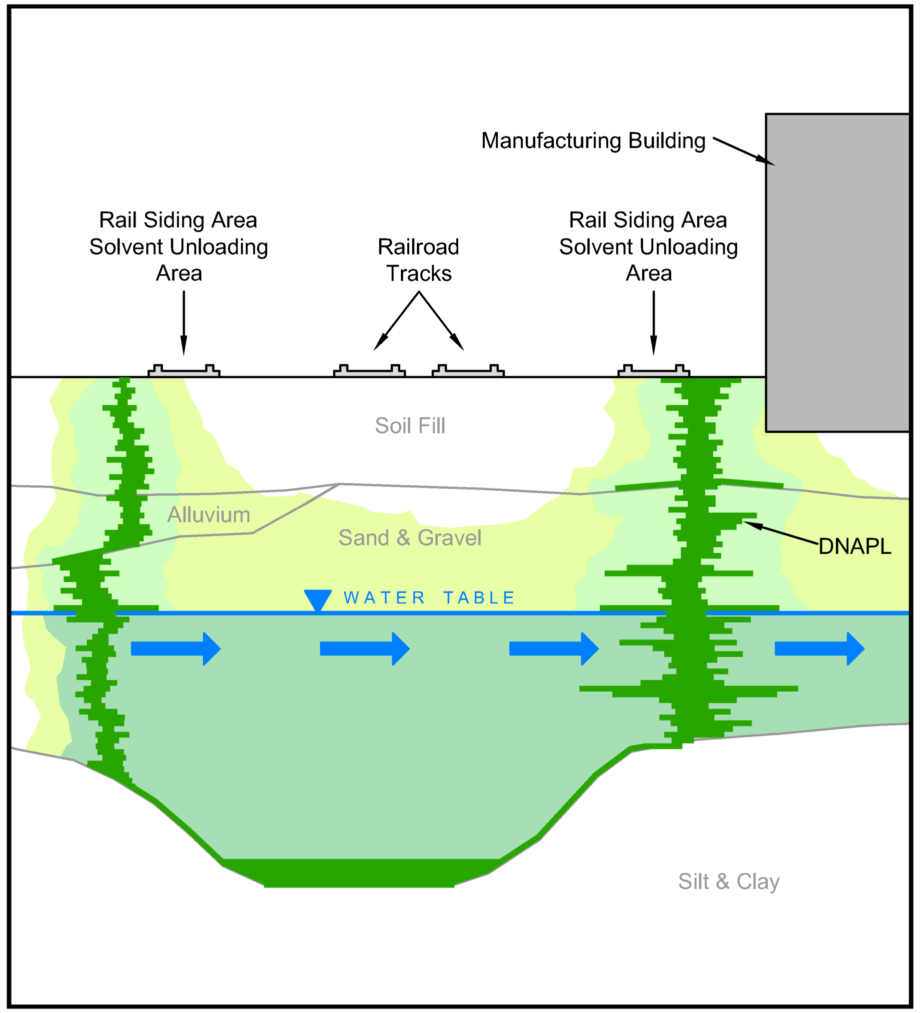


Figure 4-3: VOC Mass Removed by Constituent
OU#1 and OU#2, 1980-2017

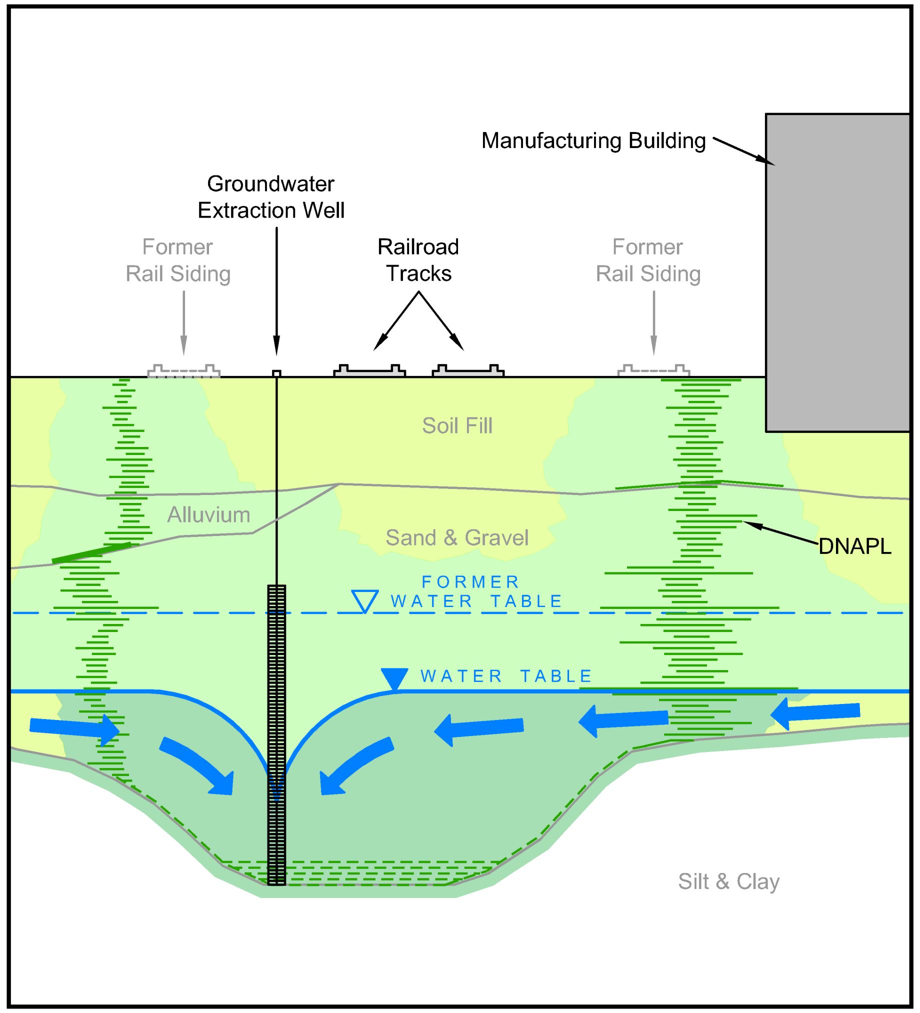


CONCEPTUAL SITE MODEL

STAGE ONE: SOLVENT RELEASES



STAGE TWO: RESIDUAL DNAPL SOURCE AREAS



STAGE THREE: REDUCTION IN RESIDUAL DNAPL SOURCE AREAS

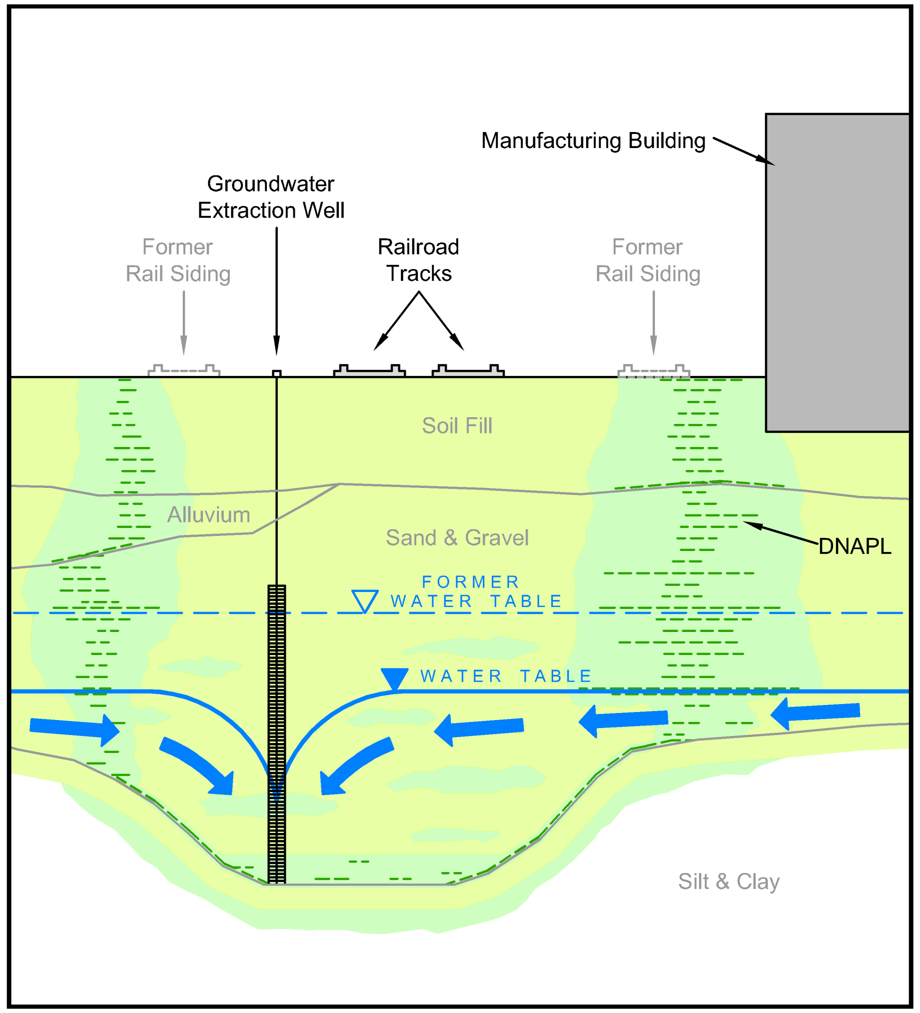


Figure 4-4

Former IBM Endicott Site
Site #704014

Conceptual Model of
DNAPL Fate and Transport
On-Site Source Areas

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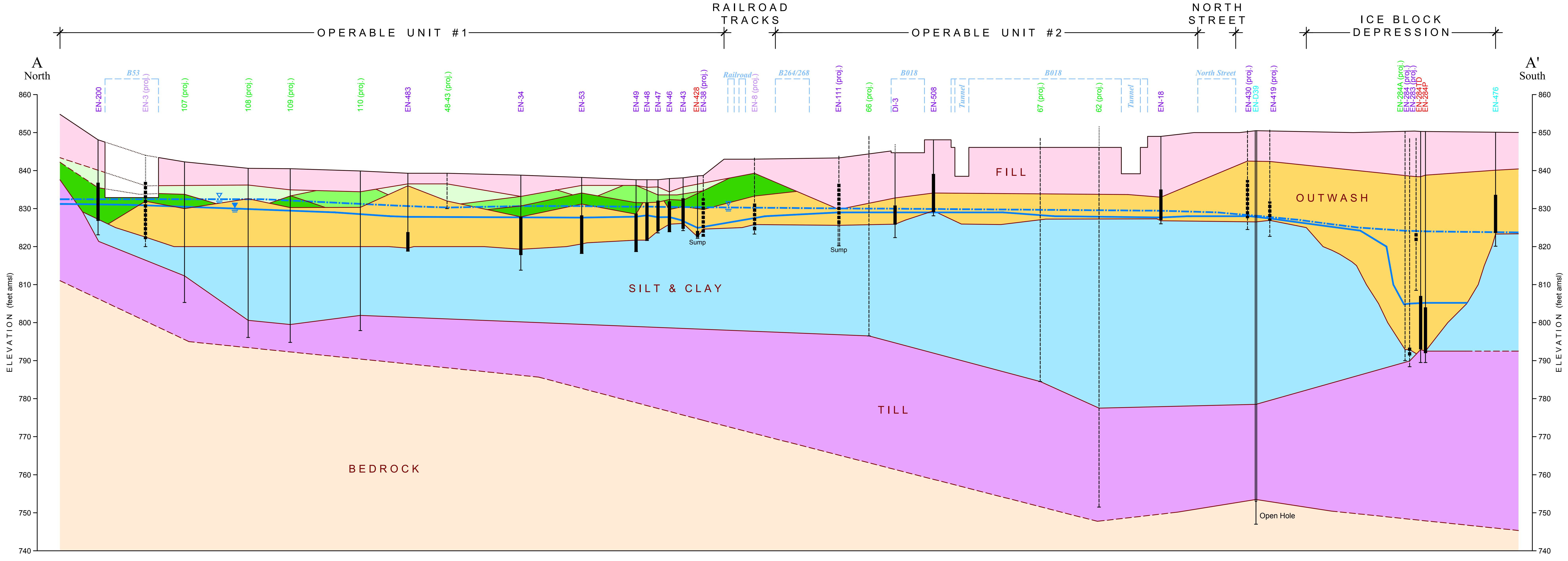
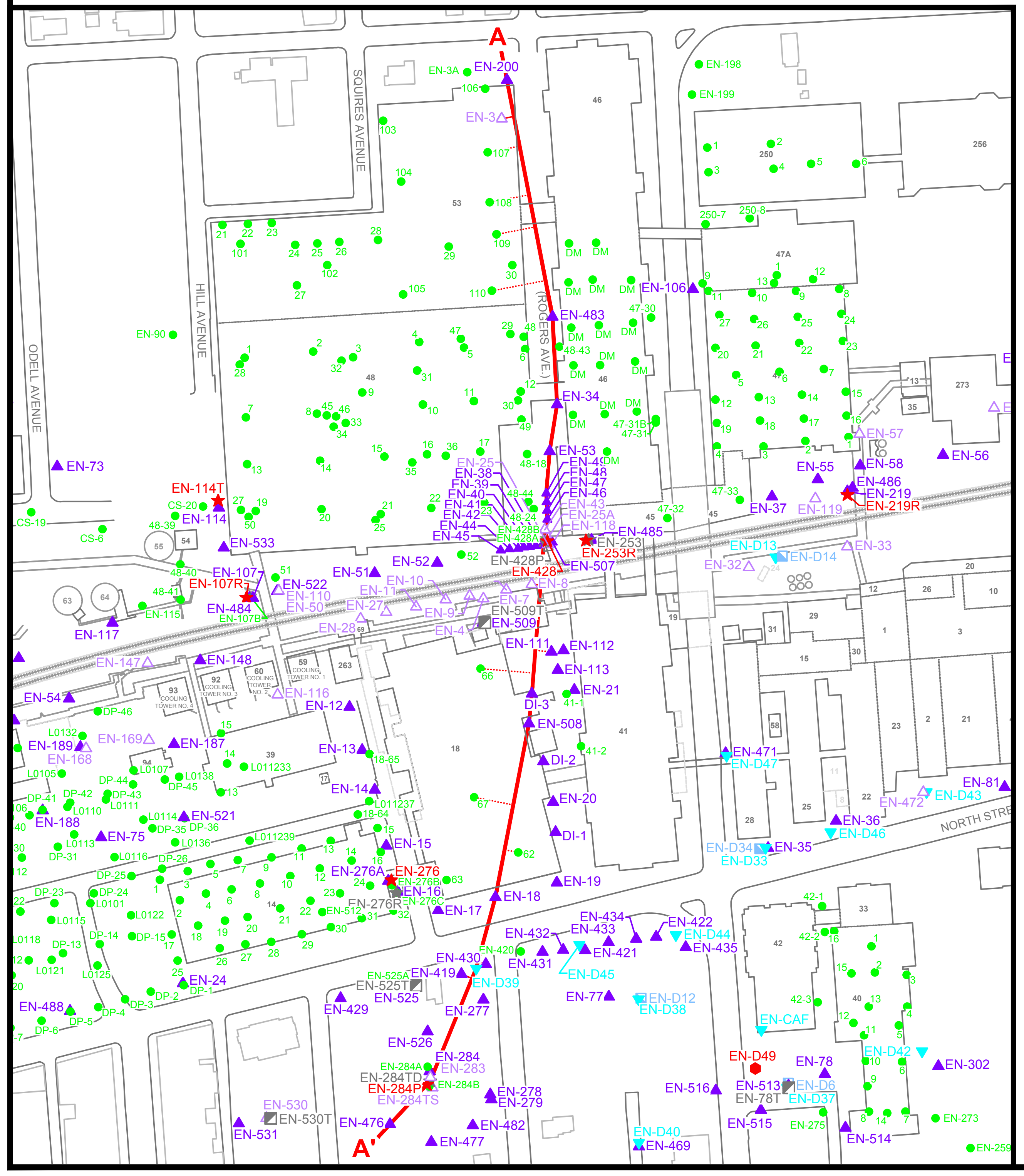
NOT TO SCALE

GROUNDWATER SCIENCES CORPORATION





Cross Section Location Map

LEGEND

- ▲ - Upper Aquifer Monitoring Well
- ▲ - Other Upper Aquifer Monitoring Well
- △ - Abandoned Upper Aquifer Monitoring Well
- ★ - Upper Aquifer Extraction Well
- ★ - Inactive Upper Aquifer Extraction Well
- ◩ - Inactive Upper Aquifer Injection Well
- ◩ - Ice Contact/Till Monitoring Well
- ▼ - Bedrock Monitoring Well
- ⬢ - Bedrock Extraction Well
- ● - Soil Boring

Scale
0 250'

BOREHOLES

Monitoring Well or Soil Boring (lines dashed where projected into line of section; lines dotted where excavated previously)

Water Table, August 2003

Water Table, August 2008

Lithologic contact (dashed where inferred)

HEADERS

Railroad	Names of streets, buildings and other landmarks
EN-24	Prefix EN indicates wells drilled as part of water-quality investigations
18-265	Foundation test borings for buildings; first number is building number (prefix omitted for borings inside buildings)

STRATIGRAPHIC UNITS

- 🟪 Soil Fill
- Late-Glacial to Post-Glacial Alluvium
  - 🟩 Silt & Clay
  - 🟩 Fine Sand, Silt, and/or Clay interbedded with lesser amounts of Sand & Gravel
  - 🟩 Sand & Gravel with little to trace amounts of Silt & Clay
- 🟨 Glaciofluvial Outwash Sand & Gravel
- 🟦 Glaciolacustrine Silt & Clay
- 🟪 Glacial Till (may include Post-Glacial Colluvium derived from Glacial Till)
- 🟧 Bedrock

Horizontal Scale: 1" = 100'
Vertical Scale: 1" = 20'

Vertical Exaggeration = 5X

Scale
0 50' 100'

Plate 3-1

Former IBM Endicott Site
Site #704014

Geologic Cross Section A-A'

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CHECKED & APPROVED BY: RCW		22007-CS31-1

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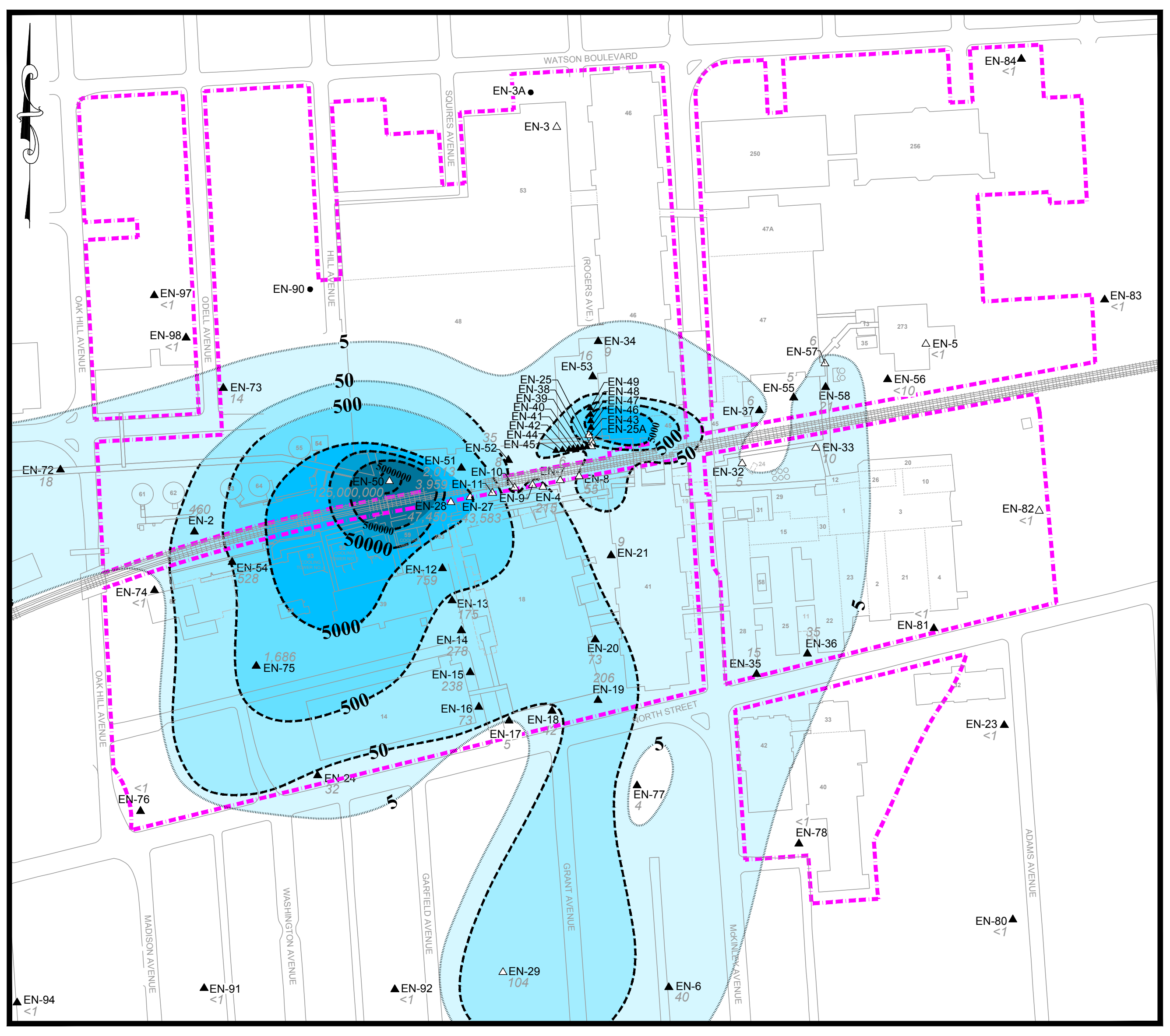
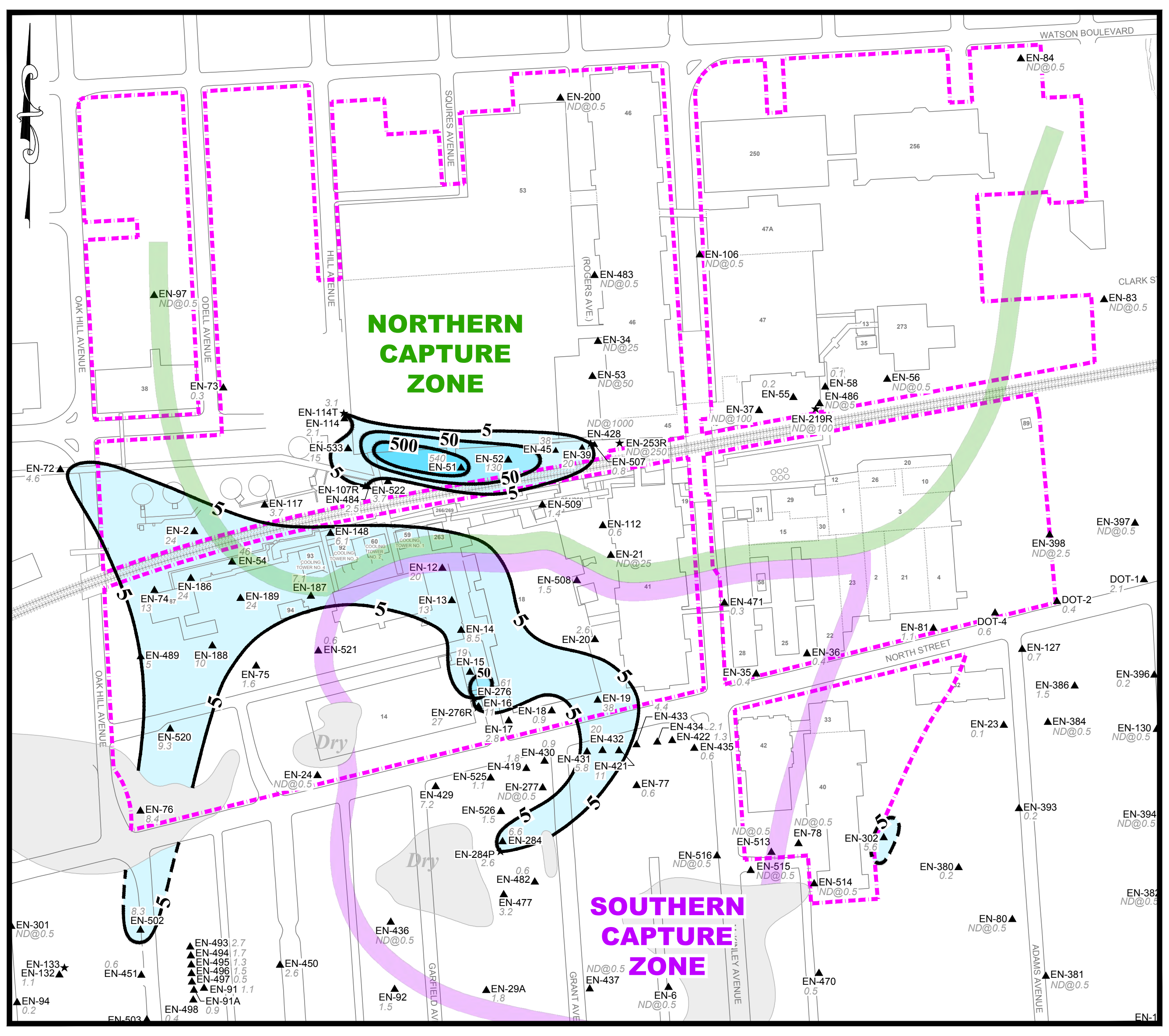
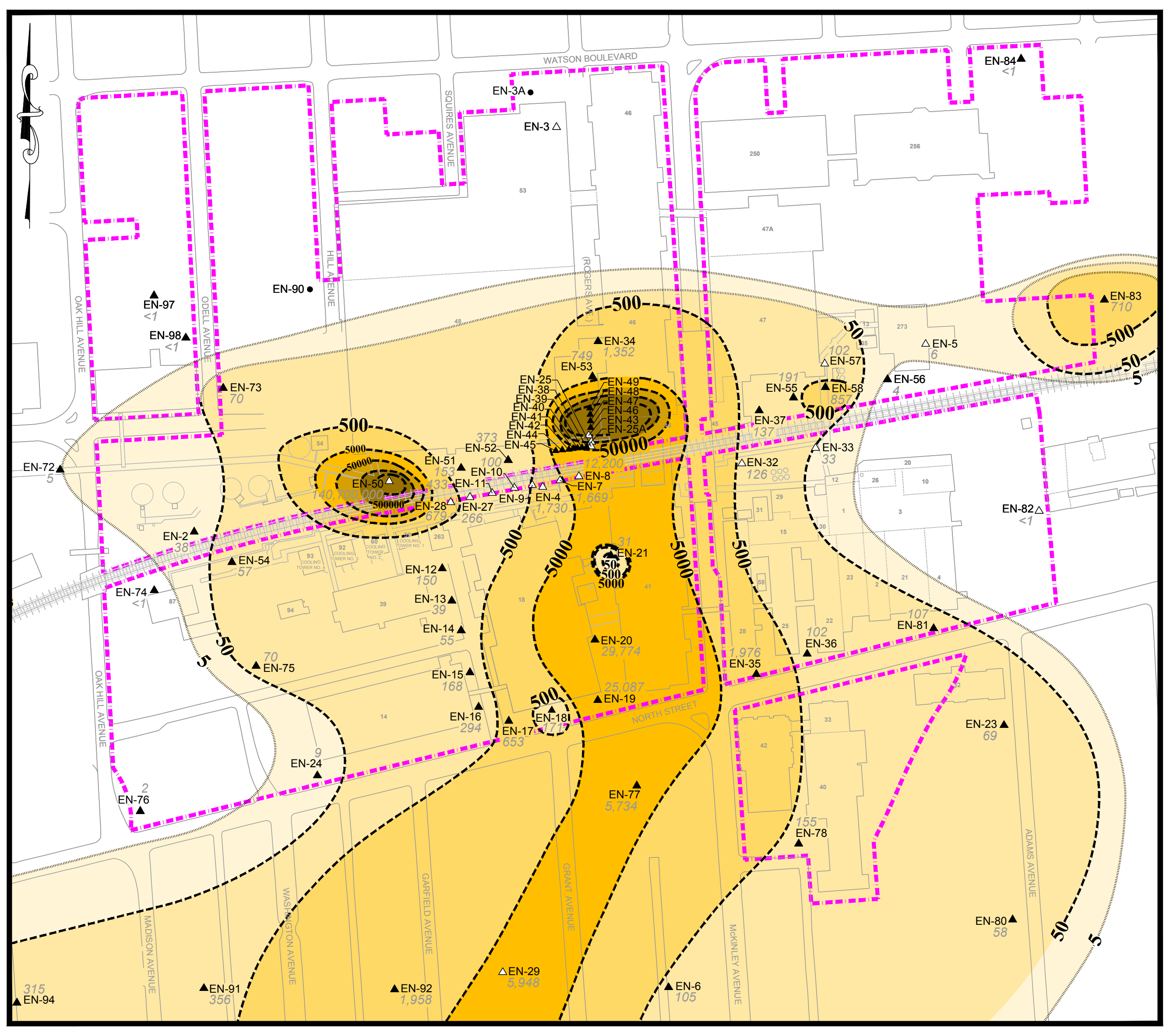


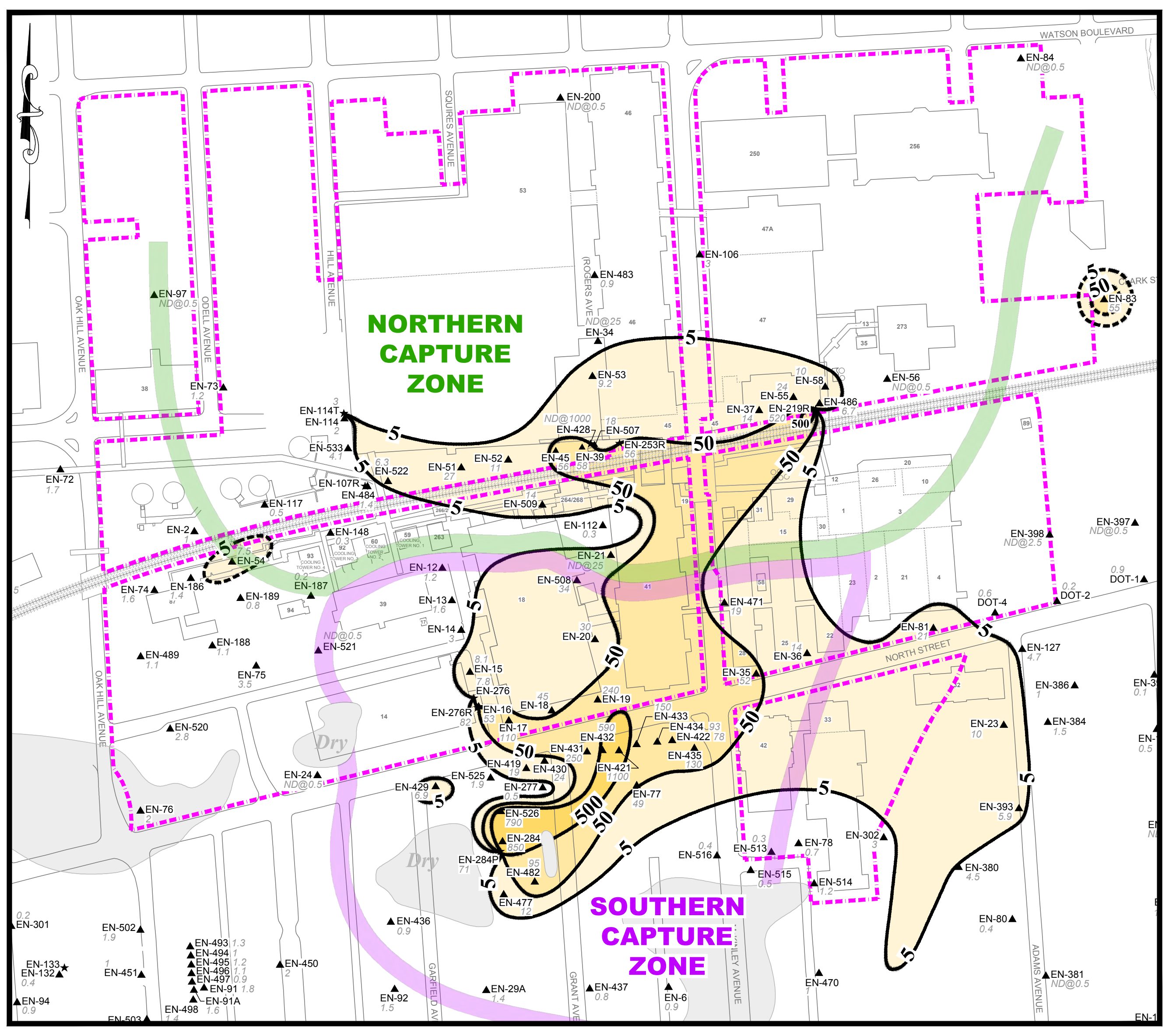
PCE Isoconcentration Contour Map (September 1980)



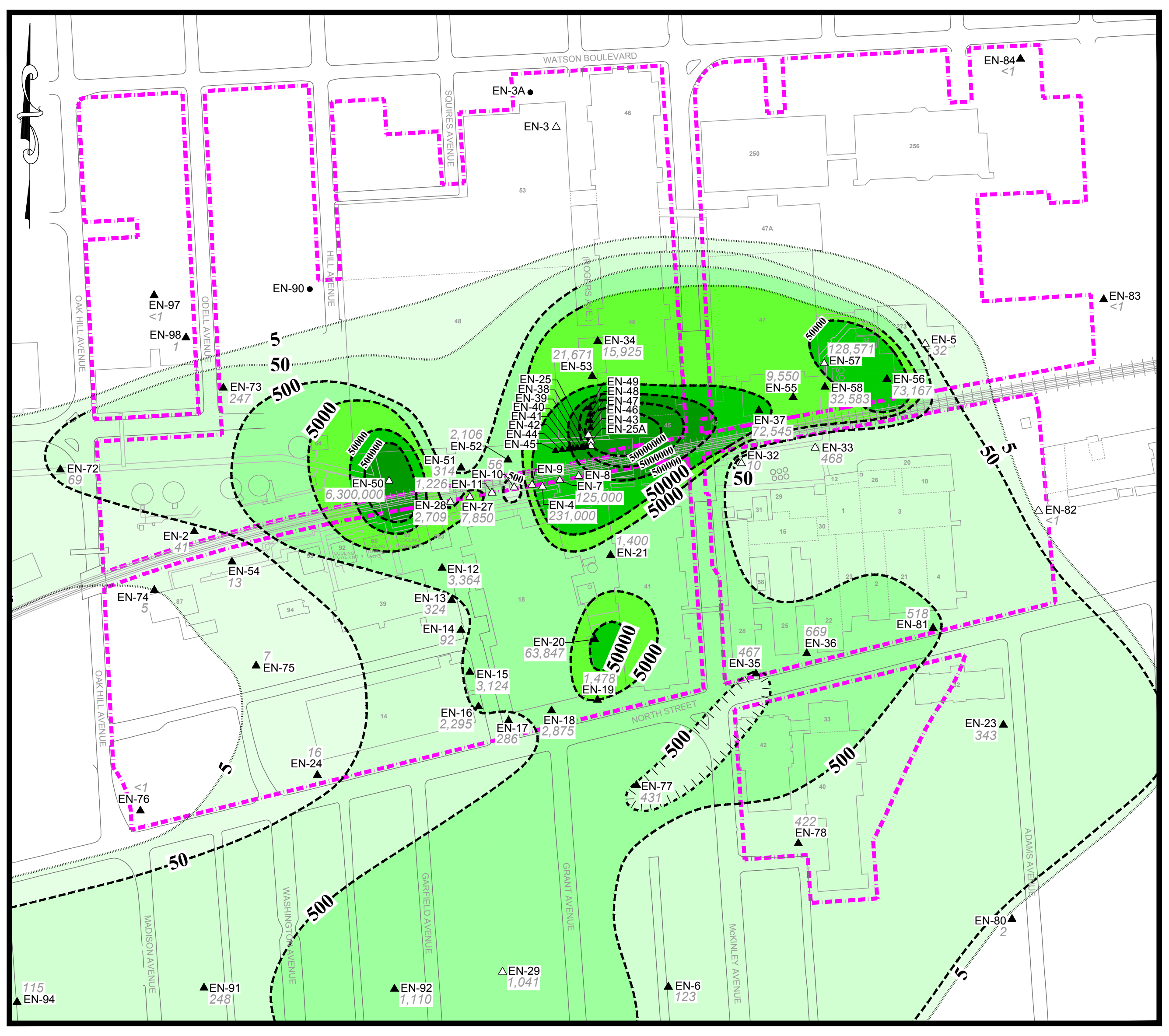
PCE Isoconcentration Contour Map (August 2018)



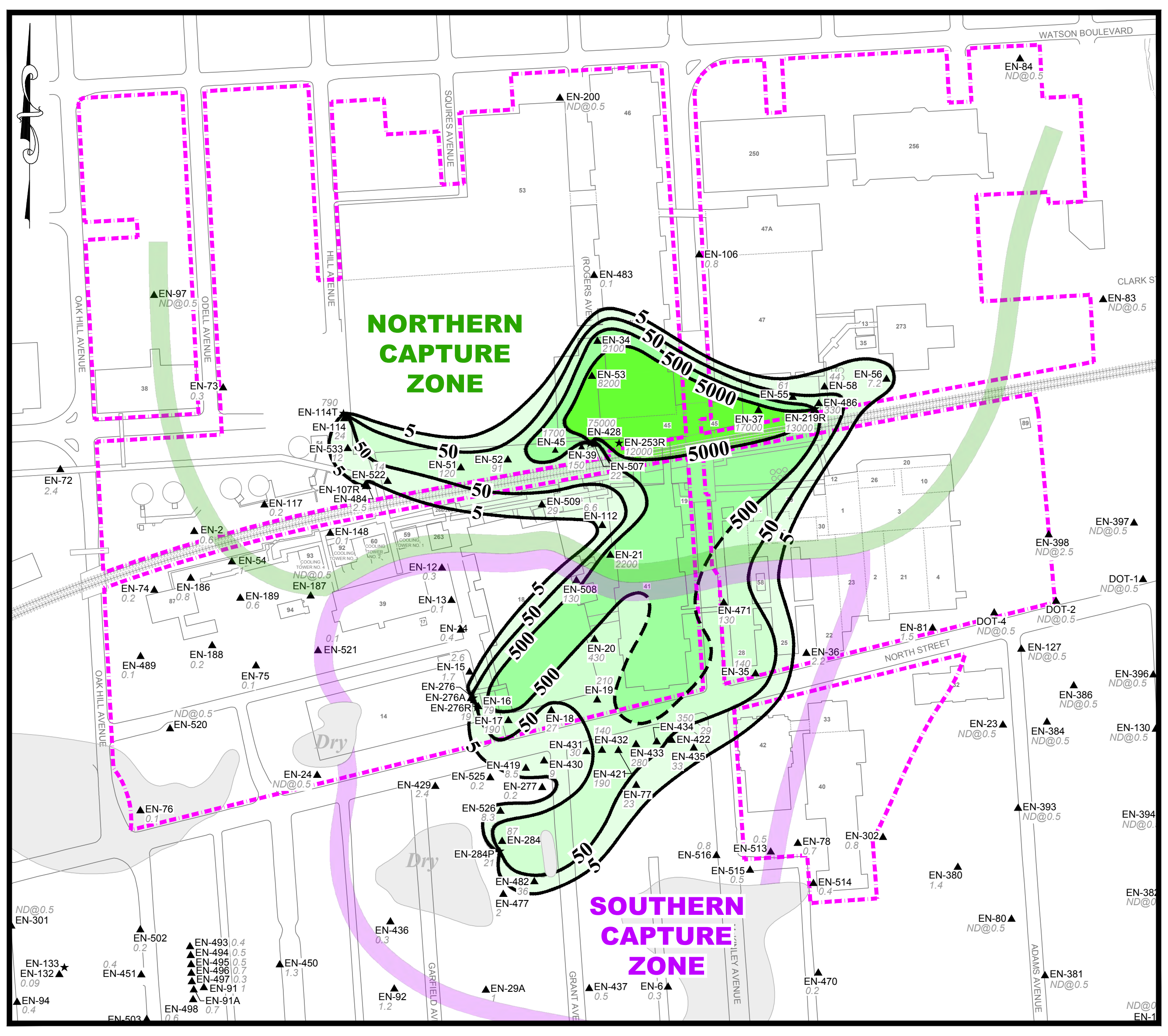
TCE Isoconcentration Contour Map (September 1980)



TCE Isoconcentration Contour Map (August 2018)



TCA Isoconcentration Contour Map (September 1980)



TCA Isoconcentration Contour Map (August 2018)

PCE CONCENTRATIONS	TCE CONCENTRATIONS	TCA CONCENTRATIONS
■ 5 - 50 µg/l	■ 5 - 50 µg/l	■ 5 - 50 µg/l
■ 50 - 500 µg/l	■ 50 - 500 µg/l	■ 50 - 500 µg/l
■ 500 - 5,000 µg/l	■ 500 - 5,000 µg/l	■ 500 - 5,000 µg/l
■ 5,000 - 50,000 µg/l	■ 5,000 - 50,000 µg/l	■ 5,000 - 50,000 µg/l
■ 50,000 - 500,000 µg/l	■ 50,000 - 500,000 µg/l	■ 50,000 - 500,000 µg/l
■ Greater than 500,000 µg/l	■ Greater than 500,000 µg/l	■ Greater than 500,000 µg/l

LEGEND

TCE - Trichloroethene
~50~ - TCE Isoconcentration Contour (µg/l; dashed where inferred)
10 - TCE Concentration (µg/l)
ND - Not Detected (various detection limits)
TCA - 1,1,1-Trichloroethane
~50~ - TCA Isoconcentration Contour (µg/l; dashed where inferred)
16 - TCA Concentration (µg/l)
ND - Not Detected (various detection limits)
PCE - Tetrachloroethene
~50~ - PCE Isoconcentration Contour (µg/l; dashed where inferred)
7 - PCE Concentration (µg/l)
ND - Not Detected (various detection limits)
○ - Area of Unsaturated Soil in the Upper Aquifer
▪▪▪ - Operable Units #1 and #2

▲ - Upper Aquifer Monitoring Well
△ - Abandoned Upper Aquifer Monitoring Well
★ - Upper Aquifer Extraction Well
☆ - Inactive Upper Aquifer Extraction Well
◩ - Upper Aquifer Injection Well
● - Soil Boring

Scale
0 150' 300'

Plate 4-1

Former IBM Endicott Site
Site #704014

Operable Units #1 and #2
Temporal Variations in Upper Aquifer
Chemistry, 1980 and 2018

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CHECKED & APPROVED BY: SMF/RCW		2007_3up_1980-09_J1

GROUNDWATER SCIENCES CORPORATION

APPENDIX A

Photographs - 1980 Soil Excavation

Photo 01
Photograph of 1980 excavation

Photo 02
Photograph of 1980 excavation

Photo 03
Photograph of 1980 excavation

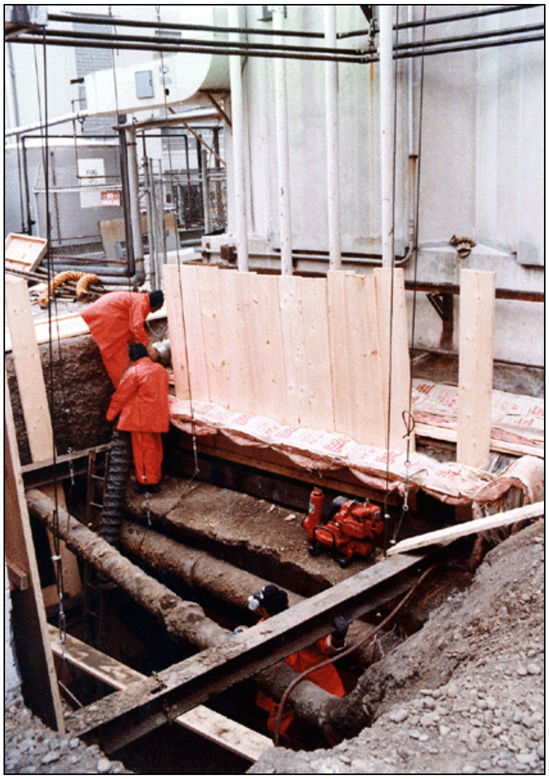

Photo 04
Photograph of 1980 excavation

Photo 05
Photograph of 1980 excavation

Photo 06
Photograph of 1980 excavation

Photo 07
Photograph of 1980 excavation

Photo 08
Photograph of 1980 excavation

Photo 09

Photograph of 1980 excavation

Photo 10

Photograph of 1980 excavation

APPENDIX B

Groundwater Analytical Chemistry Data
(August 2018)

TABLE B.1

Summary of VOC Detections in Groundwater (August 2018)

OU#1 and OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Area	WELL	111-TCA	11-DCA	11-DCE	CEA	PCE	TCE	C12-DCE	VC	FR113	FR123A	12-DCA	BZ	EBZ	DCM	TOL	T12DCE	XYL	DATE
		Part 703 Groundwater Quality Standards (ug/L)																	
		5	**5**	**5**	**5**	**5**	**5**	**5**	**2**	**5**	**5**	**0.6**	**1**	**5**	**5**	**5**	**5**	**5**	
OU1	EN-002	0.6				**24**	1	0.3		4.2									08/02/18
OU1	EN-034	**2100**	**120**	**12**	**11**			**170**	**62**	**7**		**3.8**			**5.9**				08/16/18
OU1	EN-037	**17000**	**3600**	**1200**	**1300**		**14**	**15000**	**1100**	**17**		**18**			**19**	**78**	**44**		08/16/18
OU1	EN-039	**150**	**8.8**	3.1		**20**	**58**	**64**				**0.9**					1.1		08/09/18
OU1	EN-045	**1700**	**6.5**	**18**		**38**	**56**	**190**		**13**		**4.1**							08/09/18
OU1	EN-051	**120**		**9**		**540**	**27**	**4200**	**33**	**190**							**18**	**14**	08/09/18
OU1	EN-052	**91**	4.3	2.7		**130**	**11**	**1000**		**73**	1.4						**21**		08/09/18
OU1	EN-053	**8200**	**290**	**39**	**37**		**9.2**	**430**	**210**	**21**		**12**			**12**				08/16/18
OU1	EN-055	**61**	**8.3**	4.4	0.08	0.2	**24**	**11**	0.1	3.5	0.2	0.3					1.4		08/16/18
OU1	EN-056	**7.2**	1.1							0.9	1.9								08/02/18
OU1	EN-058	**44**	2.8	1.5		0.1	**10**	1.2		0.9	0.06	0.1					0.2		08/16/18
OU1	EN-073	0.3	2.5	0.2		0.3	1.2	4.6	0.1		0.3								08/02/18
OU1	EN-083		0.9	2.3			**55**	**210**	**2.9**	1.3	2.3		0.1				**8.3**		08/02/18
OU1	EN-084																		08/02/18
OU1	EN-097																		08/02/18
OU1	EN-106	0.8	1.6	0.3			3	**13**			0.7						0.3		08/02/18
OU1	EN-114	**24**	**7**	2.5		2.1	2	**650**	**110**	**63**	**7.4**						**5.6**		08/16/18
OU1	EN-114T	**790**	**210**	**15**	3.3	3.1	3	**780**	**210**	**49**	**6.4**	**1.5**		2.2			3.6		08/01/18
OU1	EN-117	0.2	0.1			3.7	0.5	3.1	0.2	0.5	0.6								08/02/18
OU1	EN-200																		08/02/18
OU1	EN-219R	**13000**	**630**	**120**	**340**		**520**	**2100**	**190**	**77**									08/01/18
OU1	EN-253R	**12000**	**27000**	**150**	**29000**		**56**	**3300**	**520**		**280**				**480**	**810**			08/01/18
OU1	EN-428	**75000**	**25000**	**810**	**5100**			**2200**	**200**						**2200**	**580**			08/01/18
OU1	EN-483	0.1	0.9	0.2			0.9	**24**	0.2	1	4.5						2.3		08/02/18
OU1	EN-484	2.5	0.2			2.5	1.4	1.5		0.1									08/08/18
OU1	EN-486	**330**	**43**	**14**			**6.7**	4.7		**150**	**12**	0.5					0.6		08/09/18
OU1	EN-507	**22**	**22**	0.4	2.6	0.8	**18**	**6.8**	0.1	0.1		0.08			0.8	0.2			08/09/18
OU1	EN-522	**14**	0.7			3.7	**6.3**	**7.5**	0.2	0.4	0.2	0.06							08/09/18
OU1	EN-533	**12**	2.8	0.7		**15**	4.1	**280**	**4.8**	**25**	3			0.3			0.5	0.1	08/08/18
OU2	DOT-1					2.1	0.9	0.2											08/06/18
OU2	DOT-2					0.4	0.2												08/06/18
OU2	DOT-4		0.4			0.6	0.6	1.1	1.2									0.1	08/06/18
OU2	EN-012	0.3				**20**	1.2	1.4	0.2	0.07	0.1								08/16/18
OU2	EN-013	0.1				**13**	1.6	0.5		0.1									08/09/18

TABLE B.1

Summary of VOC Detections in Groundwater (August 2018)

OU#1 and OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Area	WELL	111-TCA	11-DCA	11-DCE	CEA	PCE	TCE	C12-DCE	VC	FR113	FR123A	12-DCA	BZ	EBZ	DCM	TOL	T12DCE	XYL	DATE
		Part 703 Groundwater Quality Standards (ug/L)																	
		5	**5**	**5**	**5**	**5**	**5**	**5**	**2**	**5**	**5**	**0.6**	**1**	**5**	**5**	**5**	**5**	**5**	
OU2	EN-014	0.4				**8.5**	3	0.2											08/09/18
OU2	EN-015	2.6	1	0.2		**19**	**8.1**	3.3		1.5	0.3								08/16/18
OU2	EN-016	**79**	**68**	**13**		**11**	**53**	**87**		1.7	0.6	**2.6**					0.6		08/16/18
OU2	EN-017	**190**	**210**	**18**		2.8	**110**	**140**		1	0.5	**7**					2.8		08/10/18
OU2	EN-018	**27**	**21**	1		0.9	**45**	**14**				0.3					0.2		08/10/18
OU2	EN-019	**210**	**370**	**37**		**38**	**240**	**310**		2.5	0.9	**1.9**					2.3		08/10/18
OU2	EN-020	**430**	**780**	**74**		2.6	**30**	**860**	**110**	**12**	3	**4.9**				3.1	**10**	2.1	08/09/18
OU2	EN-021	**2200**	**2400**	**87**	**290**			**140**	**73**	**14**	**10**	**6.9**				**5.9**			08/09/18
OU2	EN-024							1.4	0.3										08/09/18
OU2	EN-035	**140**	**61**	**24**		0.4	**52**	**35**		0.6	0.1	0.4					0.1		08/16/18
OU2	EN-036	2.2	0.4	0.4		0.4	**14**	0.5											08/16/18
OU2	EN-054	1				**46**	**7.5**	2.7		0.8							0.2		08/06/18
OU2	EN-074	0.2				**13**	1.6	0.2		0.6	0.2								08/06/18
OU2	EN-075	0.1				1.6	3.5	2.1											08/07/18
OU2	EN-076	0.1				**8.4**	2	0.2											08/07/18
OU2	EN-077	**23**	**25**	**6.5**		0.6	**49**	**14**		0.1	0.1	0.1					0.1		08/20/18
OU2	EN-081	1.5	1.4	0.8		1.1	**21**	**13**	1				0.2				0.3		08/16/18
OU2	EN-112	**6.6**	**57**	0.6	**45**	0.6	0.3	0.5	**2.6**	0.8	3.7	0.09			0.2	0.2	0.09		08/09/18
OU2	EN-148	0.1				**6.1**	0.3	0.1											08/06/18
OU2	EN-186	0.8				**24**	1.4	1.1		**6.6**	0.3								08/06/18
OU2	EN-187					**7.1**	0.2	0.2											08/06/18
OU2	EN-188	0.2				**10**	1.1	0.2		0.2									08/06/18
OU2	EN-189	0.6				**24**	0.8	0.2		0.7									08/06/18
OU2	EN-276	1.7	1.1	0.6		**61**	**7.8**	**5.1**	0.3	**80**	0.7								08/01/18
OU2	EN-276R	**19**	**31**	4.4		**27**	**82**	**37**		**36**	0.7	**0.6**					0.3		08/01/18
OU2	EN-277	0.2					0.5	0.1											08/09/18
OU2	EN-284	**87**	**190**	**33**		**6.6**	**850**	**380**				**2.6**					**7.6**		08/08/18
OU2	EN-284P	**21**	**48**	**7.5**		2.6	**71**	**83**		0.6	0.6	0.5					0.5		08/01/18
OU2	EN-397							0.2											08/06/18
OU2	EN-398																		08/06/18
OU2	EN-419	**8.5**	**7**	0.9		1.8	**19**	**7.3**		0.6	0.1	0.1							08/21/18
OU2	EN-421	**190**	**210**	**23**		**11**	**1100**	**500**		0.8		**2**			1.2		3.4		08/21/18
OU2	EN-422	**29**	**88**	**12**	0.1	1.3	**78**	**120**	**17**	0.6	0.3	0.6					1.1		08/21/18
OU2	EN-429	2.4	0.4	0.09		**7.2**	**6.9**	0.5		0.2									08/21/18

TABLE B.1
Summary of VOC Detections in Groundwater (August 2018)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Area	WELL	111-TCA	11-DCA	11-DCE	CEA	PCE	TCE	C12-DCE	VC	FR113	FR123A	12-DCA	BZ	EBZ	DCM	TOL	T12DCE	XYL	DATE
		Part 703 Groundwater Quality Standards (ug/L)																	
		5	**5**	**5**	**5**	**5**	**5**	**5**	**2**	**5**	**5**	**0.6**	**1**	**5**	**5**	**5**	**5**	**5**	
OU2	EN-430	**9**	**7.5**	0.4		0.9	**24**	**8.1**				0.2							08/21/18
OU2	EN-431	**30**	**56**	2.3		**5.8**	**250**	**89**				**0.9**			0.3		0.7		08/21/18
OU2	EN-432	**140**	**320**	**13**		**20**	**590**	**370**			0.6	**2.5**			0.8		**7.7**		08/21/18
OU2	EN-433	**280**	**620**	**78**		4.4	**150**	**890**	**6.7**	2.5	1.6	**4.9**			1.4		**5.4**		08/21/18
OU2	EN-434	**350**	**2000**	**150**	0.7	2.1	**93**	**610**	**67**	**8**	**6.2**	**6.9**					2.9		08/21/18
OU2	EN-435	**33**	**46**	**10**		0.6	**130**	**29**	0.7	0.1		0.5			0.2		0.4		08/21/18
OU2	EN-471	**130**	**340**	**33**		0.3	**19**	**52**	0.1	3	1.1	**1.7**					0.3		08/09/18
OU2	EN-489	0.1				**5**	1.1	0.1		0.2									08/07/18
OU2	EN-508	**130**	**18**	4.8		1.5	**34**	**6**		0.8									08/09/18
OU2	EN-509	**29**	0.1	0.3		1.4	**14**	0.7		0.2									08/09/18
OU2	EN-520					**9.3**	2.8	0.6											08/07/18
OU2	EN-521	0.1				0.6													08/07/18
OU2	EN-525	0.2				1.1	1.9												08/09/18
OU2	EN-526	**8.3**	**160**	**91**		1.5	**790**	**380**	1.9	**34**	**16**	**3.4**					**5**		08/09/18

	111-TCA	11-DCA	11-DCE	CEA	PCE	TCE	C12-DCE	VC	FR113	FR123A	12-DCA	BZ	EBZ	DCM	TOL	T12DCE	XYL
MAX CONC.	**75000**	**27000**	**1200**	**29000**	**540**	**1100**	**15000**	**1100**	**190**	**280**	**18**	**0.2**	**2.2**	**2200**	**810**	**44**	**14**
# OF DETECTS	**70**	**55**	**51**	**13**	**63**	**71**	**74**	**31**	**52**	**37**	**34**	**2**	**2**	**12**	**7**	**35**	**4**

Total # of samples = 82 in OU#1 and OU#2

All units are in ug/L.
Concentrations exceeding the Part 703 Groundwater Quality Standard are in **BOLD** typeface.

Key:

111-TCA = 1,1,1-TRICHLOROETHANE
11-DCA = 1,1-DICHLOROETHANE
11-DCE = 1,1-DICHLOROETHENE
CEA = CHLOROETHANE
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
C12DCE = CIS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

FR113 = 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE
FR123A = 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE
12-DCA = 1,2-DICHLOROETHANE (EDC)
BZ = BENZENE
EBZ = ETHYLBENZENE
DCM = METHYLENE CHLORIDE (DICHLOROMETHANE)
TOL = TOLUENE
T12DCE = TRANS-1,2-DICHLOROETHENE
XYL = TOTAL XYLENES

TABLE B.2
Groundwater Analytical Chemistry Data (August 2018)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		DOT-1		DOT-2		DOT-4		DOT-4		EN-002		EN-012	
Operable Unit No.		OU2		OU2		OU2		OU2		OU1		OU2	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		REPLICATE		GW MON WELL		GW MON WELL	
Sample Date		08/06/2018		08/06/2018		08/06/2018		08/06/2018		08/02/2018		08/16/2018	
Laboratory Sample I.D.		9746090		9746091		9746092		9746093		9738699		9761157	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		0.6		0.3	J
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		4.2		0.07	J
1,1-DICHLOROETHANE	ug/L	ND@0.5		ND@0.5		0.4	J	0.3	J	ND@0.5		ND@0.5	
1,1-DICHLOROETHENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		0.1	J
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
BENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
CHLOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
CIS-1,2-DICHLOROETHENE	ug/L	0.2	J	ND@0.5		1.1		1.1		0.3	J	1.4	
ETHYLBENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
METHYLENE CHLORIDE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TETRACHLOROETHENE	ug/L	2.1		0.4	J	0.3	J	0.8		24		20	
TOLUENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TRANS-1,2-DICHLOROETHENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TRICHLOROETHENE	ug/L	0.9		0.2	J	0.5	J	0.7		1		1.2	
VINYL CHLORIDE	ug/L	ND@0.5		ND@0.5		1.1		1.2		ND@0.5		0.2	J
XYLENES, TOTAL	ug/L	ND@0.5		ND@0.5		0.1	J	0.1	J	ND@0.5		ND@0.5	

TABLE B.2

Groundwater Analytical Chemistry Data (August 2018)

OU#1 and OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Sample Location		EN-013		EN-013		EN-014		EN-015		EN-016		EN-017	
Operable Unit No.		OU2		OU2		OU2		OU2		OU2		OU2	
Sample Description		GW MON WELL		REPLICATE		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL	
Sample Date		08/09/2018		08/09/2018		08/09/2018		08/16/2018		08/16/2018		08/10/2018	
Laboratory Sample I.D.		9749967		9749968		9749970		9761158		9761159		9749972	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	0.1	J	0.08	J	0.4	J	2.6		79		190	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.1	J	0.1	J	ND@0.5		1.5		1.7		1	J
1,1-DICHLOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		1		68		210	
1,1-DICHLOROETHENE	ug/L	ND@0.5		ND@0.5		ND@0.5		0.2	J	13		18	
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5		0.08	J	ND@0.5		0.3	J	0.6		0.5	J
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		2.6		7	
BENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@2.5	
CHLOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@2.5	
CIS-1,2-DICHLOROETHENE	ug/L	0.4	J	0.5		0.2	J	3.3		87		140	
ETHYLBENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@2.5	
METHYLENE CHLORIDE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@2.5	
TETRACHLOROETHENE	ug/L	13		12		8.5		19		11		2.8	
TOLUENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@2.5	
TRANS-1,2-DICHLOROETHENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		0.6		2.8	
TRICHLOROETHENE	ug/L	1.7		1.5		3		8.1		53		110	
VINYL CHLORIDE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@2.5	
XYLENES, TOTAL	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@2.5	

TABLE B.2

Groundwater Analytical Chemistry Data (August 2018)

OU#1 and OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Sample Location		EN-018		EN-019		EN-020		EN-021		EN-024		EN-034	
Operable Unit No.		OU2		OU2		OU2		OU2		OU2		OU1	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL	
Sample Date		08/10/2018		08/10/2018		08/09/2018		08/09/2018		08/09/2018		08/16/2018	
Laboratory Sample I.D.		9749973		9749974		9749962		9749963		9749961		9761165	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	27		210		430		2200		ND@0.5		2100	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@1		2.5	J	12		14	J	ND@0.5		7	J
1,1-DICHLOROETHANE	ug/L	21		370		780		2400		ND@0.5		120	
1,1-DICHLOROETHENE	ug/L	1	J	37		74		87		ND@0.5		12	J
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@1		0.9	J	3	J	10	J	ND@0.5		ND@25	
1,2-DICHLOROETHANE (EDC)	ug/L	0.3	J	1.9	J	4.9	J	6.9	J	ND@0.5		3.8	J
BENZENE	ug/L	ND@1		ND@2.5		ND@10		ND@25		ND@0.5		ND@25	
CHLOROETHANE	ug/L	ND@1		ND@2.5		ND@10		290		ND@0.5		11	J
CIS-1,2-DICHLOROETHENE	ug/L	14		310		860		140		1.4		170	
ETHYLBENZENE	ug/L	ND@1		ND@2.5		ND@10		ND@25		ND@0.5		ND@25	
METHYLENE CHLORIDE	ug/L	ND@1		ND@2.5		ND@10		ND@25		ND@0.5		5.9	J
TETRACHLOROETHENE	ug/L	0.9	J	38		2.6	J	ND@25		ND@0.5		ND@25	
TOLUENE	ug/L	ND@1		ND@2.5		3.1	J	5.9	J	ND@0.5		ND@25	
TRANS-1,2-DICHLOROETHENE	ug/L	0.2	J	2.3	J	10		ND@25		ND@0.5		ND@25	
TRICHLOROETHENE	ug/L	45		240		30		ND@25		ND@0.5		ND@25	
VINYL CHLORIDE	ug/L	ND@1		ND@2.5		110		73		0.3	J	62	
XYLENES, TOTAL	ug/L	ND@1		ND@2.5		2.1	J	ND@25		ND@0.5		ND@25	

TABLE B.2
Groundwater Analytical Chemistry Data (August 2018)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-035		EN-036		EN-037		EN-039		EN-039		EN-045	
Operable Unit No.		OU2		OU2		OU1		OU1		OU1		OU1	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		REPLICATE		GW MON WELL	
Sample Date		08/16/2018		08/16/2018		08/16/2018		08/09/2018		08/09/2018		08/09/2018	
Laboratory Sample I.D.		9761174		9761173		9761166		9749957		9749958		9749956	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	140		2.2		17000		150		150		1700	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.6		ND@0.5		17	J	ND@2.5		ND@2.5		13	J
1,1-DICHLOROETHANE	ug/L	61		0.4	J	3600		8.8		8.8		6.5	J
1,1-DICHLOROETHENE	ug/L	24		0.4	J	1200		3.1		3		18	J
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.1	J	ND@0.5		ND@100		ND@2.5		ND@2.5		ND@25	
1,2-DICHLOROETHANE (EDC)	ug/L	0.4	J	ND@0.5		18	J	0.9	J	0.8	J	4.1	J
BENZENE	ug/L	ND@0.5		ND@0.5		ND@100		ND@2.5		ND@2.5		ND@25	
CHLOROETHANE	ug/L	ND@0.5		ND@0.5		1300		ND@2.5		ND@2.5		ND@25	
CIS-1,2-DICHLOROETHENE	ug/L	35		0.5		15000		64		64		190	
ETHYLBENZENE	ug/L	ND@0.5		ND@0.5		ND@100		ND@2.5		ND@2.5		ND@25	
METHYLENE CHLORIDE	ug/L	ND@0.5		ND@0.5		19	J	ND@2.5		ND@2.5		ND@25	
TETRACHLOROETHENE	ug/L	0.4	J	0.4	J	ND@100		20		19		38	
TOLUENE	ug/L	ND@0.5		ND@0.5		78	J	ND@2.5		ND@2.5		ND@25	
TRANS-1,2-DICHLOROETHENE	ug/L	0.1	J	ND@0.5		44	J	1.1	J	1.1	J	ND@25	
TRICHLOROETHENE	ug/L	52		14		14	J	58		57		56	
VINYL CHLORIDE	ug/L	ND@0.5		ND@0.5		1100		ND@2.5		ND@2.5		ND@25	
XYLENES, TOTAL	ug/L	ND@0.5		ND@0.5		ND@100		ND@2.5		ND@2.5		ND@25	

TABLE B.2
Groundwater Analytical Chemistry Data (August 2018)

OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-051		EN-052		EN-053		EN-054		EN-054		EN-055	
Operable Unit No.		OU1		OU1		OU1		OU2		OU2		OU1	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		REPLICATE		GW MON WELL	
Sample Date		08/09/2018		08/09/2018		08/16/2018		08/06/2018		08/06/2018		08/16/2018	
Laboratory Sample I.D.		9749954		9749955		9761164		9746096		9746097		9761167	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	120		91		8200		1		1		61	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	190		73		21	J	0.8		0.8		3.5	
1,1-DICHLOROETHANE	ug/L	ND@50		4.3	J	290		ND@0.5		ND@0.5		8.3	
1,1-DICHLOROETHENE	ug/L	9	J	2.7	J	39	J	ND@0.5		ND@0.5		4.4	
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@50		1.4	J	ND@50		ND@0.5		ND@0.5		0.2	J
1,2-DICHLOROETHANE (EDC)	ug/L	ND@50		ND@10		12	J	ND@0.5		ND@0.5		0.3	J
BENZENE	ug/L	ND@50		ND@10		ND@50		ND@0.5		ND@0.5		ND@0.5	
CHLOROETHANE	ug/L	ND@50		ND@10		37	J	ND@0.5		ND@0.5		0.08	J
CIS-1,2-DICHLOROETHENE	ug/L	4200		1000		430		2.7		2.6		11	
ETHYLBENZENE	ug/L	ND@50		ND@10		ND@50		ND@0.5		ND@0.5		ND@0.5	
METHYLENE CHLORIDE	ug/L	ND@50		ND@10		12	J	ND@0.5		ND@0.5		ND@0.5	
TETRACHLOROETHENE	ug/L	540		130		ND@50		47		45		0.2	J
TOLUENE	ug/L	ND@50		ND@10		ND@50		ND@0.5		ND@0.5		ND@0.5	
TRANS-1,2-DICHLOROETHENE	ug/L	18	J	21		ND@50		0.2	J	0.2	J	1.4	
TRICHLOROETHENE	ug/L	27	J	11		9.2	J	7.4		7.5		24	
VINYL CHLORIDE	ug/L	33	J	ND@10		210		ND@0.5		ND@0.5		0.1	J
XYLENES, TOTAL	ug/L	14	J	ND@10		ND@50		ND@0.5		ND@0.5		ND@0.5	

TABLE B.2

Groundwater Analytical Chemistry Data (August 2018)

OU#1 and OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Sample Location		EN-056		EN-058		EN-073		EN-074		EN-075		EN-076	
Operable Unit No.		OU1		OU1		OU1		OU2		OU2		OU2	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL	
Sample Date		08/02/2018		08/16/2018		08/02/2018		08/06/2018		08/07/2018		08/07/2018	
Laboratory Sample I.D.		9738739		9761168		9738698		9746099		9745924		9745926	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	7.2		44		0.3	J	0.2	J	0.1	J	0.1	J
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.9		0.9		ND@0.5		0.6		ND@0.5		ND@0.5	
1,1-DICHLOROETHANE	ug/L	1.1		2.8		2.5		ND@0.5		ND@0.5		ND@0.5	
1,1-DICHLOROETHENE	ug/L	ND@0.5		1.5		0.2	J	ND@0.5		ND@0.5		ND@0.5	
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	1.9		0.06	J	0.3	J	0.2	J	ND@0.5		ND@0.5	
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5		0.1	J	ND@0.5		ND@0.5		ND@0.5		ND@0.5	
BENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
CHLOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
CIS-1,2-DICHLOROETHENE	ug/L	ND@0.5		1.2		4.6		0.2	J	2.1		0.2	J
ETHYLBENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
METHYLENE CHLORIDE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TETRACHLOROETHENE	ug/L	ND@0.5		0.1	J	0.3	J	13		1.6		8.4	
TOLUENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TRANS-1,2-DICHLOROETHENE	ug/L	ND@0.5		0.2	J	ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TRICHLOROETHENE	ug/L	ND@0.5		10		1.2		1.6		3.5		2	
VINYL CHLORIDE	ug/L	ND@0.5		ND@0.5		0.1	J	ND@0.5		ND@0.5		ND@0.5	
XYLENES, TOTAL	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	

TABLE B.2
Groundwater Analytical Chemistry Data (August 2018)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-077		EN-081		EN-083		EN-084		EN-097		EN-106	
Operable Unit No.		OU2		OU2		OU1		OU1		OU1		OU1	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL	
Sample Date		08/20/2018		08/16/2018		08/02/2018		08/02/2018		08/02/2018		08/02/2018	
Laboratory Sample I.D.		9766914		9761172		9738704		9738703		9738697		9738702	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	23		1.5		ND@0.5		ND@0.5		ND@0.5		0.8	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.1	J	ND@0.5		1.3		ND@0.5		ND@0.5		ND@0.5	
1,1-DICHLOROETHANE	ug/L	25		1.4		0.9		ND@0.5		ND@0.5		1.6	
1,1-DICHLOROETHENE	ug/L	6.5		0.8		2.3		ND@0.5		ND@0.5		0.3	J
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.1	J	ND@0.5		2.3		ND@0.5		ND@0.5		0.7	
1,2-DICHLOROETHANE (EDC)	ug/L	0.1	J	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
BENZENE	ug/L	ND@0.5		0.2	J	0.1	J	ND@0.5		ND@0.5		ND@0.5	
CHLOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
CIS-1,2-DICHLOROETHENE	ug/L	14		13		210		ND@0.5		ND@0.5		13	
ETHYLBENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
METHYLENE CHLORIDE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TETRACHLOROETHENE	ug/L	0.6		1.1		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TOLUENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TRANS-1,2-DICHLOROETHENE	ug/L	0.1	J	0.3	J	8.3		ND@0.5		ND@0.5		0.3	J
TRICHLOROETHENE	ug/L	49		21		55		ND@0.5		ND@0.5		3	
VINYL CHLORIDE	ug/L	ND@0.5		1		2.9		ND@0.5		ND@0.5		ND@0.5	
XYLENES, TOTAL	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	

TABLE B.2

Groundwater Analytical Chemistry Data (August 2018)

OU#1 and OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Sample Location		EN-112		EN-114		EN-114T		EN-117		EN-148		EN-186	
Operable Unit No.		OU2		OU1		OU1		OU1		OU2		OU2	
Sample Description		GW MON WELL		GW MON WELL		GW EXTR WELL		GW MON WELL		GW MON WELL		GW MON WELL	
Sample Date		08/09/2018		08/16/2018		08/01/2018		08/02/2018		08/06/2018		08/06/2018	
Laboratory Sample I.D.		9749965		9761163		9734807		9738700		9746094		9746098	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	6.6		24		790		0.2	J	0.1	J	0.8	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.8		63		49		0.5	J	ND@0.5		6.6	
1,1-DICHLOROETHANE	ug/L	57		7	J	210		0.1	J	ND@0.5		ND@0.5	
1,1-DICHLOROETHENE	ug/L	0.6		2.5	J	15		ND@0.5		ND@0.5		ND@0.5	
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	3.7		7.4	J	6.4		0.6		ND@0.5		0.3	J
1,2-DICHLOROETHANE (EDC)	ug/L	0.09	J	ND@10		1.5	J	ND@0.5		ND@0.5		ND@0.5	
BENZENE	ug/L	ND@0.5		ND@10		ND@5		ND@0.5		ND@0.5		ND@0.5	
CHLOROETHANE	ug/L	45		ND@10		3.3	J	ND@0.5		ND@0.5		ND@0.5	
CIS-1,2-DICHLOROETHENE	ug/L	0.5	J	650		780		3.1		0.1	J	1.1	
ETHYLBENZENE	ug/L	ND@0.5		ND@10		2.2	J	ND@0.5		ND@0.5		ND@0.5	
METHYLENE CHLORIDE	ug/L	0.2	J	ND@10		ND@5		ND@0.5		ND@0.5		ND@0.5	
TETRACHLOROETHENE	ug/L	0.6		2.1	J	3.1	J	3.7		6.1		24	
TOLUENE	ug/L	0.2	J	ND@10		ND@5		ND@0.5		ND@0.5		ND@0.5	
TRANS-1,2-DICHLOROETHENE	ug/L	0.09	J	5.6	J	3.6	J	ND@0.5		ND@0.5		ND@0.5	
TRICHLOROETHENE	ug/L	0.3	J	2	J	3	J	0.5		0.3	J	1.4	
VINYL CHLORIDE	ug/L	2.6		110		210		0.2	J	ND@0.5		ND@0.5	
XYLENES, TOTAL	ug/L	ND@0.5		ND@10		ND@5		ND@0.5		ND@0.5		ND@0.5	

TABLE B.2
Groundwater Analytical Chemistry Data (August 2018)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-187		EN-188		EN-189		EN-200		EN-219R		EN-253R	
Operable Unit No.		OU2		OU2		OU2		OU1		OU1		OU1	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW EXTR WELL		GW EXTR WELL	
Sample Date		08/06/2018		08/06/2018		08/06/2018		08/02/2018		08/01/2018		08/01/2018	
Laboratory Sample I.D.		9746101		9746102		9746100		9738701		9734803		9734804	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	ND@0.5		0.2	J	0.6		ND@0.5		13000		12000	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5		0.2	J	0.7		ND@0.5		77	J	ND@250	
1,1-DICHLOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		630		27000	
1,1-DICHLOROETHENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		120		150	J
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@100		280	
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@100		ND@250	
BENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@100		ND@250	
CHLOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		340		29000	
CIS-1,2-DICHLOROETHENE	ug/L	0.2	J	0.2	J	0.2	J	ND@0.5		2100		3300	
ETHYLBENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@100		ND@250	
METHYLENE CHLORIDE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@100		480	
TETRACHLOROETHENE	ug/L	7.1		10		24		ND@0.5		ND@100		ND@250	
TOLUENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@100		810	
TRANS-1,2-DICHLOROETHENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@100		ND@250	
TRICHLOROETHENE	ug/L	0.2	J	1.1		0.8		ND@0.5		520		56	J
VINYL CHLORIDE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		190		520	
XYLENES, TOTAL	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@100		ND@250	

TABLE B.2
Groundwater Analytical Chemistry Data (August 2018)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-276		EN-276R		EN-277		EN-284		EN-284P		EN-397	
Operable Unit No.		OU2		OU2		OU2		OU2		OU2		OU2	
Sample Description		GW EXTR WELL		GW EXTR WELL		GW MON WELL		GW MON WELL		GW EXTR WELL		GW MON WELL	
Sample Date		08/01/2018		08/01/2018		08/09/2018		08/08/2018		08/01/2018		08/06/2018	
Laboratory Sample I.D.		9734800		9734801		9749897		9749850		9734802		9746088	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	1.7		19		0.2	J	87		21		ND@0.5	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	80	E	36		ND@0.5		ND@10		0.6	J	ND@0.5	
1,1-DICHLOROETHANE	ug/L	1.1		31		ND@0.5		190		48		ND@0.5	
1,1-DICHLOROETHENE	ug/L	0.6		4.4		ND@0.5		33		7.5		ND@0.5	
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.7		0.7	J	ND@0.5		ND@10		0.6	J	ND@0.5	
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5		0.6	J	ND@0.5		2.6	J	0.5	J	ND@0.5	
BENZENE	ug/L	ND@0.5		ND@1		ND@0.5		ND@10		ND@1		ND@0.5	
CHLOROETHANE	ug/L	ND@0.5		ND@1		ND@0.5		ND@10		ND@1		ND@0.5	
CIS-1,2-DICHLOROETHENE	ug/L	5.1		37		0.1	J	380		83		0.2	J
ETHYLBENZENE	ug/L	ND@0.5		ND@1		ND@0.5		ND@10		ND@1		ND@0.5	
METHYLENE CHLORIDE	ug/L	ND@0.5		ND@1		ND@0.5		ND@10		ND@1		ND@0.5	
TETRACHLOROETHENE	ug/L	61	E	27		ND@0.5		6.6	J	2.6		ND@0.5	
TOLUENE	ug/L	ND@0.5		ND@1		ND@0.5		ND@10		ND@1		ND@0.5	
TRANS-1,2-DICHLOROETHENE	ug/L	ND@0.5		0.3	J	ND@0.5		7.6	J	0.5	J	ND@0.5	
TRICHLOROETHENE	ug/L	7.8		82		0.5	J	850		71		ND@0.5	
VINYL CHLORIDE	ug/L	0.3	J	ND@1		ND@0.5		ND@10		ND@1		ND@0.5	
XYLENES, TOTAL	ug/L	ND@0.5		ND@1		ND@0.5		ND@10		ND@1		ND@0.5	

TABLE B.2

Groundwater Analytical Chemistry Data (August 2018)

OU#1 and OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Sample Location		EN-398		EN-419		EN-421		EN-422		EN-428		EN-429	
Operable Unit No.		OU2		OU2		OU2		OU2		OU1		OU2	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW EXTR WELL		GW MON WELL	
Sample Date		08/06/2018		08/21/2018		08/21/2018		08/21/2018		08/01/2018		08/21/2018	
Laboratory Sample I.D.		9746089		9766893		9766889		9766891		9734805		9766895	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	ND@2.5		8.5		190		29		75000		2.4	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@2.5		0.6		0.8	J	0.6		ND@1000		0.2	J
1,1-DICHLOROETHANE	ug/L	ND@2.5		7		210		88		25000		0.4	J
1,1-DICHLOROETHENE	ug/L	ND@2.5		0.9		23		12		810	J	0.09	J
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@2.5		0.1	J	ND@5		0.3	J	ND@1000		ND@0.5	
1,2-DICHLOROETHANE (EDC)	ug/L	ND@2.5		0.1	J	2	J	0.6		ND@1000		ND@0.5	
BENZENE	ug/L	ND@2.5		ND@0.5		ND@5		ND@0.5		ND@1000		ND@0.5	
CHLOROETHANE	ug/L	ND@2.5		ND@0.5		ND@5		0.1	J	5100		ND@0.5	
CIS-1,2-DICHLOROETHENE	ug/L	ND@2.5		7.3		500		120		2200		0.5	
ETHYLBENZENE	ug/L	ND@2.5		ND@0.5		ND@5		ND@0.5		ND@1000		ND@0.5	
METHYLENE CHLORIDE	ug/L	ND@2.5		ND@0.5		1.2	J	ND@0.5		2200		ND@0.5	
TETRACHLOROETHENE	ug/L	ND@2.5		1.8		11		1.3		ND@1000		7.2	
TOLUENE	ug/L	ND@2.5		ND@0.5		ND@5		ND@0.5		580	J	ND@0.5	
TRANS-1,2-DICHLOROETHENE	ug/L	ND@2.5		ND@0.5		3.4	J	1.1		ND@1000		ND@0.5	
TRICHLOROETHENE	ug/L	ND@2.5		19		1100		78		ND@1000		6.9	
VINYL CHLORIDE	ug/L	ND@2.5		ND@0.5		ND@5		17		200	J	ND@0.5	
XYLENES, TOTAL	ug/L	ND@2.5		ND@0.5		ND@5		ND@0.5		ND@1000		ND@0.5	

TABLE B.2

Groundwater Analytical Chemistry Data (August 2018)

OU#1 and OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Sample Location		EN-430		EN-431		EN-432		EN-433		EN-434		EN-435	
Operable Unit No.		OU2		OU2		OU2		OU2		OU2		OU2	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL	
Sample Date		08/21/2018		08/21/2018		08/21/2018		08/21/2018		08/21/2018		08/21/2018	
Laboratory Sample I.D.		9766894		9766887		9766888		9766890		9766917		9766892	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	9		30		140		280		350		33	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5		ND@1		ND@2.5		2.5	J	8		0.1	J
1,1-DICHLOROETHANE	ug/L	7.5		56		320		620		2000		46	
1,1-DICHLOROETHENE	ug/L	0.4	J	2.3		13		78		150		10	
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5		ND@1		0.6	J	1.6	J	6.2		ND@1	
1,2-DICHLOROETHANE (EDC)	ug/L	0.2	J	0.9	J	2.5		4.9	J	6.9		0.5	J
BENZENE	ug/L	ND@0.5		ND@1		ND@2.5		ND@5		ND@5		ND@1	
CHLOROETHANE	ug/L	ND@0.5		ND@1		ND@2.5		ND@5		0.7	J	ND@1	
CIS-1,2-DICHLOROETHENE	ug/L	8.1		89		370		890		610		29	
ETHYLBENZENE	ug/L	ND@0.5		ND@1		ND@2.5		ND@5		ND@5		ND@1	
METHYLENE CHLORIDE	ug/L	ND@0.5		0.3	J	0.8	J	1.4	J	ND@5		0.2	J
TETRACHLOROETHENE	ug/L	0.9		5.8		20		4.4	J	2.1	J	0.6	J
TOLUENE	ug/L	ND@0.5		ND@1		ND@2.5		ND@5		ND@5		ND@1	
TRANS-1,2-DICHLOROETHENE	ug/L	ND@0.5		0.7	J	7.7		5.4		2.9	J	0.4	J
TRICHLOROETHENE	ug/L	24		250		590		150		93		130	
VINYL CHLORIDE	ug/L	ND@0.5		ND@1		ND@2.5		6.7		67		0.7	J
XYLENES, TOTAL	ug/L	ND@0.5		ND@1		ND@2.5		ND@5		ND@5		ND@1	

TABLE B.2
Groundwater Analytical Chemistry Data (August 2018)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-471		EN-483		EN-484		EN-486		EN-489		EN-507	
Operable Unit No.		OU2		OU1		OU1		OU1		OU2		OU1	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL	
Sample Date		08/09/2018		08/02/2018		08/08/2018		08/09/2018		08/07/2018		08/09/2018	
Laboratory Sample I.D.		9749898		9738740		9749892		9749960		9745925		9749959	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	130		0.1	J	2.5		330		0.1	J	22	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	3		1		0.1	J	150		0.2	J	0.1	J
1,1-DICHLOROETHANE	ug/L	340		0.9		0.2	J	43		ND@0.5		22	
1,1-DICHLOROETHENE	ug/L	33		0.2	J	ND@0.5		14		ND@0.5		0.4	J
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	1.1		4.5		ND@0.5		12		ND@0.5		ND@0.5	
1,2-DICHLOROETHANE (EDC)	ug/L	1.7		ND@0.5		ND@0.5		0.5	J	ND@0.5		0.08	J
BENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@5		ND@0.5		ND@0.5	
CHLOROETHANE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@5		ND@0.5		2.6	
CIS-1,2-DICHLOROETHENE	ug/L	52		24		1.5		4.7	J	0.1	J	6.8	
ETHYLBENZENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@5		ND@0.5		ND@0.5	
METHYLENE CHLORIDE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@5		ND@0.5		0.8	
TETRACHLOROETHENE	ug/L	0.3	J	ND@0.5		2.5		ND@5		5		0.8	
TOLUENE	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@5		ND@0.5		0.2	J
TRANS-1,2-DICHLOROETHENE	ug/L	0.3	J	2.3		ND@0.5		0.6	J	ND@0.5		ND@0.5	
TRICHLOROETHENE	ug/L	19		0.9		1.4		6.7		1.1		18	
VINYL CHLORIDE	ug/L	0.1	J	0.2	J	ND@0.5		ND@5		ND@0.5		0.1	J
XYLENES, TOTAL	ug/L	ND@0.5		ND@0.5		ND@0.5		ND@5		ND@0.5		ND@0.5	

TABLE B.2
Groundwater Analytical Chemistry Data (August 2018)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-508		EN-509		EN-520		EN-521		EN-522		EN-525	
Operable Unit No.		OU2		OU2		OU2		OU2		OU1		OU2	
Sample Description		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL		GW MON WELL	
Sample Date		08/09/2018		08/09/2018		08/07/2018		08/07/2018		08/09/2018		08/09/2018	
Laboratory Sample I.D.		9749964		9749966		9745927		9745923		9749953		9749894	
Parameter	**Units**												
1,1,1-TRICHLOROETHANE	ug/L	130		29		ND@0.5		0.1	J	14		0.2	J
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.8	J	0.2	J	ND@0.5		ND@0.5		0.4	J	ND@0.5	
1,1-DICHLOROETHANE	ug/L	18		0.1	J	ND@0.5		ND@0.5		0.7		ND@0.5	
1,1-DICHLOROETHENE	ug/L	4.8		0.3	J	ND@0.5		ND@0.5		ND@0.5		ND@0.5	
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		0.2	J	ND@0.5	
1,2-DICHLOROETHANE (EDC)	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		0.06	J	ND@0.5	
BENZENE	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
CHLOROETHANE	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
CIS-1,2-DICHLOROETHENE	ug/L	6		0.7		0.6		ND@0.5		7.5		ND@0.5	
ETHYLBENZENE	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
METHYLENE CHLORIDE	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TETRACHLOROETHENE	ug/L	1.5	J	1.4		9.3		0.6		3.7		1.1	
TOLUENE	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TRANS-1,2-DICHLOROETHENE	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	
TRICHLOROETHENE	ug/L	34		14		2.8		ND@0.5		6.3		1.9	
VINYL CHLORIDE	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		0.2	J	ND@0.5	
XYLENES, TOTAL	ug/L	ND@2.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5		ND@0.5	

TABLE B.2

Groundwater Analytical Chemistry Data (August 2018)

OU#1 and OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Sample Location		EN-526		EN-533	
Operable Unit No.		OU2		OU1	
Sample Description		GW MON WELL		GW MON WELL	
Sample Date		08/09/2018		08/08/2018	
Laboratory Sample I.D.		9749895		9749893	
Parameter	**Units**				
1,1,1-TRICHLOROETHANE	ug/L	8.3		12	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	34		25	
1,1-DICHLOROETHANE	ug/L	160		2.8	
1,1-DICHLOROETHENE	ug/L	91		0.7	
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	16		3	
1,2-DICHLOROETHANE (EDC)	ug/L	3.4	J	ND@0.5	
BENZENE	ug/L	ND@5		ND@0.5	
CHLOROETHANE	ug/L	ND@5		ND@0.5	
CIS-1,2-DICHLOROETHENE	ug/L	380		280	
ETHYLBENZENE	ug/L	ND@5		0.3	J
METHYLENE CHLORIDE	ug/L	ND@5		ND@0.5	
TETRACHLOROETHENE	ug/L	1.5	J	15	
TOLUENE	ug/L	ND@5		ND@0.5	
TRANS-1,2-DICHLOROETHENE	ug/L	5		0.5	
TRICHLOROETHENE	ug/L	790		4.1	
VINYL CHLORIDE	ug/L	1.9	J	4.8	
XYLENES, TOTAL	ug/L	ND@5		0.1	J

TABLE B.2
Groundwater Analytical Chemistry Data (August 2018)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Reporting Conventions

NA	Not Analyzed
ND@X	Not Detected at Detection Limit X

Code	**Explanation**
J	Estimated value: the result is >= the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

APPENDIX C

Soil Analytical Chemistry Data
(GSC, August 2009)

TABLE C.1.1
VOCs Detected
Soil Sampling to Screen for Lateral Extent of Contamination
OU#1 / OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

SAMPLE LOCATION			**EN-485**		**EN-508**				**EN-509**				**EN-512**							
SAMPLE DEPTH (ft. bgs)			15	17	13	15	17	19	11	13	15	17	6-7.5	10-10.5	15-17	19-21	23-25	27-29	33-35	35-37
SAMPLE DATE			1/18/2007	1/18/2007	1/22/2007	1/22/2007	1/22/2007	1/22/2007	1/22/2007	1/22/2007	1/22/2007	1/22/2007	4/21/2007	4/21/2007	4/21/2007	4/22/2007	4/22/2007	4/22/2007	4/22/2007	4/22/2007
PARAMETER	TAGM #4046 (See Note #3)	Part 375-6 (See Note #3)	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CHLORINATED ETHENES																				
Tetrachloroethene	1.4	1.3	<0.63	<1.6	**0.0039 J**	**0.0099 J**	**0.0077 J**	**0.0047 J**	**0.0087 J**	**0.02 J**	**0.013 J**	<380	<0.0037	<0.0044	**0.013**	**0.022 J**	**0.035**	**0.026**	**0.0016 J**	**0.016**
Trichloroethene	0.7	0.47	**0.12 J**	**14**	**0.072 J**	**0.14 J**	**0.15 J**	**0.0057 J**	**0.023 J**	**0.053 J**	**0.035 J**	<380	**0.0036 J**	**0.0066**	**0.053**	**0.015 J**	**0.011**	**0.0093**	**0.0088**	**0.066**
1,1-Dichloroethene	0.4	0.33	<0.63	<1.6	<0.0041	<0.006	<0.0061	**0.0018 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043 J	<0.0042	<0.0041	<0.0053	<0.0049
cis-1,2-Dichloroethene	-	0.25	**0.45 J**	**5**				**0.0018 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	**0.00092 J**	**0.0027 J**	**0.0014 J**	**0.0019 J**	**0.0023 J**	**0.0016 J**	**0.0032 J**
CHLORINATED ETHANES																				
1,1,1-Trichloroethane	0.8	0.68	**1.5**	**48**	<0.006 J	<0.01 J	<0.011 J	<0.029 J	<0.013 J	<0.025 J	**0.035 J**	**11000**	<0.0037	<0.0044	**0.00084 J**	**0.0012 J**	**0.001 J**	<0.0041	<0.0053	<0.0049
1,1-Dichloroethane	0.2	0.27	**0.2 J**	<1.6	<0.0041	<0.006	<0.0061	**0.023 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	**0.0025 J**	<0.0042	<0.0043 J	<0.0042	<0.0041	<0.0053	<0.0049
1,2-Dichloroethane	0.1	0.02	<0.63	<1.6	<0.0041	<0.006	<0.0061	**0.0035 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043 J	<0.0042	<0.0041	<0.0053	<0.0049
Chloroethane	1.9	-	<0.63	<1.6	<0.0041	<0.006	<0.0061	**0.15 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043 J	<0.0042	<0.0041	<0.0053	<0.0049
AROMATICS																				
Benzene	0.06	0.06	<0.63	<1.6	<0.0041	**0.0011 J**	<0.0061	**0.00094 J**	<0.0049	**0.0016 J**	**0.00089 J**	<380	<0.0037	<0.0044	**0.00087 J**	**0.00079 J**	<0.0042	**0.00089 J**	<0.0053	<0.0049
Ethylbenzene	5.5	1.0	<0.63	<1.6	<0.0041	<0.006	<0.0061	**0.0017 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
Toluene	1.5	0.7	<0.63	<1.6	**0.0011 J**	**0.0013 J**	**0.0011 J**	**0.01 J**	**0.0011 J**	**0.0018 J**	**0.0016 J**	**180 J**	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	**0.00083 J**	<0.0053	<0.0049
Total Xylenes	1.2	1.6	<0.63	<1.6	<0.0041	<0.006	<0.0061	**0.0044 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
ALKYLBENZENE ISOMERS																				
n-Butylbenzene	-	-	<0.63	**0.87 J**	<0.0041	<0.006	<0.0061	**0.0023 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
sec-Butylbenzene	-	11	<0.63	**0.42 J**	<0.0041	<0.006	<0.0061	**0.0019 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
Isopropylbenzene	-	-	<0.63	<1.6	<0.0041	<0.006	<0.0061	**0.0012 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
n-Propylbenzene	-	3.9	<0.63	<1.6	<0.0041	<0.006	<0.0061	**0.0037 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
1,2,4-Trimethylbenzene	-	3.6	<0.63	**0.66 J**	<0.0041	<0.006	<0.0061	**0.048 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
1,3,5-Trimethylbenzene	-	8.4	<0.63	**0.29 J**	<0.0041	<0.006	<0.0061	**0.0069 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
OTHERS																				
Acetone	0.2	0.05	<2.8 J	<2.8 J	<0.032 J	<0.013 J	<0.013 J	<0.023 J	<0.014 J	<0.011 J	<0.018 J	R	**0.014 J**	<0.022 J	<0.015 J	**0.015 J**	<0.013 J	<0.024 J	**0.0063 J**	**0.0064 J**
Acrolein	-	-	NA	NA	**0.0062 J**	R	R	R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone (MEK, 2-Butanone)	0.3	0.12	NA	NA	R	R	R	**0.012 J**	**0.0031 J**	R	**0.0033 J**	R	**0.0021 J**	**0.0028 J**	**0.0019 J**	**0.002 J**	**0.002 J**	**0.0027 J**	R	R
Carbon Disulfide	2.7	-	<0.63	<1.6	<0.0041	<0.006	<0.0061	**0.0026 J**	**0.0037 J**	<0.0056 J	**0.0015 J**	<380	**0.00076 J**	**0.0016 J**	**0.0019 J**	**0.0022 J**	**0.0014 J**	**0.0028 J**	<0.0053	<0.0049
Chlorobenzene	1.7	1.1	<0.63	<1.6	<0.0041	<0.006	<0.0061	<0.0048	**0.0017 J**	**0.0031 J**	**0.0034 J**	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
1,2-Dichlorobenzene	7.9	1.1	<0.63	<1.6	<0.0041	<0.006	<0.0061	**0.0043 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
Isopropyltoluene	-	-	<0.63	**0.73 J**	<0.0041	<0.006	<0.0061	**0.0036 J**	<0.0049	<0.0056	<0.0047	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
Methylene Chloride	0.1	0.05	<0.63	<1.6	**0.0051 J**	**0.0014 J**	<0.0061	**0.012 J**	**0.0018 J**	**0.0011 J**	**0.0012 J**	<380	<0.0037	<0.0044	<0.0042	<0.0043 J	<0.0042	**0.0014 J**	**0.0012 J**	<0.0049
MIBK (4-Methyl-2-pentanone)	1.0	-	<0.63	<1.6	<0.0041	<0.006	<0.0061	<0.0048	<0.0049	<0.0056	**0.0011 J**	<380	<0.0037	<0.0044	<0.0042	<0.0043	<0.0042	<0.0041	<0.0053	<0.0049
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	6.0	-	<0.63	<1.6 J	<0.0041	<0.006	<0.0061	<0.0048	**0.0023 J**	**0.0028 J**	**0.0027 J**	**74 J**	<0.0037	<0.0044	<0.0042	**0.00092 J**	**0.001 J**	**0.00085 J**	<0.0053	<0.0049

NOTES:
1. The test borings and soil sampling were performed between January 18 and April 22, 2007 by Parratt Wolff, Inc. of East Syracuse, New York. The test borings and soil sampling were observed and logged by Groundwater Sciences Corporation personnel. Sample intervals consisting of sand or sand & gravel are highlighted in yellow and sample intervals consisting of silt are highlighted in blue. The soil samples were submitted to Severn Trent Laboratories, Inc. of Colchester, Vermont and analyzed for volatile organic compounds via EPA Method 5035/8260B.

2. The soil quality results are presented in units of milligrams per kilogram (mg/kg). Values greater than laboratory reporting limits are **emboldened**. "<" denotes that the compound was not detected. The sample and compound-specific laboratory reporting limit is posted for comparison.

3. The data qualifiers have been added as a result of third-party data validation performed by Trillium, Inc. of Downingtown, Pennsylvania. Values flagged with a "J" reflect an estimated value. "R" reflects the result for the specific compound was rejected due to analytical and quality control deficiencies - the presence or absence of the particular compound cannot be verified.

4. Column 2 lists recommended soil cleanup objectives as listed in Appendix A of New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum #4046. The values are provided solely for comparison with generic soil cleanup standards. As indicated in TAGM #4046, actual soil cleanup standards should be developed based on site-specific conditions such as depth to groundwater, organic carbon content of soil, and other factors. Column 3 lists Restricted Use Soil Cleanup Objectives for the Protection of Groundwater as per 6 NYCRR Subpart 375-6, Table 375-6.8(b). Concentrations greater than the generic soil cleanup standards listed in TAGM #4046 and/or the Part-375-6 Restricted Use Soil Cleanup Objectives for the Protection of Groundwater are highlighted in **red**.

TABLE C.1.2
Soil Analytical Chemistry Data
Soil Sampling to Screen for Lateral Extent of Contamination
OU#1 / OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-485		EN-485	
Sample Depth (ft bgs)		15.0'		17.0'	
Sample Date		01/18/2007		01/18/2007	
Laboratory Sample I.D.		698183		698184	
Parameter	**Units**				
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@630		ND@1600	
1,1,1-TRICHLOROETHANE	ug/kg	1500		48000	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@630		ND@1600	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@630	J	ND@1600	J
1,1,2-TRICHLOROETHANE	ug/kg	ND@630		ND@1600	
1,1-DICHLOROETHANE	ug/kg	200	J	ND@1600	
1,1-DICHLOROETHENE	ug/kg	ND@630		ND@1600	
1,1-DICHLOROPROPENE	ug/kg	ND@630		ND@1600	
1,2,3-TRICHLOROBENZENE	ug/kg	ND@630		ND@1600	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@630		ND@1600	
1,2,4-TRICHLOROBENZENE	ug/kg	ND@630		ND@1600	
1,2,4-TRIMETHYLBENZENE	ug/kg	ND@630		660	J
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	ND@630		ND@1600	
1,2-DIBROMOETHANE	ug/kg	ND@630		ND@1600	
1,2-DICHLOROBENZENE	ug/kg	ND@630		ND@1600	
1,2-DICHLOROETHANE	ug/kg	ND@630		ND@1600	
1,2-DICHLOROETHENE, TOTAL	ug/kg	460	J	5000	
1,2-DICHLOROPROPANE	ug/kg	ND@630		ND@1600	
1,3,5-TRIMETHYLBENZENE	ug/kg	ND@630		290	J
1,3-DICHLOROBENZENE	ug/kg	ND@630		ND@1600	
1,3-DICHLOROPROPANE	ug/kg	ND@630		ND@1600	
1,4-DICHLOROBENZENE	ug/kg	ND@630		ND@1600	
1,4-DIOXANE	ug/kg	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	ND@630		ND@1600	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@630		ND@1600	
2-CHLOROTOLUENE	ug/kg	ND@630		ND@1600	
3-CHLOROPROPENE	ug/kg	ND@630		ND@1600	
4-CHLOROTOLUENE	ug/kg	ND@630		ND@1600	
ACETONE	ug/kg	ND@2800	J	ND@2800	J
ACROLEIN	ug/kg	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@630		ND@1600	
BENZENE	ug/kg	ND@630		ND@1600	
BROMOBENZENE	ug/kg	ND@630		ND@1600	
BROMOCHLOROMETHANE	ug/kg	ND@630		ND@1600	
BROMODICHLOROMETHANE	ug/kg	ND@630		ND@1600	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@630		ND@1600	
BROMOMETHANE	ug/kg	ND@630		ND@1600	
CARBON DISULFIDE	ug/kg	ND@630		ND@1600	
CARBON TETRACHLORIDE	ug/kg	ND@630		ND@1600	
CHLOROBENZENE	ug/kg	ND@630		ND@1600	
CHLORODIBROMOMETHANE	ug/kg	ND@630		ND@1600	
CHLOROETHANE	ug/kg	ND@630		ND@1600	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@630		ND@1600	
CHLOROMETHANE	ug/kg	ND@630		ND@1600	
CHLOROPRENE	ug/kg	ND@630		ND@1600	
CIS-1,2-DICHLOROETHENE	ug/kg	450	J	5000	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@630		ND@1600	
DIBROMOMETHANE	ug/kg	ND@630		ND@1600	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@630		ND@1600	
ETHYL METHACRYLATE	ug/kg	ND@630		ND@1600	
ETHYLBENZENE	ug/kg	ND@630		ND@1600	
HEXACHLOROBUTADIENE	ug/kg	ND@630		ND@1600	
IODOMETHANE	ug/kg	ND@630		ND@1600	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@630		ND@1600	
ISOPROPYLTOLUENE	ug/kg	ND@630		730	J
M,P-XYLENE	ug/kg	ND@630		ND@1600	
METHACRYLONITRILE	ug/kg	ND@630		ND@1600	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@630		ND@1600	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@630		ND@1600	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@630		ND@1600	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@630		ND@1600	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@630		ND@1600	
N-BUTYLBENZENE	ug/kg	ND@630		870	J
N-PROPYLBENZENE	ug/kg	ND@630		ND@1600	
O-XYLENE	ug/kg	ND@630		ND@1600	
PROPIONITRILE	ug/kg	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	ND@630		420	J
STYRENE	ug/kg	ND@630		ND@1600	
TERT-BUTYLBENZENE	ug/kg	ND@630		ND@1600	
TETRACHLOROETHENE	ug/kg	ND@630		ND@1600	
TETRAHYDROFURAN	ug/kg	ND@6300		ND@16000	
TOLUENE	ug/kg	ND@630		ND@1600	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@630		ND@1600	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@630		ND@1600	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@630		ND@1600	
TRICHLOROETHENE	ug/kg	120	J	14000	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@630		ND@1600	
VINYL ACETATE	ug/kg	ND@630		ND@1600	
VINYL CHLORIDE	ug/kg	ND@630		ND@1600	
XYLENES, TOTAL	ug/kg	ND@630		ND@1600	

TABLE C.1.2
Soil Analytical Chemistry Data
Soil Sampling to Screen for Lateral Extent of Contamination
OU#1 / OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-508		EN-508		EN-508		EN-508	
Sample Depth (ft bgs)		13.0'		15.0'		17.0'		19.0'	
Sample Date		01/22/2007		01/22/2007		01/22/2007		01/22/2007	
Laboratory Sample I.D.		698597		698598		698599		698600	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,1,1-TRICHLOROETHANE	ug/kg	ND@6.0	J	ND@10	J	ND@11	J	ND@29	J
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,1,2-TRICHLOROETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,1-DICHLOROETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		23	J
1,1-DICHLOROETHENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		1.8	J
1,1-DICHLOROPROPENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,2,3-TRICHLOROBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,2,4-TRICHLOROBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,2,4-TRIMETHYLBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		48	J
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	ND@4.1	J	ND@6.0	J	ND@6.1	J	ND@4.8	J
1,2-DIBROMOETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,2-DICHLOROBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		4.3	J
1,2-DICHLOROETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		3.5	J
1,2-DICHLOROETHENE, TOTAL	ug/kg	ND@4.1		ND@6.0		ND@6.1		1.8	J
1,2-DICHLOROPROPANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,3,5-TRIMETHYLBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		6.9	J
1,3-DICHLOROBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,3-DICHLOROPROPANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,4-DICHLOROBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
2-CHLOROTOLUENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
3-CHLOROPROPENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
4-CHLOROTOLUENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
ACETONE	ug/kg	ND@32	J	ND@13	J	ND@13	J	ND@23	J
ACROLEIN	ug/kg	6.2	J	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
BENZENE	ug/kg	ND@4.1		1.1	J	ND@6.1		0.94	J
BROMOBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
BROMOCHLOROMETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
BROMODICHLOROMETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
BROMOMETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
CARBON DISULFIDE	ug/kg	ND@4.1		ND@6.0		ND@6.1		2.6	J
CARBON TETRACHLORIDE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
CHLOROBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
CHLORODIBROMOMETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
CHLOROETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		150	J
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
CHLOROMETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
CHLOROPRENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
CIS-1,2-DICHLOROETHENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		1.8	J
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
DIBROMOMETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
ETHYL METHACRYLATE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
ETHYLBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		1.7	J
HEXACHLOROBUTADIENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
IODOMETHANE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		1.2	J
ISOPROPYLTOLUENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		3.6	J
M,P-XYLENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		2.7	J
METHACRYLONITRILE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	12	J
METHYL METHACRYLATE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	5.1	J	1.4	J	ND@6.1		12	J
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
N-BUTYLBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		2.3	J
N-PROPYLBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		3.7	J
O-XYLENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		1.5	J
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		1.9	J
STYRENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
TERT-BUTYLBENZENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
TETRACHLOROETHENE	ug/kg	3.9	J	9.9	J	7.7	J	4.7	J
TETRAHYDROFURAN	ug/kg	ND@41		ND@60		ND@61		ND@48	
TOLUENE	ug/kg	1.1	J	1.3	J	1.1	J	10	J
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
TRICHLOROETHENE	ug/kg	72	J	140	J	150	J	5.7	J
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
VINYL ACETATE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
VINYL CHLORIDE	ug/kg	ND@4.1		ND@6.0		ND@6.1		ND@4.8	
XYLENES, TOTAL	ug/kg	ND@4.1		ND@6.0		ND@6.1		4.4	J

TABLE C.1.2
Soil Analytical Chemistry Data
Soil Sampling to Screen for Lateral Extent of Contamination
OU#1 / OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Sample Location		EN-509		EN-509		EN-509		EN-509	
Sample Depth (ft bgs)		11.0'		13.0'		15.0'		17.0'	
Sample Date		01/22/2007		01/22/2007		01/22/2007		01/22/2007	
Laboratory Sample I.D.		698601A		698602A		698603A		698604A	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,1,1-TRICHLOROETHANE	ug/kg	ND@13	J	ND@25	J	35	J	11000000	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	2.3	J	2.8	J	2.7	J	74000	J
1,1,2-TRICHLOROETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,1-DICHLOROETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,1-DICHLOROETHENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,1-DICHLOROPROPENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,2,3-TRICHLOROBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,2,4-TRICHLOROBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,2,4-TRIMETHYLBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	ND@4.9	J	ND@5.6	J	ND@4.7	J	ND@380000	
1,2-DIBROMOETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,2-DICHLOROBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,2-DICHLOROETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,2-DICHLOROETHENE, TOTAL	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,2-DICHLOROPROPANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,3,5-TRIMETHYLBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,3-DICHLOROBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,3-DICHLOROPROPANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,4-DICHLOROBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
2-CHLOROTOLUENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
3-CHLOROPROPENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
4-CHLOROTOLUENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
ACETONE	ug/kg	ND@14	J	ND@11	J	ND@18	J	NA	R
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
BENZENE	ug/kg	ND@4.9		1.6	J	0.89	J	ND@380000	
BROMOBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
BROMOCHLOROMETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
BROMODICHLOROMETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
BROMOMETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
CARBON DISULFIDE	ug/kg	3.7	J	ND@5.6	J	1.5	J	ND@380000	
CARBON TETRACHLORIDE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
CHLOROBENZENE	ug/kg	1.7	J	3.1	J	3.4	J	ND@380000	
CHLORODIBROMOMETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
CHLOROETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
CHLOROMETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
CHLOROPRENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
CIS-1,2-DICHLOROETHENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
DIBROMOMETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
ETHYL METHACRYLATE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
ETHYLBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
HEXACHLOROBUTADIENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
IODOMETHANE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
ISOPROPYLTOLUENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
M,P-XYLENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
METHACRYLONITRILE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	3.1	J	NA	R	3.3	J	NA	R
METHYL METHACRYLATE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	1.8	J	1.1	J	1.2	J	ND@380000	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@4.9		ND@5.6		1.1	J	ND@380000	
N-BUTYLBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
N-PROPYLBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
O-XYLENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
STYRENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
TERT-BUTYLBENZENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
TETRACHLOROETHENE	ug/kg	8.7	J	20	J	13	J	ND@380000	
TETRAHYDROFURAN	ug/kg	ND@49		ND@56		ND@47		ND@3800000	
TOLUENE	ug/kg	1.1	J	1.8	J	1.6	J	180000	J
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
TRICHLOROETHENE	ug/kg	23	J	53	J	35	J	ND@380000	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
VINYL ACETATE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
VINYL CHLORIDE	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	
XYLENES, TOTAL	ug/kg	ND@4.9		ND@5.6		ND@4.7		ND@380000	

TABLE C.1.2
Soil Analytical Chemistry Data
Soil Sampling to Screen for Lateral Extent of Contamination
OU#1 / OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Sample Location		EN-512		EN-512		EN-512		EN-512	
Sample Depth (ft bgs)		6.0'-7.5'		10.0'-10.5'		15.0'-17.0'		19.0'-21.0'	
Sample Date		04/21/2007		04/21/2007		04/21/2007		04/22/2007	
Laboratory Sample I.D.		707997		707998		707999		708001	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,1,1-TRICHLOROETHANE	ug/kg	ND@3.7		ND@4.4		0.84	J	1.2	J
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		0.92	J
1,1,2-TRICHLOROETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,1-DICHLOROETHANE	ug/kg	ND@3.7		2.5	J	ND@4.2		ND@4.3	J
1,1-DICHLOROETHENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
1,1-DICHLOROPROPENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
1,2,3-TRICHLOROBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,2,4-TRICHLOROBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,2,4-TRIMETHYLBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,2-DIBROMOETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,2-DICHLOROBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,2-DICHLOROETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
1,2-DICHLOROETHENE, TOTAL	ug/kg	ND@3.7		0.94	J	2.8	J	1.4	J
1,2-DICHLOROPROPANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
1,3,5-TRIMETHYLBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,3-DICHLOROBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,3-DICHLOROPROPANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,4-DICHLOROBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
2-CHLOROTOLUENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
3-CHLOROPROPENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
4-CHLOROTOLUENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
ACETONE	ug/kg	14	J	ND@22	J	ND@15	J	15	J
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
BENZENE	ug/kg	ND@3.7		ND@4.4		0.87	J	0.79	J
BROMOBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
BROMOCHLOROMETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
BROMODICHLOROMETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
BROMOMETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
CARBON DISULFIDE	ug/kg	0.76	J	1.6	J	1.9	J	2.2	J
CARBON TETRACHLORIDE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
CHLOROBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
CHLORODIBROMOMETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
CHLOROETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
CHLOROMETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
CHLOROPRENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
CIS-1,2-DICHLOROETHENE	ug/kg	ND@3.7		0.92	J	2.7	J	1.4	J
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
DIBROMOMETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
ETHYL METHACRYLATE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
ETHYLBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
HEXACHLOROBUTADIENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
IODOMETHANE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
ISOPROPYLTOLUENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
M,P-XYLENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
METHACRYLONITRILE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	2.1	J	2.8	J	1.9	J	2	J
METHYL METHACRYLATE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
N-BUTYLBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
N-PROPYLBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
O-XYLENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
STYRENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
TERT-BUTYLBENZENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
TETRACHLOROETHENE	ug/kg	ND@3.7		ND@4.4		13		22	J
TETRAHYDROFURAN	ug/kg	ND@37		ND@44		ND@42		ND@43	J
TOLUENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	
TRICHLOROETHENE	ug/kg	3.6	J	6.6		53		15	J
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
VINYL ACETATE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
VINYL CHLORIDE	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	J
XYLENES, TOTAL	ug/kg	ND@3.7		ND@4.4		ND@4.2		ND@4.3	

TABLE C.1.2
Soil Analytical Chemistry Data
Soil Sampling to Screen for Lateral Extent of Contamination
OU#1 / OU#2 FFS Report

Former IBM Endicott Site, Endicott, NY

Sample Location		EN-512		EN-512		EN-512		EN-512	
Sample Depth (ft bgs)		23.0'-25.0'		27.0'-29.0'		33.0'-35.0'		35.0'-37.0'	
Sample Date		04/22/2007		04/22/2007		04/22/2007		04/22/2007	
Laboratory Sample I.D.		708002		708003		708004		708006	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,1,1-TRICHLOROETHANE	ug/kg	1	J	ND@4.1		ND@5.3		ND@4.9	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	1	J	0.85	J	ND@5.3		ND@4.9	
1,1,2-TRICHLOROETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,1-DICHLOROETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,1-DICHLOROETHENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,1-DICHLOROPROPENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,2,3-TRICHLOROBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,2,4-TRICHLOROBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,2,4-TRIMETHYLBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,2-DIBROMOETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,2-DICHLOROBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,2-DICHLOROETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,2-DICHLOROETHENE, TOTAL	ug/kg	2	J	2.4	J	1.6	J	3.3	J
1,2-DICHLOROPROPANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,3,5-TRIMETHYLBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,3-DICHLOROBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,3-DICHLOROPROPANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,4-DICHLOROBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
2-CHLOROTOLUENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
3-CHLOROPROPENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
4-CHLOROTOLUENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
ACETONE	ug/kg	ND@13	J	ND@24	J	6.3	J	6.4	J
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
BENZENE	ug/kg	ND@4.2		0.89	J	ND@5.3		ND@4.9	
BROMOBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
BROMOCHLOROMETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
BROMODICHLOROMETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
BROMOMETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
CARBON DISULFIDE	ug/kg	1.4	J	2.8	J	ND@5.3		ND@4.9	
CARBON TETRACHLORIDE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
CHLOROBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
CHLORODIBROMOMETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
CHLOROETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
CHLOROMETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
CHLOROPRENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
CIS-1,2-DICHLOROETHENE	ug/kg	1.9	J	2.3	J	1.6	J	3.2	J
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
DIBROMOMETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
ETHYL METHACRYLATE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
ETHYLBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
HEXACHLOROBUTADIENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
IODOMETHANE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
ISOPROPYLTOLUENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
M,P-XYLENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
METHACRYLONITRILE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	2	J	2.7	J	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@4.2		1.4	J	1.2	J	ND@4.9	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
N-BUTYLBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
N-PROPYLBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
O-XYLENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
STYRENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
TERT-BUTYLBENZENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
TETRACHLOROETHENE	ug/kg	35		26		1.6	J	16	
TETRAHYDROFURAN	ug/kg	ND@42		ND@41		ND@53		ND@49	
TOLUENE	ug/kg	ND@4.2		0.83	J	ND@5.3		ND@4.9	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
TRICHLOROETHENE	ug/kg	11		9.3		8.8		66	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
VINYL ACETATE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
VINYL CHLORIDE	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	
XYLENES, TOTAL	ug/kg	ND@4.2		ND@4.1		ND@5.3		ND@4.9	

TABLE C.1.2
Soil Analytical Chemistry Data
Soil Sampling to Screen for Lateral Extent of Contamination
OU#1 / OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Explanation of Reporting Conventions and Key to Comment Codes

Reporting Conventions

NA	Not Analyzed
ND@X	Not Detected at Detection Limit X

Code	**Explanation**
J	Estimated value - compound meets identification criteria, but result is less than the reporting limit.
R	Result rejected due to analytical and quality control deficiencies. The presence or absence of the analyte cannot be verified.

TABLE C.2.1.1
Profile Data - Lacustrine Silt Sampling in OU#1
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Collect Date	Client ID	Boring/ Well ID	Sample Type	Depth into Silt	Dilution	Units	Acetone	Carbon Disulfide	Chlorobenzene	Chloroform	1,2-Dichlorobenzene	1,4-Dichlorobenzene	Dichlorodifluoromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Ethyl Benzene	Freon 113 (Freon TF)	Freon 123a	Methylene Chloride	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride	o-Xylene	m,p-Xylene
05/12/2005	EN025A050512	EN-25A	Aqueous	NA	5	ug/L	<50	<5	<5	**10**	<5	<5	<5	**690**	**28**	**340** J	**2400**	**9**	<5	**99**	**21**	**8**	**11**	2 J	**13000**	**4** J	**78**	**190**	<5	<10
05/26/2005	EN025A050526	EN-25A	Aqueous	NA	5	ug/L	<50	<5	<5	**9**	<5	<5	<5	**590**	**26**	**350** J	**2400**	**18**	<5	**81**	**17**	**8**	**9**	<5	**13000**	**5** J	**86**	**140**	<5	<10
06/09/2005	EN025A050609	EN-25A	Aqueous	NA	5	ug/L	<50	<5	<5	**11**	<5	<5	<5	**620**	**33**	**170**	**2600**	**25**	<5	**110**	**20**	**4** J	**8**	<5	**14000**	**5**	**65**	**230** J	<5	<10
05/04/2005	E025A0650504	EN-25A	Soil	6"	1	ug/kg	<610	<610	<610	<610	<610	<610	<610 J	**760**	<610	**400** J	**3600**	<610	<610	<610	NA	<610	<610	**260** J	**4400**	<610	<610	**210** J	<610	<610
05/04/2005	E025A1250504	EN-25A	Soil	12"	1	ug/kg	<600	<600	<600	<600	<600	<600	<600 J	**1800**	<600	**1100**	**9200**	<600	<600	**150** J	NA	<600	<600	**460** J	**3500**	<600	**150** J	**200** J	<600	<600
05/04/2005	E025A1850504	EN-25A	Soil	18"	1	ug/kg	<690	<690	<690	<690	<690	<690	<690 J	**2300**	<690	**1200**	**11000**	<690	<690	**130** J	NA	<690	<690	**410** J	**3200**	<690	**180** J	**130** J	<690	<690
05/04/2005	E025A2450504	EN-25A	Soil	24"	1	ug/kg	<680	<680	<680	<680	<680	<680	<680 J	**2500**	<680	**1200**	**12000**	<680	<680	**130** J	NA	<680	<680	**350** J	**2500**	<680	**260** J	<680	<680	<680
05/04/2005	E025A3050504	EN-25A	Soil	30"	1	ug/kg	<590	<590	<590	<590	<590	<590	<590 J	**1400**	<590	**540** J	**5100**	<590	<590	<590	NA	<590	<590	**110** J	**1200**	<590	<590	<590	<590	<590
05/04/2005	E025A3650504	EN-25A	Soil	36"	1	ug/kg	<670	<670	<670	<670	<670	<670	<670 J	**3100**	<670	**1300**	**19000**	<670	<670	<670	NA	<670	<670	**240** J	**1100**	<670	**130** J	<670	<670	<670
05/04/2005	E025A4250504	EN-25A	Soil	42"	1	ug/kg	<770	<770	<770	<770	<770	<770	<770 J	**3500**	<770	**1300**	**24000**	<770	<770	<770	NA	<770	<770	**180** J	**700** J	<770	<770	<770	<770	<770
05/04/2005	E025A4850504	EN-25A	Soil	48"	1	ug/kg	<750	<750	<750	<750	<750	<750	<750 J	**4200**	<750	**1500**	**31000**	<750	<750	<750	NA	<750	<750	190 J	**480** J	<750	**210** J	<750	<750	<750
05/12/2005	EN107A050526	EN-107A	Aqueous	NA	5	ug/L	<50	<5	**1** J	<5	**1400**	**14**	<5	**6**	<5	**30**	**17000**	**14**	**980**	**330** J	**22**	<5	**130**	**7**	**20**	<5	**15** J	**580**	**590**	**1100**
05/26/2005	EN107A050526	EN-107A	Aqueous	NA	5	ug/L	<50	<5	**0.8** J	<5	**1000**	**11**	<5	**4** J	<5	**16**	**8500**	**36**	**710**	**180** J	**9**	<5	**5**	**4** J	**7**	<5	**1** J	**390** J	**390** J	**650** J
06/09/2005	EN107A050526	EN-107A	Aqueous	NA	5	ug/L	<50	<5	**1** J	<5	**1600**	**15**	<5	**2** J	<5	**19**	**9400**	**16**	**830**	**340** J	**5**	<5	**2** J	**3** J	<5	<5	<5	**640**	**360** J	**740** J
05/04/2005	E107A0650504	EN-107A	Soil	6"	1.5	ug/kg	<1400	<1400	<1400	<1400	**3900**	<1400	<1400 J	<1400	<1400	<1400	**42000**	<1400	**1700**	<1400	NA	<1400	<1400	<1400	<1400	<1400	<1400	**360** J	**1500**	**3000**
05/04/2005	E107A1250504	EN-107A	Soil	12"	1	ug/kg	<1000	<1000	<1000	<1000	**4000**	<1000	<1000 J	<1000	<1000	<1000	**17000**	<1000	**1200**	**260** J	NA	<1000	<1000	<1000	<1000	<1000	<1000	<1000	**930** J	**1800**
05/04/2005	E107A1950504	EN-107A	Soil	19"	1	ug/kg	<990	<990	<990	<990	**6200**	<990	**520** J	<990	<990	<990	**33000**	<990	**4000**	<990	NA	<990	<990	<990	<990	<990	<990	<990	**2000**	**6400**
05/04/2005	E107A2450504	EN-107A	Soil	24"	1	ug/kg	<640	<640	<640	<640	**950**	<640	<640 J	<640	<640	<640	**23000**	<640	**1900**	<640	NA	<640	<640	<640	<640	<640	<640	<640	**650**	**1400**
05/04/2005	E107A3050504	EN-107A	Soil	30"	1	ug/kg	<690	<690	<690	<690	<690	<690	**240** J	<690	<690	<690	**21000**	<690	**180** J	<690	NA	<690	**650** J	<690	<690	<690	**540** J	<690	**260** J	<690
05/04/2005	E107A3650504	EN-107A	Soil	36"	1	ug/kg	<660	<660	<660	<660	<660	<660	<660 J	<660	<660	<660	**18000**	<660	<660	<660	NA	<660	<660	<660	<660	<660	**720**	<660	<660	<660
05/04/2005	E107A4250504	EN-107A	Soil	42"	1.8	ug/kg	<1200	<1200	<1200	<1200	<1200	<1200	<1200 J	<1200	<1200	<1200	**42000**	<1200	<1200	<1200	NA	<1200	<1200	<1200	<1200	<1200	<1200	**500** J	<1200	<1200
05/04/2005	E107A4850504	EN-107A	Soil	48"	3	ug/kg	<1900	<1900	<1900	<1900	<1900	<1900	<1900 J	<1900	<1900	<1900	**52000**	<1900	<1900	<1900	NA	<1900	<1900	<1900	<1900	<1900	<1900	**600** J	<1900	<1900
05/12/2005	EN119A050512	EN-119A	Aqueous	NA	10	ug/L	<100	<10	<10	**15**	<10	<10	<10	**550** J	**25**	**510** J	**940** J	**5** J	<10	**390**	**17**	<10	<10	**2** J	**19000**	**7** J	**120**	**15**	<10	<20
05/26/2005	EN119A050526	EN-119A	Aqueous	NA	10	ug/L	<100	<10	<10	**14**	<10	<10	<10	**690** J	**27**	**630** J	**1100**	**5** J	<10	**540** J	**21**	<10	<10	**2** J	**22000**	**8** J	**120**	**17**	<10	<20
06/09/2005	EN119A050609	EN-119A	Aqueous	NA	10	ug/L	<100	<10	<10	**29**	<10	<10	<10	**890** J	**53**	**620** J	**1100** J	**9** J	<10	**700** J	**22**	<10	<10	**3** J	**46000**	**11**	**99**	**30**	<10	<20
05/09/2005	E119A0650509	EN-119A	Soil	6"	1	ug/kg	<660 R	<660	<660	<660	<660	<660	<660	**4800**	<660	**1200**	**640** J	<660	<660	<660	NA	<660	<660	<660	**4800**	<660	<660	<660	<660	<660
05/09/2005	E119A1250509	EN-119A	Soil	12"	1	ug/kg	<750 R	<750	<750	<750	<750	<750	<750	**3600**	<750	**190** J	<750	<750	<750	<750	NA	<750	<750	<750	**160** J	<750	<750	<750	<750	<750
05/09/2005	E119A1850509	EN-119A	Soil	18"	1	ug/kg	<660 R	<660	<660	<660	<660	<660	<660	**3700**	<660	<660	<660	<660	<660	<660	NA	<660	<660	<660	<660	<660	<660	<660	<660	<660
05/09/2005	E119A2450509	EN-119A	Soil	24"	1	ug/kg	**11** J	<6.8	<6.8	<6.8	<6.8 J	<6.8 J	<6.8	**1.8** J	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	NA	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8
05/09/2005	E119A3050509	EN-119A	Soil	30"	1	ug/kg	**11** J	<5.9	<5.9	<5.9	<5.9 J	<5.9 J	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	NA	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9
05/09/2005	E119A3650509	EN-119A	Soil	36"	1	ug/kg	**11** J	<7.3	<7.3	<7.3	<7.3 J	<7.3 J	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	NA	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3
05/09/2005	E119A4250509	EN-119A	Soil	42"	1	ug/kg	**12** J	<8.2	<8.2	<8.2	<8.2 J	<8.2 J	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	NA	<8.2	<8.2	<8.2	**74**	<8.2	<8.2	<8.2	<8.2	<8.2
05/09/2005	E119A4850509	EN-119A	Soil	48"	1	ug/kg	<670 R	<670	<670	<670	<670	<670	<670	**5800**	<670	**150** J	<670	<670	<670	<670	NA	<670	<670	<670	**3200**	<670	<670	<670	<670	<670
05/11/2005	EN483050511	EN-483	Aqueous	NA	1	ug/L	<10	**0.5**	<1	<1	<1	<1	<1	**2**	<1	**0.9** J	**96**	**5**	<1	**9**	**7**	<1	<1	<1	**0.5** J	<1	**2**	**0.8** J	<1	<2
05/26/2005	EN483050526	EN-483	Aqueous	NA	1	ug/L	<10	**0.6**	<1	<1	<1	<1	<1	**2**	<1	**0.9** J	**90**	**5**	<1	**9**	**7**	<1	<1	<1	**0.6** J	<1	**2**	**0.9** J	<1	<2
06/09/2005	EN483050609	EN-483	Aqueous	NA	1	ug/L	<10	<1	<1	<1	<1	<1	<1	**2**	<1	**0.8** J	**70**	**4**	<1	**8**	**6**	<1	<1	<1	**0.7** J	<1	**2**	**0.8** J	<1	<2

NOTES:

1. This table summarizes results of groundwater and soil sampling adjacent to former or existing wells EN-107, EN-25, and EN-119 and results of groundwater sampling in a newly installed Upper Aquifer monitoring well (EN-483) located between Buildings 46 and 47, north of well EN-34. The soil borings were advanced to within 2 feet of the Lacustrine Si using 6 1/4-inch hollow-stem auger drilling techniques. The soil borings were advanced beyond the augers and into the Lacustrine Silt using 4-inch cased mud-rotary drilling technqiues. Soil samples were collected ahead of the 4-inch casing using 3-inch diamter split-spoon samplers. Upon completion of each soil boring a temporary monitoring well was installed in the borehole. The temporary wells were constructed with one-foot long screens set above the apparent interface between the Upper Aquifer sand and gravel stratum and the underlying Lacustrine Silt. Upper Aquifer monitoring well EN-483 was installed using 4 1/4-inch hollow-stem auger drilling techniques with continous split-spoon sampling. Tl soil borings, temporary monitoring well installations, and permanent monitoring well installation were performed between May 4 and 9, 2005 by Parratt-Wolff, Inc. of East Syracuse, New York and were observed and logged by Groundwater Sciences Corporation personnel.

2. The groundwater samples were submitted to the Hudson Valley Environmental Laboratory (HVEL) of Hopewell Junction, New York and analyzed for volatile organic compounds (VOCs) by SW-846 Method 8260B. The groundwater results are presented in units of micrograms per liter (ug/L).

3. The soil quality samples were submitted to Severn Trent Laboratories, Inc. of Colchester, Vermont and anlyzed for VOCs using SW-846 Method 5035/8260B. The soil quality results are presented in units of micrograms per kilogram (ug/kg).

4. The analytical data was validated by Trillium, Inc. of Downingtown, Pennsylvania. The "J" qualifier indicates that the compound meets the identification criteria, but the result is less than the reporting limit and, therefore, is estimated. The "R" qualifier indicates that the result was rejected due to analytical and quality control deficiencies and, therefore, the presence or absence of the analyte cannot be verified.

TABLE C.2.1.2
Profile Data - Lacustrine Silt Sampling in OU#2

OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Collect Date	Client ID	Boring/ Well ID	Sample Type	Depth into Silt	Dilution	Units	Acetone	2-Butanone (MEK)	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,2-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Freon 113 (Freon TF)	Freon 123a	Methylene Chloride	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl Chloride	m,p-Xylene
07/28/2005	EN017A050728	EN-17A	Aqueous	NA	10 & 1000	ug/L	**9600** J	**39100**	<10	<10	**14**	<10	<10	**520** J	**5** J	**6** J	**18** J	<10	<10	<10	<10	**4** J	<10	**59** J	**24** J	<10	<20
08/11/2005	EN017A050811	EN-17A	Aqueous	NA	10 & 1000	ug/L	**350**	**2600**	<10	<10	**19**	<10	<10	**790** J	**6** J	**11**	**35**	<10	<10	**5** J	<10	**8** J	<10	**110**	**18**	<10	<20
08/25/2005	EN017A050825	EN-17A	Aqueous	NA	1 & 20	ug/L	**52**	**100**	<1	<1	**12**	<1	<1	**540**	**6**	**11**	**200**	**0.7** J	**1**	**5**	**0.6** J	**9**	<1	**160**	**19**	**2**	<2
08/25/2005	ENMWXX050825	EN-17A	Aqueous	NA	1 & 20	ug/L	**NA**	**NA**	NA	<1	**14**	<1	<1	**600**	**5.5**	**16**	**240**	**0.83** J	**1.5**	**5.8**	**1.2**	**10**	<1	**170**	**20**	**200**	<1
07/21/2005	E017A0650721	EN-17A	Soil	6"	1	ug/kg	**7.7**	R	<6.5	<6.5	**6.7**	<6.5	<6.5	**170**	**2.1** J	**6.8**	**8.4**	<6.5	<6.5	NA	<6.5	<6.5	<6.5	**8.4**	**1.3** J	**3.0** J	<6.5
07/21/2005	E017A1250721	EN-17A	Soil	12"	1	ug/kg	**7.3**	R	<6.3	<6.3	**4.6** J	<6.3	<6.3	**500** J	**3.6** J	**12**	**14**	<6.3	**1.2** J	NA	<6.3	**6.0** J	<6.3	**71**	**7.1**	**3.4** J	<6.3
07/21/2005	E017A1850721	EN-17A	Soil	18"	1	ug/kg	**4.5** J	R	<6.8	<6.8	**4.0** J	<6.8	<6.8	**390** J	**3.1** J	**15**	**20**	<6.8	**1.5** J	NA	<6.8	**9.2**	<6.8	**54**	**12**	<6.8	<6.8
07/21/2005	E017A2450721	EN-17A	Soil	24"	1	ug/kg	**16** J	**5.4** J	**1.9** J	<6.1	**3.0** J	<6.1	<6.1	**280** J	**4.7** J	**41**	**42**	<6.1	**4.6** J	NA	**1.9** J	**43**	<6.1	**95**	**30**	<6.1	<6.1
07/21/2005	E017A3050721	EN-17A	Soil	30"	1	ug/kg	**1200** J	R	<670	<670	<670 J	<670	<670	**3600**	**140** J	**1500**	**2100**	<670	**370** J	NA	<670	<670	<670	**4000**	**380** J	<670	<670
07/21/2005	E017A3650721	EN-17A	Soil	36"	1	ug/kg	**1000** J	R	<630	<630	<630 J	<630	<630	**2300**	<630	**500** J	**1500**	<630	**220** J	NA	<630	<630	<630	**2500**	**210** J	<630	<630
07/21/2005	E017A4250721	EN-17A	Soil	42"	1	ug/kg	**1200** J	R	<700	<700	<700 J	<700	<700	**1400**	<700	**560** J	**860**	<700	**200** J	NA	<700	<700	<700	**2000**	**3300**	<700	<700
07/21/2005	E017A4850721	EN-17A	Soil	48"	1	ug/kg	**1100** J	R	<630	<630	<630 J	<630	<630	**620** J	<630	**260** J	**590** J	<630	**140** J	NA	<630	<630	<630	**720**	**3500**	<630	<630
07/28/2005	EN020A050728	EN-20A	Aqueous	NA	2	ug/L	<20	<4	<2	<2	<2	<2	<2	**8**	<2	**2**	**120** J	<2	<2	<2	<2	<2	<2	<2	**19**	**2**	<4
08/11/2005	EN020A050811	EN-20A	Aqueous	NA	2 & 5	ug/L	<20	<4	<2	<2	<2	<2	<2	**13**	<2	**3**	**79**	<2	<2	<2	<2	<2	<2	**3**	**9**	**3**	<4
08/25/2005	EN020A050825	EN-20A	Aqueous	NA	1 & 5	ug/L	<10	R	<1	<1	**0.8** J	<1	<1	**15**	**0.5** J	**3**	**89**	**0.6** J	<1	<1	**0.4** J	**0.6** J	<1	**4**	**10**	**7**	<2
08/25/2005	ENMWX1050825	EN-20A	Aqueous	NA	1	ug/L	NA	NA	NA	<1	**0.65** J	<1	<1	**15**	<1	**1.7**	**81**	<1	<1	<1	**1**	**0.84** J	<1	**6.7**	**14**	**3.4**	<1
07/22/2005	E020A0650722	EN-20A	Soil	6"	1	ug/kg	**1300** J	R	<750	<750	<750 J	<750	<750	**670** J	<750	<750	**3700**	<750	<750	NA	<750	<750	<750	<750	**380** J	**310** J	<750
07/22/2005	E020A1250722	EN-20A	Soil	12"	1	ug/kg	**1000** J	R	<610	<610	<610 J	<610	<610	**2100**	<610	**720**	**11000**	<610	<610	NA	<610	**170** J	**350** J	<610	**530** J	**900**	**150** J
07/22/2005	E020A1850722	EN-20A	Soil	19"	1	ug/kg	**1200** J	R	<700	<700	<700 J	<700	<700	**3100**	<700	**970**	**14000**	<700	<700	NA	<700	<700	**500** J	<700	<700	**1500**	<700
07/22/2005	E020A2450722	EN-20A	Soil	24"	1	ug/kg	**1100** J	R	<750	<750	<750 J	<750	<750	**3000**	<750	**840**	**20000**	<750	<750	NA	<750	<750	<750	<750	<750	**1500**	<750
07/22/2005	E020A3050722	EN-20A	Soil	30"	1.8	ug/kg	**1400** J	R	<1200	<1200	<1200 J	<1200	<1200	**3900**	<1200	**1400**	**35000**	<1200	<1200	NA	<1200	<1200	<1200	<1200	<1200	**2000**	<1200
07/22/2005	E020A3650722	EN-20A	Soil	36"	1.4	ug/kg	**950** J	R	<910	<910	<910 J	<910	<910	**2800**	<910	**770** J	**22000**	<910	<910	NA	<910	<910	<910	<910	<910	**1400**	<910
07/22/2005	E020A4250722	EN-20A	Soil	42"	1.8	ug/kg	**1200** J	R	<1300	<1300	<1300 J	<1300	<1300	**4400**	<1300	**1400**	**38000**	<1300	<1300	NA	<1300	<1300	<1300	<1300	<1300	**1800**	<1300
07/22/2005	E020A4850722	EN-20A	Soil	48"	1	ug/kg	**1200** J	R	<790	<790	<790 J	<790	<790	**4300**	<790	**930**	**31000**	<790	<790	NA	<790	<790	<790	<790	<790	**1000**	<790
07/22/2005	E020A5450722	EN-20A	Soil	54"	2.3	ug/kg	**1300** J	R	<1600	<1600	<1600 J	<1600	<1600	**5800**	<1600	**1500** J	**44000**	<1600	<1600	NA	<1600	<1600	<1600	<1600	<1600	**1200** J	<1600
07/22/2005	E020A6050722	EN-20A	Soil	60"	2.6	ug/kg	**1200** J	R	<1600	<1600	<1600 J	<1600	<1600	**5400**	<1600	**1300** J	**47000**	<1600	<1600	NA	<1600	<1600	<1600	<1600	<1600	**1200** J	<1600
07/22/2005	E020A6650722	EN-20A	Soil	66"	3	ug/kg	**1300** J	R	<2100	<2100	<2100 J	<2100	<2100	**5100**	<2100	**1400** J	**62000**	<2100	<2100	NA	<2100	<2100	<2100	<2100	<2100	**1100** J	<2100
07/22/2005	E020A7250722	EN-20A	Soil	72"	5	ug/kg	**3900** J	R	<3400	<3400	<3400 J	<3400	<3400	**9000**	<3400	**2300** J	**140000**	<3400	<3400	NA	<3400	<3400	<3400	<3400	<3400	**2000** J	<3400
07/22/2005	E020A7850722	EN-20A	Soil	78"	4.9	ug/kg	**1200** J	R	<3100	<3100	<3100 J	<3100	<3100	**3900**	<3100	**1200** J	**70000**	<3100	<3100	NA	<3100	<3100	<3100	<3100	<3100	**880** J	<3100
07/22/2005	E020A8450722	EN-20A	Soil	84"	4.9	ug/kg	**1300** J	R	<3000	<3000	<3000 J	<3000	<3000	**3100**	<3000	**900** J	**71000**	<3000	<3000	NA	<3000	<3000	<3000	<3000	<3000	**770** J	<3000
07/22/2005	E020A9050722	EN-20A	Soil	90"	1	ug/kg	**980** J	R	<600	<600	<600 J	<600	<600	**1700**	<600	**480** J	**13000**	<600	<600	NA	<600	<600	<600	<600	<600	**170** J	<600
07/22/2005	E020A9650722	EN-20A	Soil	96"	1	ug/kg	**1000** J	R	<640	<640	<640 J	<640	<640	**270** J	<640	<640	**1900**	<640	<640	NA	<640	<640	<640	<640	<640	<640	<640
07/28/2005	EN421A050728	EN-421A	Aqueous	NA	1 & 200	ug/L	<10	**2**	<1	**0.4** J	**18**	**5**	**0.3** J	**180** J	**3**	**44** J	**1700**	**1**	**5**	**6**	**4**	**17**	**0.3** J	**120** J	**6000**	**95** J	<2
08/11/2005	EN421A050811	EN-421A	Aqueous	NA	5 & 500	ug/L	<50	<10	<5	<5	**19**	**8**	**3** J	**260** J	**4** J	**53**	**2100**	**2** J	**6**	**7**	**4** J	**16**	<5	**190**	**9600**	**110**	<10
08/25/2005	EN421A050825	EN-421A	Aqueous	NA	5 & 500	ug/L	<50	<10	<5	<5	**13**	**7**	<5	**230** J	**4** J	**41**	**1900**	**2** J	**7**	**6**	**4** J	**17**	<5	**210** J	**7800**	**82**	<10
08/25/2005	ENMWX2050825	EN-421A	Aqueous	NA	1 & 250	ug/L	NA	NA	NA	<1	**17**	**7.9**	<1	**310**	**3.9**	**59**	**2700**	**1.8**	**9.6**	**8.1**	**4.9**	**19**	<1	**290**	**9300**	**140** J	<1
07/20/2005	E421A0650720	EN-421A	Soil	6"	1	ug/kg	R	R	<1400 J	<1400 J	<1400 J	<1400 J	<1400 J	<1200	<1400 J	<1200	**600** J	<1400 J	<1400 J	NA	<1200	<1400 J	<1400 J	<1200	**1700** J	<1400 J	<1400 J
07/20/2005	E421A1250720	EN-421A	Soil	12"	1	ug/kg	R	R	<1400 J	<1400 J	<1400 J	<1400 J	<1400 J	<1200	<1400 J	<1200	**630** J	<1400 J	<1400 J	NA	<1200	<1400 J	<1400 J	<1200	**1900** J	<1400 J	<1400 J
07/20/2005	E421A1850720	EN-421A	Soil	18"	1	ug/kg	R	R	<1400 J	<1400 J	<1400 J	<1400 J	<1400 J	<1200	<1400 J	<1200	**1900** J	<1400 J	<1400 J	NA	<1200	<1400 J	<1400 J	**460** J	**14000** J	<1400 J	<1400 J
07/20/2005	E421A2450720	EN-421A	Soil	24"	1	ug/kg	R	R	<1400 J	<1400 J	<1400 J	<1400 J	<1400 J	**300** J	<1400 J	<1200	**2800** J	<1400 J	<1400 J	NA	<1200	<1400 J	<1400 J	**1000** J	**20000** J	<1400 J	<1400 J
07/20/2005	E421A3050720	EN-421A	Soil	30"	1	ug/kg	R	R	<1300 J	<1300 J	<1300 J	<1300 J	<1300 J	**650** J	<1300 J	**300** J	**12000** J	<1300 J	<1300 J	NA	**300** J	<1300 J	<1300 J	**2000** J	**45000** J	<1300 J	<1300 J
07/20/2005	E421A3650720	EN-421A	Soil	36"	1.7	ug/kg	R	R	<2300 J	<2300 J	<2300 J	<2300 J	<2300 J	**1000** J	<2300 J	**480** J	**6400** J	<2300 J	<2300 J	NA	<2000	<2300 J	<2300 J	**1900** J	**70000** J	<2300 J	<2300 J
07/20/2005	E421A4250720	EN-421A	Soil	42"	2.3	ug/kg	R	R	<3100 J	<3100 J	<3100 J	<3100 J	<3100 J	**1300** J	<3100 J	**630** J	**6900** J	<3100 J	<3100 J	NA	**820** J	<3100 J	<3100 J	**1200** J	**97000** J	<3100 J	<3100 J
07/20/2005	E421A4850720	EN-421A	Soil	48"	2.3	ug/kg	R	R	<3300 J	<3300 J	<3300 J	<3300 J	<3300 J	**1200** J	<3300 J	<2900	**7200** J	<3300 J	<3300 J	NA	**880** J	<3300 J	<3300 J	**860** J	**100000** J	<3300 J	<3300 J

NOTES:

1. This table summarizes results of groundwater and soil sampling adjacent to existing wells EN-17, EN-20, and EN-421. The soil borings were advanced to within 2 feet of the Lacustrine Silt using 6 1/4-inch hollow-stem auger drilling techniques. The soil borings were advanced beyond the augers and into the Lacustrine Silt using 4-inch cased mud-rotary drilling technqiues. Soil samples were collected ahead of the 4-inch casing using 3-inch split-spoons. Upon completion of each soil boring a temporary monitoring well was installed in the borehole. The temporary wells were constructed with one-foot long screens set above the apparent interface between the Upper Aquifer sand and gravel stratum and the underlying Lacustrine Silt. The soil borings and temporary monitoring well installations were performed between July 20 and 22, 2005 by Parratt-Wolff, Inc. of East Syracuse, New York and were observed and logged by Groundwater Sciences Corporation personnel.
2. The groundwater samples were submitted to the Hudson Valley Environmental Laboratory (HVEL) of Hopewell Junction, New York and were analyzed for volatile organic compounds (VOCs) by SW-846 Method 8260B. Duplicate groundwater samples were collected on 8/25/2005 and were sent to the secondary laboratory, STL Newburgh of Newburgh, New York and were analyzed for VOCs by SW-846 Method 8260B. The groundwater results are presented in units of micrograms per liter (ug/L).
3. The soil quality samples were submitted to Severn Trent Laboratories, Inc. of Colchester, Vermont and were analyzed for VOCs using SW-846 Method 5035/8260B. The soil quality results are presented in units of micrograms per kilogram (ug/kg).
4. The analytical data was validated by Trillium, Inc. of Downingtown, Pennsylvania. The "J" qualifier indicates that the compound meets the identification criteria, but the result is less than the reporting limit and, therefore, is estimated. The "R" qualifier indicates that the result was rejected due to analytical and quality control deficiencies and, therefore, the presence or absence of the analyte cannot be verified.

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-017A		EN-017A		EN-017A		EN-017A	
Sample Depth (feet bgs)			23.5'		24.0'		24.5'		25.0'
Sample Date		07/21/2005		07/21/2005		07/21/2005		07/21/2005	
Laboratory Sample I.D.		629757		629758		629759		629760	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
1,1,1-TRICHLOROETHANE	ug/kg	8.4		71		54		95	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@6.5		1.2	J	1.5	J	4.6	J
1,1,2-TRICHLOROETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
1,1-DICHLOROETHANE	ug/kg	170		500	J	390	J	280	J
1,1-DICHLOROETHENE	ug/kg	6.8		12		15		41	
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
1,2-DICHLOROBENZENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
1,2-DICHLOROETHANE	ug/kg	2.1	J	3.6	J	3.1	J	4.7	J
1,2-DICHLOROETHENE, TOTAL	ug/kg	8.7		15		20		45	
1,2-DICHLOROPROPANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@6.5	J	ND@6.3	J	ND@6.8	J	ND@6.1	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@6.5	J	ND@6.3	J	ND@6.8	J	ND@6.1	
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	7.7		7.3		4.5	J	16	J
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
BENZENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
BROMODICHLOROMETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
BROMOMETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
CARBON DISULFIDE	ug/kg	ND@6.5		ND@6.3		ND@6.8		1.9	J
CARBON TETRACHLORIDE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
CHLOROBENZENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
CHLORODIBROMOMETHANE	ug/kg	ND@6.5		ND@6.3	J	ND@6.8		ND@6.1	
CHLOROETHANE	ug/kg	6.7		4.6	J	4	J	ND@6.1	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
CHLOROMETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
CHLOROPRENE	ug/kg	ND@6.5	J	ND@6.3	J	ND@6.8	J	ND@6.1	
CIS-1,2-DICHLOROETHENE	ug/kg	8.4		14		20		42	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
DIBROMOMETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
ETHYL METHACRYLATE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
ETHYLBENZENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
METHACRYLONITRILE	ug/kg	ND@6.5	J	ND@6.3	J	ND@6.8	J	ND@6.1	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@6.5	J	ND@6.3	J	ND@6.8	J	ND@6.1	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	5.4	J
METHYL METHACRYLATE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@6.5		ND@6.3		ND@6.8		1.9	J
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@6.5		6		9.2		43	
TETRAHYDROFURAN	ug/kg	ND@65	J	ND@63	J	ND@68	J	ND@61	
TOLUENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
TRICHLOROETHENE	ug/kg	1.3	J	7.1		12		30	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	
VINYL ACETATE	ug/kg	ND@6.5	J	ND@6.3	J	ND@6.8	J	ND@6.1	
VINYL CHLORIDE	ug/kg	3	J	3.4	J	ND@6.8		ND@6.1	
XYLENES, TOTAL	ug/kg	ND@6.5		ND@6.3		ND@6.8		ND@6.1	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-017A		EN-017A		EN-017A		EN-017A	
Sample Depth (feet bgs)			25.5'		26.0'		26.5'		27.0'
Sample Date		07/21/2005		07/21/2005		07/21/2005		07/21/2005	
Laboratory Sample I.D.		629761		629762		629763		629764	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
1,1,1-TRICHLOROETHANE	ug/kg	4000		2500		2000		720	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	370	J	220	J	200	J	140	J
1,1,2-TRICHLOROETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
1,1-DICHLOROETHANE	ug/kg	3600		2300		1400		620	J
1,1-DICHLOROETHENE	ug/kg	1500		500	J	560	J	260	J
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
1,2-DICHLOROBENZENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
1,2-DICHLOROETHANE	ug/kg	140	J	ND@630		ND@700		ND@630	
1,2-DICHLOROETHENE, TOTAL	ug/kg	2200		1600		910		620	J
1,2-DICHLOROPROPANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@670		ND@630		ND@700		ND@630	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@670	J	ND@630	J	ND@700	J	ND@630	J
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	1200	J	1000	J	1200	J	1100	J
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
BENZENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
BROMODICHLOROMETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@670		ND@630		ND@700		ND@630	
BROMOMETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
CARBON DISULFIDE	ug/kg	ND@670		ND@630		ND@700		ND@630	
CARBON TETRACHLORIDE	ug/kg	ND@670		ND@630		ND@700		ND@630	
CHLOROBENZENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
CHLORODIBROMOMETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
CHLOROETHANE	ug/kg	ND@670	J	ND@630	J	ND@700	J	ND@630	J
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@670		ND@630		ND@700		ND@630	
CHLOROMETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
CHLOROPRENE	ug/kg	ND@670	J	ND@630	J	ND@700	J	ND@630	J
CIS-1,2-DICHLOROETHENE	ug/kg	2100		1500		860		590	J
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
DIBROMOMETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@670		ND@630		ND@700		ND@630	
ETHYL METHACRYLATE	ug/kg	ND@670		ND@630		ND@700		ND@630	
ETHYLBENZENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@670		ND@630		ND@700		ND@630	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
METHACRYLONITRILE	ug/kg	ND@670		ND@630		ND@700		ND@630	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@670		ND@630		ND@700		ND@630	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@670		ND@630		ND@700		ND@630	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@670		ND@630		ND@700		ND@630	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@670		ND@630		ND@700		ND@630	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@670		ND@630		ND@700		ND@630	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
TETRAHYDROFURAN	ug/kg	ND@6700		ND@6300		ND@7000		ND@6300	
TOLUENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@670		ND@630		ND@700		ND@630	
TRICHLOROETHENE	ug/kg	380	J	210	J	3300		3500	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@670		ND@630		ND@700		ND@630	
VINYL ACETATE	ug/kg	NA	R	NA	R	NA	R	NA	R
VINYL CHLORIDE	ug/kg	ND@670		ND@630		ND@700		ND@630	
XYLENES, TOTAL	ug/kg	ND@670		ND@630		ND@700		ND@630	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles

OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-020A		EN-020A		EN-020A		EN-020A	
Sample Depth (feet bgs)			20.0'		20.5'		21.0'		21.5'
Sample Date		07/22/2005		07/22/2005		07/22/2005		07/22/2005	
Laboratory Sample I.D.		629960		629961		629962		629963	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,1,1-TRICHLOROETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,1,2-TRICHLOROETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,1-DICHLOROETHANE	ug/kg	670	J	2100		3100		3000	
1,1-DICHLOROETHENE	ug/kg	ND@750		720		970		840	
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,2-DICHLOROBENZENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,2-DICHLOROETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,2-DICHLOROETHENE, TOTAL	ug/kg	3900		12000		15000		21000	
1,2-DICHLOROPROPANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@750		ND@610		ND@700		ND@750	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@750	J	ND@610	J	ND@700	J	ND@750	U
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	1300	J	1000	J	1200	J	1100	J
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
BENZENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
BROMODICHLOROMETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@750		ND@610		ND@700		ND@750	
BROMOMETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
CARBON DISULFIDE	ug/kg	ND@750		ND@610		ND@700		ND@750	
CARBON TETRACHLORIDE	ug/kg	ND@750		ND@610		ND@700		ND@750	
CHLOROBENZENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
CHLORODIBROMOMETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
CHLOROETHANE	ug/kg	ND@750	J	ND@610	J	ND@700	J	ND@750	J
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@750		ND@610		ND@700		ND@750	
CHLOROMETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
CHLOROPRENE	ug/kg	ND@750	J	ND@610	J	ND@700	J	ND@750	J
CIS-1,2-DICHLOROETHENE	ug/kg	3700		11000		14000		20000	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
DIBROMOMETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@750		ND@610		ND@700		ND@750	
ETHYL METHACRYLATE	ug/kg	ND@750		ND@610		ND@700		ND@750	
ETHYLBENZENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@750		ND@610		ND@700		ND@750	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@750		150	J	ND@700		ND@750	
METHACRYLONITRILE	ug/kg	ND@750		ND@610		ND@700		ND@750	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@750		ND@610		ND@700		ND@750	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@750		ND@610		ND@700		ND@750	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@750		ND@610		ND@700		ND@750	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@750		ND@610		ND@700		ND@750	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@750		ND@610		ND@700		ND@750	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@750		170	J	ND@700		ND@750	
TETRAHYDROFURAN	ug/kg	ND@7500		ND@6100		ND@7000		ND@7500	
TOLUENE	ug/kg	ND@750		350	J	500	J	ND@750	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@750		ND@610		ND@700		ND@750	
TRICHLOROETHENE	ug/kg	380	J	530	J	ND@700		ND@750	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@750		ND@610		ND@700		ND@750	
VINYL ACETATE	ug/kg	NA	R	NA	R	NA	R	NA	R
VINYL CHLORIDE	ug/kg	310	J	900		1500		1500	
XYLENES, TOTAL	ug/kg	ND@750		160	J	ND@700		ND@750	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-020A		EN-020A		EN-020A		EN-020A	
Sample Depth (feet bgs)			22.0'		22.5'		23.0'		23.5'
Sample Date		07/22/2005		07/22/2005		07/22/2005		07/22/2005	
Laboratory Sample I.D.		629964		629965		629966		629967	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,1,1-TRICHLOROETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,1,2-TRICHLOROETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,1-DICHLOROETHANE	ug/kg	3900		2800		4400		4300	
1,1-DICHLOROETHENE	ug/kg	1400		770	J	1400		930	
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,2-DICHLOROBENZENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,2-DICHLOROETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,2-DICHLOROETHENE, TOTAL	ug/kg	37000		24000		41000		33000	
1,2-DICHLOROPROPANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	J
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	1400	J	950	J	1200	J	1200	J
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@1200		ND@910		ND@1300		NA	R
BENZENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
BROMODICHLOROMETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
BROMOMETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
CARBON DISULFIDE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
CARBON TETRACHLORIDE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
CHLOROBENZENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
CHLORODIBROMOMETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
CHLOROETHANE	ug/kg	ND@1200	J	ND@910	J	ND@1300	J	ND@790	J
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
CHLOROMETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
CHLOROPRENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	J
CIS-1,2-DICHLOROETHENE	ug/kg	35000		22000		38000		31000	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
DIBROMOMETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
ETHYL METHACRYLATE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
ETHYLBENZENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
METHACRYLONITRILE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
TETRAHYDROFURAN	ug/kg	ND@12000		ND@9100		ND@13000		ND@7900	
TOLUENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
TRICHLOROETHENE	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@1200		ND@910		ND@1300		ND@790	
VINYL ACETATE	ug/kg	NA	R	NA	R	NA	R	NA	R
VINYL CHLORIDE	ug/kg	2000		1400		1800		1000	
XYLENES, TOTAL	ug/kg	ND@1200		ND@910		ND@1300		ND@790	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-020A		EN-020A		EN-020A		EN-020A	
Sample Depth (feet bgs)			24.0'		24.5'		25.0'		25.5'
Sample Date		07/22/2005		07/22/2005		07/22/2005		07/22/2005	
Laboratory Sample I.D.		629968		629969		629970		629971	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,1,1-TRICHLOROETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,1,2-TRICHLOROETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,1-DICHLOROETHANE	ug/kg	5800		5400		5100		9000	
1,1-DICHLOROETHENE	ug/kg	1500	J	1300	J	1400	J	2300	J
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,2-DICHLOROBENZENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,2-DICHLOROETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,2-DICHLOROETHENE, TOTAL	ug/kg	47000		50000		66000		140000	
1,2-DICHLOROPROPANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	1300	J	1200	J	1300	J	3900	J
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
BENZENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
BROMODICHLOROMETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
BROMOMETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
CARBON DISULFIDE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
CARBON TETRACHLORIDE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
CHLOROBENZENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
CHLORODIBROMOMETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
CHLOROETHANE	ug/kg	ND@1600	J	ND@1600	J	ND@2100	J	ND@3400	J
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
CHLOROMETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
CHLOROPRENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
CIS-1,2-DICHLOROETHENE	ug/kg	44000		47000		62000		140000	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
DIBROMOMETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
ETHYL METHACRYLATE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
ETHYLBENZENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
METHACRYLONITRILE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
TETRAHYDROFURAN	ug/kg	ND@16000		ND@16000		ND@21000		ND@34000	
TOLUENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
TRICHLOROETHENE	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	
VINYL ACETATE	ug/kg	NA	R	NA	R	NA	R	NA	R
VINYL CHLORIDE	ug/kg	1200	J	1200	J	1100	J	2000	J
XYLENES, TOTAL	ug/kg	ND@1600		ND@1600		ND@2100		ND@3400	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-020A		EN-020A		EN-020A		EN-020A	
Sample Depth (feet bgs)		26		26.5'		27.0'		27.5'	
Sample Date		07/22/2005		07/22/2005		07/22/2005		07/22/2005	
Laboratory Sample I.D.		629972		629973		629974		629975	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,1,1-TRICHLOROETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,1,2-TRICHLOROETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,1-DICHLOROETHANE	ug/kg	3900		3100		1700		270	J
1,1-DICHLOROETHENE	ug/kg	1200	J	ND@3000		480	J	ND@640	
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,2-DICHLOROBENZENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,2-DICHLOROETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,2-DICHLOROETHENE, TOTAL	ug/kg	74000		75000		14000		2000	
1,2-DICHLOROPROPANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	1200	J	1300	J	980	J	1000	J
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
BENZENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
BROMODICHLOROMETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
BROMOMETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
CARBON DISULFIDE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
CARBON TETRACHLORIDE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
CHLOROBENZENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
CHLORODIBROMOMETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
CHLOROETHANE	ug/kg	ND@3100	J	ND@3000	J	ND@600	J	ND@640	J
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
CHLOROMETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
CHLOROPRENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
CIS-1,2-DICHLOROETHENE	ug/kg	70000		71000		13000		1900	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
DIBROMOMETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
ETHYL METHACRYLATE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
ETHYLBENZENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
METHACRYLONITRILE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
TETRAHYDROFURAN	ug/kg	ND@31000		ND@30000		ND@6000		ND@6400	
TOLUENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
TRICHLOROETHENE	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@3100		ND@3000		ND@600		ND@640	
VINYL ACETATE	ug/kg	NA	R	NA	R	NA	R	NA	R
VINYL CHLORIDE	ug/kg	880	J	770	J	170	J	ND@640	
XYLENES, TOTAL	ug/kg	ND@3100		ND@3000		ND@600		ND@640	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-025A		EN-025A		EN-025A		EN-025A	
Sample Depth (feet bgs)			14.5'		15.0'		15.5'		16.0'
Sample Date		05/04/2005		05/04/2005		05/04/2005		05/04/2005	
Laboratory Sample I.D.		619017		619018		619019		619020	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,1,1-TRICHLOROETHANE	ug/kg	4400		3500		3200		2500	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@610		150	J	130	J	130	J
1,1,2-TRICHLOROETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,1-DICHLOROETHANE	ug/kg	760		1800		2300		2500	
1,1-DICHLOROETHENE	ug/kg	400	J	1100		1200		1200	
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,2-DICHLOROBENZENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,2-DICHLOROETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,2-DICHLOROETHENE, TOTAL	ug/kg	3600		9400		11000		12000	
1,2-DICHLOROPROPANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@610		ND@600		ND@690		ND@680	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	ND@610		ND@600		ND@690		ND@680	
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@610		ND@600		ND@690		ND@680	
BENZENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
BROMODICHLOROMETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@610		ND@600		ND@690		ND@680	
BROMOMETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
CARBON DISULFIDE	ug/kg	ND@610		ND@600		ND@690		ND@680	
CARBON TETRACHLORIDE	ug/kg	ND@610		ND@600		ND@690		ND@680	
CHLOROBENZENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
CHLORODIBROMOMETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
CHLOROETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@610		ND@600		ND@690		ND@680	
CHLOROMETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
CHLOROPRENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
CIS-1,2-DICHLOROETHENE	ug/kg	3600		9200		11000		12000	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
DIBROMOMETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@610	J	ND@600		ND@690	J	ND@680	J
ETHYL METHACRYLATE	ug/kg	ND@610		ND@600		ND@690		ND@680	
ETHYLBENZENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@610		ND@600		ND@690		ND@680	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
METHACRYLONITRILE	ug/kg	ND@610		ND@600		ND@690		ND@680	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@610		ND@600		ND@690		ND@680	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@610		ND@600		ND@690		ND@680	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@610		ND@600		ND@690		ND@680	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@610		ND@600		ND@690		ND@680	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@610		ND@600		ND@690		ND@680	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
TETRAHYDROFURAN	ug/kg	ND@6100		ND@6000		ND@6900		ND@6800	
TOLUENE	ug/kg	260	J	460	J	410	J	350	J
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@610		ND@600		ND@690		ND@680	
TRICHLOROETHENE	ug/kg	ND@610		150	J	180	J	260	J
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@610		ND@600		ND@690		ND@680	
VINYL ACETATE	ug/kg	ND@610		ND@600		ND@690		ND@680	
VINYL CHLORIDE	ug/kg	210	J	200	J	130	J	ND@680	
XYLENES, TOTAL	ug/kg	ND@610		ND@600		ND@690		ND@680	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-025A		EN-025A		EN-025A		EN-025A	
Sample Depth (feet bgs)			16.5'		17.0'		17.5'		18.0'
Sample Date		05/04/2005		05/04/2005		05/04/2005		05/04/2005	
Laboratory Sample I.D.		619021		619022		619023		619024	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,1,1-TRICHLOROETHANE	ug/kg	1200		1100		ND@770		480	J
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,1,2-TRICHLOROETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,1-DICHLOROETHANE	ug/kg	1400		3100		3500		4200	
1,1-DICHLOROETHENE	ug/kg	ND@590		1300		1300		1500	
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,2-DICHLOROBENZENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,2-DICHLOROETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,2-DICHLOROETHENE, TOTAL	ug/kg	5200		20000		24000		31000	
1,2-DICHLOROPROPANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@590		ND@670		ND@770		ND@750	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	ND@590		ND@670		ND@770		ND@750	
ACROLEIN	ug/kg	ND@590		NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@590		ND@670		ND@770		ND@750	
BENZENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
BROMODICHLOROMETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@590		ND@670		ND@770		ND@750	
BROMOMETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
CARBON DISULFIDE	ug/kg	ND@590		ND@670		ND@770		ND@750	
CARBON TETRACHLORIDE	ug/kg	ND@590		ND@670		ND@770		ND@750	
CHLOROBENZENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
CHLORODIBROMOMETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
CHLOROETHANE	ug/kg	NA	R	ND@670		ND@770		ND@750	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@590		ND@670		ND@770		ND@750	
CHLOROMETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
CHLOROPRENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
CIS-1,2-DICHLOROETHENE	ug/kg	5100		19000		24000		31000	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
DIBROMOMETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@590	J	ND@670	J	ND@770	J	ND@750	J
ETHYL METHACRYLATE	ug/kg	ND@590		ND@670		ND@770		ND@750	
ETHYLBENZENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@590		ND@670		ND@770		ND@750	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
METHACRYLONITRILE	ug/kg	ND@590		ND@670		ND@770		ND@750	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@590		ND@670		ND@770		ND@750	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@590		ND@670		ND@770		ND@750	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@590		ND@670		ND@770		ND@750	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@590		ND@670		ND@770		ND@750	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@590		ND@670		ND@770		ND@750	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
TETRAHYDROFURAN	ug/kg	ND@5900		ND@6700		ND@7700		ND@7500	
TOLUENE	ug/kg	110	J	240	J	180		190	J
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@590		ND@670		ND@770		ND@750	
TRICHLOROETHENE	ug/kg	ND@590		130	J	ND@770		210	J
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@590		ND@670		ND@770		ND@750	
VINYL ACETATE	ug/kg	ND@590		ND@670		ND@770		ND@750	
VINYL CHLORIDE	ug/kg	ND@590		ND@670		ND@770		ND@750	
XYLENES, TOTAL	ug/kg	ND@590		ND@670		ND@770		ND@750	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-107A		EN-107A		EN-107A		EN-107A	
Sample Depth (feet bgs)		14.5'		15.0'		15.5'		16.0'	
Sample Date		05/04/2005		05/04/2005		05/04/2005		05/04/2005	
Laboratory Sample I.D.		618705		618706		618707		618708	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,1,1-TRICHLOROETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@1400		260	J	ND@990		ND@640	
1,1,2-TRICHLOROETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,1-DICHLOROETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,1-DICHLOROETHENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,2-DICHLOROBENZENE	ug/kg	3900		4000		6200		950	
1,2-DICHLOROETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,2-DICHLOROETHENE, TOTAL	ug/kg	43000		17000		33000		24000	
1,2-DICHLOROPROPANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
BENZENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
BROMODICHLOROMETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
BROMOMETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
CARBON DISULFIDE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
CARBON TETRACHLORIDE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
CHLOROBENZENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
CHLORODIBROMOMETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
CHLOROETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
CHLOROMETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
CHLOROPRENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
CIS-1,2-DICHLOROETHENE	ug/kg	42000		17000		33000		23000	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
DIBROMOMETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@1400	J	ND@1000	J	520	J	ND@640	J
ETHYL METHACRYLATE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
ETHYLBENZENE	ug/kg	1700		1200		4000		1900	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	3000		1800		6400		1400	
METHACRYLONITRILE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	1500		930	J	2000		650	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
TETRAHYDROFURAN	ug/kg	ND@14000		ND@10000		ND@9900		ND@6400	
TOLUENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
TRICHLOROETHENE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
VINYL ACETATE	ug/kg	ND@1400		ND@1000		ND@990		ND@640	
VINYL CHLORIDE	ug/kg	360	J	ND@1000		ND@990		ND@640	
XYLENES, TOTAL	ug/kg	4700		2900		8800		2100	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-107A		EN-107A		EN-107A		EN-107A	
Sample Depth (feet bgs)			16.5'		17.0'		17.5'		18.0'
Sample Date		05/04/2005		05/04/2005		05/04/2005		05/04/2005	
Laboratory Sample I.D.		618709		618710		618711		618712	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,1,1-TRICHLOROETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,1,2-TRICHLOROETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,1-DICHLOROETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,1-DICHLOROETHENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,2-DICHLOROBENZENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,2-DICHLOROETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,2-DICHLOROETHENE, TOTAL	ug/kg	22000		18000		43000		53000	
1,2-DICHLOROPROPANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
BENZENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
BROMODICHLOROMETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
BROMOMETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
CARBON DISULFIDE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
CARBON TETRACHLORIDE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
CHLOROBENZENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
CHLORODIBROMOMETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
CHLOROETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
CHLOROMETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
CHLOROPRENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
CIS-1,2-DICHLOROETHENE	ug/kg	21000		18000		42000		52000	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
DIBROMOMETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	240	J	ND@660	J	ND@1200	J	ND@1900	J
ETHYL METHACRYLATE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
ETHYLBENZENE	ug/kg	180	J	ND@660		ND@1200		ND@1900	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
METHACRYLONITRILE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	260	J	ND@660		ND@1200		ND@1900	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	650	J	ND@660		ND@1200		ND@1900	
TETRAHYDROFURAN	ug/kg	ND@6900		ND@6600		ND@12000		ND@19000	
TOLUENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
TRICHLOROETHENE	ug/kg	540	J	720		ND@1200		ND@1900	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
VINYL ACETATE	ug/kg	ND@690		ND@660		ND@1200		ND@1900	
VINYL CHLORIDE	ug/kg	ND@690		ND@660		500	J	600	J
XYLENES, TOTAL	ug/kg	260	J	ND@660		ND@1200		ND@1900	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-119A		EN-119A		EN-119A		EN-119A	
Sample Depth (feet bgs)			22.5'		23.0'		23.5'		24.0'
Sample Date		05/09/2005		05/09/2005		05/09/2005		05/09/2005	
Laboratory Sample I.D.		619697		619698		619699		619700	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
1,1,1-TRICHLOROETHANE	ug/kg	4800		160	J	ND@660		ND@6.8	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	J
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
1,1,2-TRICHLOROETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
1,1-DICHLOROETHANE	ug/kg	4800		3600		3700		1.8	J
1,1-DICHLOROETHENE	ug/kg	1200		190	J	ND@660		ND@6.8	
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	J
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
1,2-DICHLOROBENZENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	J
1,2-DICHLOROETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
1,2-DICHLOROETHENE, TOTAL	ug/kg	ND@660	J	ND@750		ND@660		ND@6.8	
1,2-DICHLOROPROPANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	J
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	J
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	NA	R	NA	R	NA	R	11	J
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	J
ACRYLONITRILE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
BENZENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
BROMODICHLOROMETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
BROMOMETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	J
CARBON DISULFIDE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
CARBON TETRACHLORIDE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
CHLOROBENZENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
CHLORODIBROMOMETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
CHLOROETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@660		ND@750		ND@660		ND@68	
CHLOROMETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
CHLOROPRENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
CIS-1,2-DICHLOROETHENE	ug/kg	640	J	ND@750		ND@660		ND@6.8	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
DIBROMOMETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
ETHYL METHACRYLATE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
ETHYLBENZENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	J
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
METHACRYLONITRILE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
TETRAHYDROFURAN	ug/kg	ND@6600		ND@7500		ND@6600		ND@6.8	
TOLUENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	J
TRICHLOROETHENE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
VINYL ACETATE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
VINYL CHLORIDE	ug/kg	ND@660		ND@750		ND@660		ND@6.8	
XYLENES, TOTAL	ug/kg	ND@660		ND@750		ND@660		ND@6.8	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles

OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-119A		EN-119A		EN-119A		EN-119A	
Sample Depth (feet bgs)			24.5'		25.0'		25.5'		26.0'
Sample Date		05/09/2005		05/09/2005		05/09/2005		05/09/2005	
Laboratory Sample I.D.		619701		619702		619703		619704	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
1,1,1-TRICHLOROETHANE	ug/kg	1.3	J	ND@7.3		74		3200	
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@5.9	J	ND@7.3	J	ND@8.2	J	ND@670	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
1,1,2-TRICHLOROETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
1,1-DICHLOROETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		5800	
1,1-DICHLOROETHENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		150	J
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@5.9	J	ND@7.3	J	ND@8.2	J	ND@670	
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
1,2-DICHLOROBENZENE	ug/kg	ND@5.9	J	ND@7.3	J	ND@8.2	J	ND@670	
1,2-DICHLOROETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
1,2-DICHLOROETHENE, TOTAL	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
1,2-DICHLOROPROPANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@5.9	J	ND@7.3	J	ND@8.2	J	ND@670	
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@5.9	J	ND@7.3	J	ND@8.2	J	ND@670	
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	11	J	11	J	12	J	NA	R
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
BENZENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
BROMODICHLOROMETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
BROMOMETHANE	ug/kg	ND@5.9	J	ND@7.3	J	ND@8.2	J	ND@670	
CARBON DISULFIDE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
CARBON TETRACHLORIDE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
CHLOROBENZENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
CHLORODIBROMOMETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
CHLOROETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
CHLOROMETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
CHLOROPRENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
CIS-1,2-DICHLOROETHENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
DIBROMOMETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
ETHYL METHACRYLATE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
ETHYLBENZENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@5.9	J	ND@7.3	J	ND@8.2	J	ND@670	
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
METHACRYLONITRILE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
TETRAHYDROFURAN	ug/kg	ND@59		ND@73		ND@82		ND@6700	
TOLUENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@5.9	J	ND@7.3	J	ND@8.2	J	ND@670	
TRICHLOROETHENE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
VINYL ACETATE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
VINYL CHLORIDE	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	
XYLENES, TOTAL	ug/kg	ND@5.9		ND@7.3		ND@8.2		ND@670	

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report

Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-421A		EN-421A		EN-421A		EN-421A	
Sample Depth (feet bgs)			20.0'		20.5'		21.0'		21.5'
Sample Date		07/20/2005		07/20/2005		07/20/2005		07/20/2005	
Laboratory Sample I.D.		629594		629595		629596		629597	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,1,1-TRICHLOROETHANE	ug/kg	ND@1400	J	ND@1400	J	460	J	1000	J
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,1,2-TRICHLOROETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,1-DICHLOROETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	300	J
1,1-DICHLOROETHENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,2-DICHLOROBENZENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,2-DICHLOROETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,2-DICHLOROETHENE, TOTAL	ug/kg	630	J	670	J	2000	J	3000	J
1,2-DICHLOROPROPANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	NA	R	NA	R	NA	R	NA	R
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
BENZENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
BROMODICHLOROMETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
BROMOMETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
CARBON DISULFIDE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
CARBON TETRACHLORIDE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
CHLOROBENZENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
CHLORODIBROMOMETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
CHLOROETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
CHLOROMETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
CHLOROPRENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
CIS-1,2-DICHLOROETHENE	ug/kg	600	J	630	J	1900	J	2800	J
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
DIBROMOMETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
ETHYL METHACRYLATE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
ETHYLBENZENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
METHACRYLONITRILE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
TETRAHYDROFURAN	ug/kg	ND@14000	J	ND@1400	J	ND@14000	J	ND@1400	J
TOLUENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
TRICHLOROETHENE	ug/kg	1700	J	1900	J	14000	J	20000	J
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
VINYL ACETATE	ug/kg	NA	R	NA	R	NA	R	NA	R
VINYL CHLORIDE	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J
XYLENES, TOTAL	ug/kg	ND@1400	J	ND@1400	J	ND@1400	J	ND@1400	J

TABLE C.2.1.3

Soil Analytical Chemistry Data

Lacustrine Silt Profiles

OU#1 / OU#2 FFS Report

Former IBM Endicott Facility, Endicott, NY

Sample Location		EN-421A		EN-421A		EN-421A		EN-421A	
Sample Depth (feet bgs)			22.0'		22.5'		23.0'		23.5'
Sample Date		07/20/2005		07/20/2005		07/20/2005		07/20/2005	
Laboratory Sample I.D.		629598		629599		629600		629601	
Parameter	**Units**								
1,1,1,2-TETRACHLOROETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,1,1-TRICHLOROETHANE	ug/kg	2000	J	1900	J	1200	J	860	J
1,1,2,2-TETRACHLOROETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,1,2-TRICHLOROETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,1-DICHLOROETHANE	ug/kg	650	J	1000	J	1300	J	1200	J
1,1-DICHLOROETHENE	ug/kg	300	J	480	J	630	J	ND@3300	J
1,1-DICHLOROPROPENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,3-TRICHLOROPROPANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,2,4-TRICHLOROBENZENE	ug/kg	NA		NA		NA		NA	
1,2,4-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,2-DIBROMOETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,2-DICHLOROBENZENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,2-DICHLOROETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,2-DICHLOROETHENE, TOTAL	ug/kg	12000	J	6800	J	7300	J	7600	J
1,2-DICHLOROPROPANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,3,5-TRIMETHYLBENZENE	ug/kg	NA		NA		NA		NA	
1,3-DICHLOROBENZENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,3-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
1,4-DICHLOROBENZENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
1,4-DIOXANE	ug/kg	NA	R	NA	R	NA	R	NA	R
2,2-DICHLOROPROPANE	ug/kg	NA		NA		NA		NA	
2-CHLOROETHYLVINYL ETHER	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
2-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
3-CHLOROPROPENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
4-CHLOROTOLUENE	ug/kg	NA		NA		NA		NA	
ACETONE	ug/kg	NA	R	NA	R	NA	R	NA	R
ACROLEIN	ug/kg	NA	R	NA	R	NA	R	NA	R
ACRYLONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
BENZENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
BROMOBENZENE	ug/kg	NA		NA		NA		NA	
BROMOCHLOROMETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
BROMODICHLOROMETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
BROMOFORM (TRIBROMOMETHANE)	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
BROMOMETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
CARBON DISULFIDE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
CARBON TETRACHLORIDE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
CHLOROBENZENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
CHLORODIBROMOMETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
CHLOROETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
CHLOROFORM (TRICHLOROMETHANE)	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
CHLOROMETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
CHLOROPRENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
CIS-1,2-DICHLOROETHENE	ug/kg	12000	J	6400	J	6900	J	7200	J
CIS-1,3-DICHLOROPROPENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
DIBROMOMETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
DICHLORODIFLUOROMETHANE (FREON 12)	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
ETHYL METHACRYLATE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
ETHYLBENZENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
HEXACHLOROBUTADIENE	ug/kg	NA		NA		NA		NA	
IODOMETHANE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
ISOBUTYL ALCOHOL	ug/kg	NA	R	NA	R	NA	R	NA	R
ISOPROPYLBENZENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
ISOPROPYLTOLUENE	ug/kg	NA		NA		NA		NA	
M,P-XYLENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
METHACRYLONITRILE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
METHYL BUTYL KETONE (2-HEXANONE)	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
METHYL ETHYL KETONE (MEK, 2-BUTANONE)	ug/kg	NA	R	NA	R	NA	R	NA	R
METHYL METHACRYLATE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
METHYL TERT-BUTYL ETHER (MTBE)	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/kg	300	J	ND@2300	J	820	J	880	J
MIBK (4-METHYL-2-PENTANONE)	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
N-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
N-PROPYLBENZENE	ug/kg	NA		NA		NA		NA	
O-XYLENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
PROPIONITRILE	ug/kg	NA	R	NA	R	NA	R	NA	R
SEC-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
STYRENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
TERT-BUTYLBENZENE	ug/kg	NA		NA		NA		NA	
TETRACHLOROETHENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
TETRAHYDROFURAN	ug/kg	ND@13000	J	ND@23000	J	ND@31000	J	ND@33000	J
TOLUENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
TRANS-1,2-DICHLOROETHENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
TRANS-1,3-DICHLOROPROPENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
TRANS-1,4-DICHLORO-2-BUTENE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
TRICHLOROETHENE	ug/kg	45000	J	70000	J	97000	J	100000	J
TRICHLOROFLUOROMETHANE (FREON 11)	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
VINYL ACETATE	ug/kg	NA	R	NA	J	NA	R	NA	R
VINYL CHLORIDE	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J
XYLENES, TOTAL	ug/kg	ND@1300	J	ND@2300	J	ND@3100	J	ND@3300	J

TABLE C.2.1.3
Soil Analytical Chemistry Data
Lacustrine Silt Profiles
OU#1 / OU#2 FFS Report
Former IBM Endicott Facility, Endicott, NY

Explanation of Reporting Conventions and Key to Comment Codes

Sample Depth (feet bgs)

NA	Not Analyzed
ND@X	Not Detected at Detection Limit X

Code	**Explanation**
J	Estimated value - compound meets identification criteria, but result is less than the reporting limit.
R	Result rejected due to analytical and quality control deficiencies. The presence or absence of the analyte cannot be verified.

APPENDIX D

Indoor Air Analytical Chemistry Data
(SHPC, September 2016)

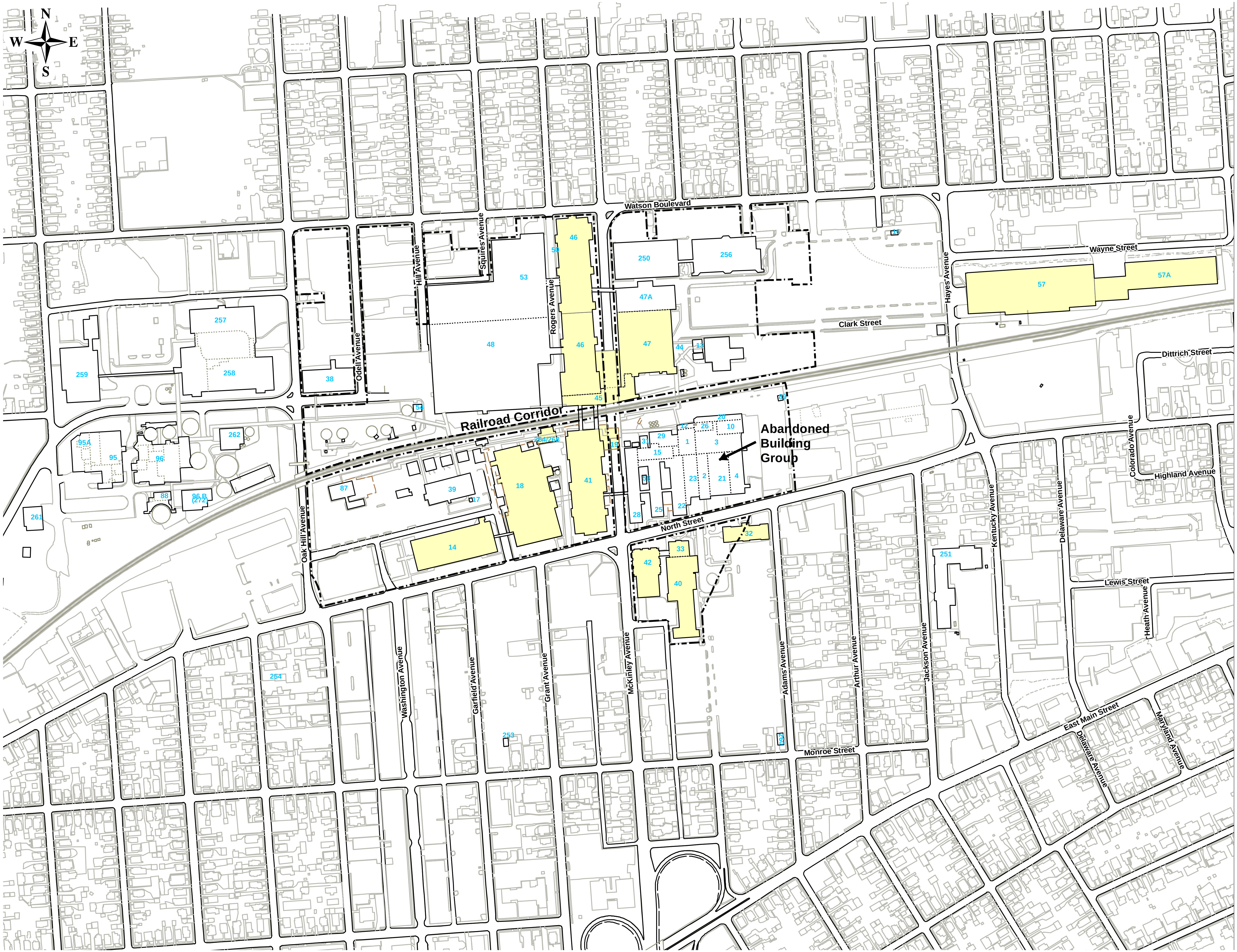

Figure 2

Building Location Plan

Indoor Air Assessment Report

Former IBM Endicott Facility

Endicott, New York

Drawn By: C. LaVack
Designed By: S. Warner
Reviewed By: D. Shea
Project No: 3935.00
Date: September 2016

Figure Narrative

This figure shows the buildings where indoor air assessment was conducted.

Legend

🟨	Building where indoor air assessment was conducted
273	Building number
☐	Unlabeled features include tanks, storage sheds, and other structures and features not intended for human occupancy
-·-·-	Approximate boundary of Operable Units #1 and #2

Feet
200 100 0 200 400

SANBORN | HEAD ENGINEERING

Last Edited By: clavack

Path: P:\3900s\3935.00\Graphics Files\GIS\Figures\Report Figures\Building_Location.mxd

Table 3A

Building 14 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in μg/m³																												
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA14-001	AA14-001	03/15/16	0.11	U		0.14	J	H	0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA14-001	IA14-001	03/15/16	0.11	U		0.31	J	H	0.14			0.053	U		0.081	U		0.085			0.079	U		0.079	U		0.079	U		0.051	U	
IA14-002	IA14-002	03/15/16	0.13			0.24	J	H	0.15			0.053	U		0.081	U		0.11			0.079	U		0.079	U		0.079	U		0.051	U	
IA14-004	IA14-004	03/15/16	0.11	U		0.33	J	H	0.14			0.053	U		0.081	U		0.089			0.079	U		0.079	U		0.079	U		0.051	U	
IA14-005	IA14-005	03/15/16	0.11			0.36	J	H	0.13			0.053	U		0.081	U		0.097			0.079	U		0.079	U		0.079	U		0.051	U	
IA14-006	IA14-006	03/15/16	0.11			0.36	J	H	0.15			0.053	U		0.081	U		0.097			0.079	U		0.079	U		0.079	U		0.051	U	
IA14-007	IA14-007	03/15/16	0.12			0.44	J	H	0.12			0.053	U		0.081	U		0.093			0.079	U		0.079	U		0.079	U		0.051	U	
IA14-008	IA14-008	03/15/16	0.11			0.46	J	H	0.11	U		0.079			0.081	U		0.13			0.079	U		0.079	U		0.079	U		0.051	U	
IA14-008*	DUP-2	03/15/16	0.11	U		0.40	J	H	0.11	U		0.053	U		0.081	U		0.089			0.079	U		0.079	U		0.079	U		0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. * indicates sample is a field duplicate.

3. Results are presented in micrograms per cubic meter (μg/m³).

4. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

5. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

6. Results are displayed with two significant figures.

Table 3B

Building 18 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in µg/m^3																													
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA18-001	AA18-001	03/24/16	0.11	UJ	I	0.14	UJ	I	0.11	UJ	I	0.053	UJ	I	0.081	UJ	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	UJ	I
IA18-001	IA18-001	03/24/16	0.26			0.16	EB	H	0.28			0.055			0.081	U		0.081	U		0.079	U		0.079	U		0.13			0.051	U	
IA18-002	IA18-002	03/24/16	0.11	U		0.16	EB	H	0.30			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.095			0.051	U	
IA18-003	IA18-003	03/24/16	0.11	U		0.16	EB	H	0.30			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.095			0.051	U	
IA18-004	IA18-004	03/24/16	0.11	U		0.20	EB	H	0.31			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.10			0.051	U	
IA18-005	IA18-005	03/24/16	0.11	U		0.14	EB	H	0.26			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.18			0.051	U	
IA18-010	IA18-010	03/24/16	0.11	U		0.23	EB	H	0.16			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA18-012	IA18-012	03/24/16	0.11	U		0.21	EB	H	0.14			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA18-016	IA18-016	03/24/16	0.13			0.18	EB	H	0.33			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. Results are presented in micrograms per cubic meter (µg/m^3).

3. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

4. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

5. Results are displayed with two significant figures.

Table 3C

Building 19 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in μg/m^3																													
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA19-001	AA19-001	03/10/16	0.23			0.14	EB	H	0.45			0.053	U		0.12			0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
AA19-001	AA19-001	05/25/16	0.11	U		0.14	U		0.15			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.10			0.051	U	
IA19-001	IA19-001	03/10/16	3.9			1.3	EB	H	1.1			0.087			0.21			0.085			0.079	U		0.12			10			0.051	U	
IA19-001	IA19-001	05/25/16	0.11	UJ	I	0.14	UJ	I	0.14	J	I	0.053	UJ	I	0.081	UJ	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	1.6	J	I	0.051	UJ	I

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. Samples collected on May 25, 2016 were under different HVAC operating conditions than March 10. 2016. Refer to the text.

3. Results are presented in micrograms per cubic meter (μg/m^3).

4. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

5. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

6. Results are displayed with two significant figures.

Table 3D

Building 32 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in µg/m³																													
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA32-001	AA32-001	03/08/16	0.14			0.14	U		0.079	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA32-001	IA32-001	03/08/16	0.92	J	I	0.52	JEB	I	0.16	J	I	0.053	UJ	I	0.081	UJ	I	0.089	J	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	UJ	I
IA32-002	IA32-002	03/08/16	0.72			0.39	EB	H	0.15			0.053	U		0.081	U		0.12			0.079	U		0.079	U		0.079	U		0.051	U	
IA32-003	IA32-003	03/08/16	0.76			0.44	EB	H	0.15			0.053	U		0.081	U		0.093			0.079	U		0.079	U		0.079	U		0.051	U	
IA32-004	IA32-004	03/08/16	0.89			0.47	EB	H	0.16			0.053	U		0.081	U		0.089			0.079	U		0.079	U		0.079	U		0.051	U	
IA32-007	IA32-007	03/08/16	1.2			0.42	EB	H	0.15			0.053	U		0.081	U		0.089			0.079	U		0.079	U		0.079	U		0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. Results are presented in micrograms per cubic meter (µg/m³).

3. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

4. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

5. Results are displayed with two significant figures.

Table 3E

Building 33 & 40 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in µg/m³																													
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA33-001	AA33-001	03/09/16	0.11	U		0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA33-002	IA33-002	03/09/16	0.61			0.60	EB	H	0.13			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA33-003	IA33-003	03/09/16	0.24			0.26	EB	H	0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
AA40-001	AA40-001	03/09/16	0.11	UJ	I	0.16	JEB	I	0.11	UJ	I	0.053	UJ	I	0.081	UJ	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	UJ	I
IA40-001	IA40-001	03/09/16	0.45			0.77	EB	H	0.14			0.053	U		0.081	U		0.11			0.079	U		0.079	U		0.079	U		0.051	U	
IA40-001*	DUP-1	03/09/16	0.54			0.70	EB	H	0.14			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA40-002	IA40-002	03/09/16	0.47			0.69	EB	H	0.15			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA40-003	IA40-003	03/09/16	0.47			0.80	EB	H	0.14			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA40-004	IA40-004	03/09/16	0.55	J	I	1.5	JEB	I	0.12	J	I	0.053	UJ	I	0.081	UJ	I	0.12	J	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	UJ	I
IA40-005	IA40-005	03/09/16	0.53			0.75	EB	H	0.15			0.071			0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA40-006	IA40-006	03/09/16	0.57			1.2	EB	H	0.13			0.053	U		0.081	U		0.12			0.079	U		0.079	U		0.079	U		0.051	U	
IA40-007	IA40-007	03/09/16	0.36			1.3	EB	H	0.11	U		0.053	U		0.081	U		0.15			0.079	U		0.079	U		0.079	U		0.051	U	
IA40-008	IA40-008	03/09/16	0.36			0.81	EB	H	0.11	U		0.053	U		0.081	U		0.13			0.079	U		0.079	U		0.079	U		0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. * indicates sample is a field duplicate.

3. Results are presented in micrograms per cubic meter (µg/m^3).

4. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
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"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

5. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

6. Results are displayed with two significant figures.

Table 3F

Building 41 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in µg/m³																													
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA41-001	AA41-001	03/10/16	0.11	U		0.14	U		0.65			0.053	U		0.12			0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA41-020	IA41-020	03/10/16	0.94			3.0	EB	H	27			0.20			2.2			0.081	U		0.68			0.49			0.69			0.051	U	
IA41-020	IA41-020	05/25/16	0.53			1.7			19			0.18			3.4			0.081	U		0.55			0.27			0.12			0.051	U	
IA41-021	IA41-021	03/10/16	1.3	J	I	1.6	JEB	I	30	J	I	0.22	J	I	2.7	J	I	0.081	UJ	I	0.83	J	I	0.70	J	I	0.54	J	I	0.051	UJ	I
IA41-021	IA41-021	05/25/16	0.68			0.56			20			0.17			2.6	J	I	0.081	U		0.68			0.34			0.85			0.051	U	
IA41-021*	FD41-021	05/25/16	0.68			0.56			20			0.18			4.0	J	I	0.081	U		0.69			0.37			0.85			0.051	U	
IA41-022	IA41-022	03/10/16	1.0			2.0	EB	H	28			0.23			2.4			0.081	U		0.71			0.52			0.52			0.051	U	
IA41-022	IA41-022	05/25/16	0.53			0.88			18			0.19			3.1			0.081	U		0.55			0.27			0.17			0.051	U	
IA41-023	IA41-023	03/10/16	0.46			1.7	EB	H	1.4			0.19			0.28			0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA41-023	IA41-023	05/25/16	0.12			0.14	U		0.73			0.16			0.11			0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA41-024	IA41-024	03/10/16	0.45	J	I	0.18	JEB	I	1.6	J	I	0.19	J	I	0.27	J	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	UJ	I
IA41-025	IA41-025	03/10/16	0.51	J	I	0.14	JEB	I	1.5	J	I	0.18	J	I	0.28	J	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	UJ	I
IA41-025	IA41-025	05/25/16	0.11			0.18			0.68			0.17			0.16			0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA41-029	IA41-029	05/25/16	0.15			0.18			1.1			0.17			0.23			0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. * indicates sample is a field duplicate.

3. Samples collected on May 25, 2016 were under different HVAC operating conditions than March 10, 2016. Refer to the text.

4. Results are presented in micrograms per cubic meter (µg/m³).

5. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

6. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

7. Results are displayed with two significant figures.

Table 3G

Building 42 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in µg/m^3																													
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA42-001	AA42-001	04/05/16	0.11	U		0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA42-002	IA42-002	04/05/16	1.4			0.14	U		0.15			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA42-005	IA42-005	04/05/16	3.1			0.14	U		0.40			0.053	U		0.081	U		0.081	U		0.079	U		0.079			0.079	U		0.051	U	
IA42-008	IA42-008	04/05/16	0.73			0.14	U		0.13			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA42-010	IA42-010	04/05/16	0.65			0.14	U		0.13			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. Results are presented in micrograms per cubic meter (µg/m^3).

3. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

4. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

5. Results are displayed with two significant figures.

Table 3H

Building 45 & 46 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in µg/m³																													
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
IA45-001	IA45-001	04/01/16	1.7			0.14	U		3.2			0.071			1.1			0.081	U		0.15			0.27			0.079	U		0.051	U	
AA46-001	AA46-001	04/01/16	0.11	UJ	I	0.14	UJ	I	0.11	UJ	I	0.053	UJ	I	0.081	UJ	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	UJ	I
IA46-001	IA46-001	04/01/16	0.30	J	I	0.18	J	I	0.46	J	I	0.053	UJ	I	0.24	J	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	UJ	I
IA46-002	IA46-002	04/01/16	0.48			0.14	U		0.75			0.071			0.41			0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA46-003	IA46-003	04/01/16	0.32			0.14	U		0.48			0.053	U		0.24			0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA46-004	IA46-004	04/01/16	0.68			0.14	U		1.2			0.053	U		0.74			0.081	U		0.079	U		0.11			0.079	U		0.051	U	
IA46-005	IA46-005	04/01/16	0.99			0.14	U		1.8			0.16			1.2			0.081	U		0.10			0.18			0.079	U		0.051	U	
IA46-006	IA46-006	04/01/16	2.0			0.14	U		4.2			0.055			2.6			0.081	U		0.24			0.45			0.079	U		0.051	U	
IA46-006*	DUP-4	04/01/16	1.9			0.14	U		4.2			0.058			2.6			0.081	U		0.23			0.41			0.079	U		0.051	U	
IA46-007	IA46-007	04/01/16	2.1			0.14	U		5.2			0.055			2.7			0.081	U		0.29			0.56			0.079	U		0.051	U	
IA46-008	IA46-008	04/01/16	1.4			0.14	U		3.8			0.082			1.4			0.081	U		0.23			0.36			0.079	U		0.051	U	
IA46-009	IA46-009	04/01/16	2.0			0.45			3.6			0.061			1.6			0.081	U		0.24			0.45			0.079	U		0.051	U	
IA46-010	IA46-010	04/01/16	2.1			0.23			4.0			0.11			2.2			0.081	U		0.22			0.36			0.079	U		0.051	U	
IA46-011	IA46-011	04/01/16	1.6			0.14	U		3.1			0.077			1.3			0.081	U		0.25			0.26			0.079	U		0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. * indicates sample is a field duplicate.

3. Results are presented in micrograms per cubic meter (µg/m³).

4. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

5. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

6. Results are displayed with two significant figures.

Table 3I

Building 47 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in µg/m^3																												
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA47-001	AA47-001	03/11/16	0.11	UJ	I	0.14	UJ	I	0.35	J	I	0.053	UJ	I	0.081	UJ	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	U	I
IA47-001	IA47-001	03/11/16	0.31			0.14	U		0.80			0.053	U		0.10			0.081	U		0.14			0.10			0.079	U		0.051	U	
IA47-002	IA47-002	03/11/16	0.17			0.14	U		0.48			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA47-003	IA47-003	03/11/16	0.48			0.14	U		0.96			0.053	U		0.10			0.081	U		0.079	U		0.17			0.079	U		0.051	U	
IA47-005	IA47-005	03/11/16	0.11	UJ	I	0.14	UJ	I	0.11	UJ	I	0.053	UJ	I	0.081	UJ	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	0.079	UJ	I	0.051	U	I
IA47-009	IA47-009	03/11/16	0.11	U		0.14	U		0.15			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA47-010	IA47-010	03/11/16	0.11			0.14	U		0.11			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. Results are presented in micrograms per cubic meter (µg/m^3).

3. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

4. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

5. Results are displayed with two significant figures.

Table 3J

Building 57 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in $\mu g/m^3$																														
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA57-001	AA57-001	03/16/16	0.11	U		0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA57-001	IA57-001	03/16/16	0.11	U		0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		1.1			0.051	U	
IA57-002	IA57-002	03/16/16	0.13	J	I	0.22	J	I	0.11	UJ	I	0.053	UJ	I	0.081	UJ	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	1.2	J	I	0.051	UJ	I
IA57-003	IA57-003	03/16/16	0.11	U		0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		1.0			0.051	U	
IA57-004	IA57-004	03/16/16	0.11	UJ	I	0.33	J	I	0.11	UJ	I	0.053	UJ	I	0.081	UJ	I	0.081	UJ	I	0.079	UJ	I	0.079	UJ	I	1.2	J	I	0.051	UJ	I
IA57-005	IA57-005	03/16/16	0.11	U		0.23			0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.90			0.051	U	
IA57-006	IA57-006	03/16/16	0.11	U		0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		4.5			0.051	U	
IA57-007	IA57-007	03/16/16	0.11	U		0.16	J	H	0.11	U		0.084			0.081	U		0.081	U		0.079	U		0.079	U		0.25			0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. Results are presented in micrograms per cubic meter ($\mu g/m^3$).

3. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

4. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

5. Results are displayed with two significant figures.

Table 3K

Building 57A - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in μg/m^3																												
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA57A-001	AA57A-001	06/01/16	0.11	U		0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA57A-001	IA57A-001	03/16/16	2.0			0.22			0.28			0.053	U		0.13			0.15			0.079	U		0.095			0.35			0.051	U	
IA57A-001*	DUP-3	03/16/16	2.0	J	I	0.24	J	I	0.29	J	I	0.082	J	I	0.14	J	I	0.16	J	I	0.079	UJ	I	0.083	J	I	0.38	J	I	0.051	UJ	I
IA57A-001	IA57A-001	06/01/16	1.3			0.23	EB	H	0.11	U		0.053	U		0.081	U		0.11			0.079	U		0.079	U		1.2			0.051	U	
IA57A-001*	FD57A-001	06/01/16	1.3			0.22	EB	H	0.11	U		0.053	U		0.081	U		0.11			0.079	U		0.079	U		1.2			0.051	U	
IA57A-001	IA57A-001	06/02/16	0.66			0.16	EB	H	0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.25			0.051	U	
IA57A-002	IA57A-002	03/16/16	2.6			0.25			0.48			0.053	U		0.23			0.16			0.079	U		0.14			0.37			0.051	U	
IA57A-002	IA57A-002	06/01/16	1.0			0.22	EB	H	0.11	U		0.053	U		0.081	U		0.085			0.079	U		0.079	U		1.3			0.051	U	
IA57A-002	IA57A-002	06/02/16	0.60			0.14	EB	H	0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.26			0.051	U	
IA57A-003	IA57A-003	03/16/16	0.26			0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA57A-003	IA57A-003	06/01/16	0.31			0.95	EB	H	0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.17			0.051	U	
IA57A-003	IA57A-003	06/02/16	0.26			0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.12			0.051	U	
IA57A-004	IA57A-004	03/16/16	0.13			0.14	U		0.11	U		0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		1.1			0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. * indicates sample is a field duplicate.

3. Samples collected on June 01, 2016 and June 02, 2016 were under different HVAC operating conditions than March 16, 2016. Refer to the text.

4. Results are presented in micrograms per cubic meter (μg/m^3).

5. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

6. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

7. Results are displayed with two significant figures.

Table 3L

Building 264 - Indoor Air Sample Data

Indoor Air Assessment Report
Former IBM Endicott Facility
Endicott, New York

Sample Location	Field Sample Name	Collection Date	Concentrations in µg/m^3																													
			TCE			PCE			1,1,1-TCA			CEA			1,1-DCA			1,2-DCA			1,1-DCE			c-1,2-DCE			t-1,2-DCE			VC		
			Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias	Result	Qual.	Bias
AA264-001	AA264-001	03/16/16	0.11	U		0.14	U		0.37			0.053	U		0.081	U		0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	
IA264-001	IA264-001	03/16/16	0.33			0.36			2.3			0.053	U		0.18			0.081	U		0.079	U		0.079	U		0.079	U		0.051	U	

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. "TCE" is trichloroethene; "PCE" is tetrachloroethene; "1,1,1-TCA" is 1,1,1-Trichloroethane; "CEA" is chloroethane; "1,1-DCA" is 1,1-dichloroethane; "1,2-DCA" is 1,2-dichloroethane; "1,1-DCE" is 1,1-dichloroethene; "c-1,2-DCE" is cis-1,2-dichloroethene; "t-1,2-DCE" is trans-1,2-dichloroethene; and "VC" is vinyl chloride.

2. Results are presented in micrograms per cubic meter (µg/m^3).

3. An in-depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) of Arlington, Massachusetts. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

4. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.

5. Results are displayed with two significant figures.

APPENDIX E

Mass Removal Data
(1980 through 2017)

TABLE E.1
VOC Mass Removed by Area (1980 through 2017)

OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Year	From Western RCSA	From Central RCSA	From Eastern RCSA	From North St Area**	Total (lbs)
1980	119	388,574			388,693
1981	2,666	139,756			142,421
1982	1,241	47,461	1,636		50,338
1983	126	10,967	1,178		12,270
1984	293	14,160	760		15,214
1985	688	30,642	992		32,323
1986	241	18,985	582		19,807
1987	133	16,915	639		17,687
1988	222	26,062	661		26,945
1989	178	5,530	247		5,954
1990	199	4,989	86		5,274
1991	376	5,122	178		5,676
1992	216	3,992	317		4,525
1993	132	5,275	247		5,654
1994	158	3,119	138		3,415
1995	236	1,838	280		2,354
1996	145	3,241	297		3,683
1997	129	1,845	1,186		3,161
1998	139	2,890	1,858		4,887
1999	73	1,832	2,068		3,973
2000	131	2,143	768		3,041
2001	113	4,908	605	9	5,636
2002	143	4,887	321	13	5,365
2003	152	2,502	744	23	3,420
2004	186	2,139	636	116	3,076
2005	108	2,221	108	160	2,597
2006	99	2,288	1,105	93	3,586
2007	55	1,410	2,117	43	3,625
2008	58	941	1,759	30	2,787
2009	44	1,288	2,318	35	3,684
2010	32	1,263	1,850	30	3,175
2011	48	1,228	1,359	63	2,698
2012	34	2,327	1,673	193	4,226
2013	33	1,561	2,244	44	3,882
2014	111	1,909	1,494	26	3,540
2015	117	1,776	1,832	33	3,759
2016	237	844	1,623	44	2,748
2017	454	634	1,589	43	2,720
				Total VOC Mass Removed (pounds)	817,818

**North St Area includes flux control portion of EN-284P pumping.

TABLE E.2
VOC Mass Removed by Constituent (1980 through 2017)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

	111-TCA					**TCE**					**Other VOCs**					**Methylene Chloride**
Area:	West	Central*	East	North St	**Total**	West	Central	East	North St	**Total**	West	Central	East	North St	**Total**	
Year																Central
1980	14.6	385,943.4			**385,958.0**	3.3	1,809.5			**1,812.8**	101.3	48.4			**149.7**	**772.3**
1981	1,301.2	112,631.8			**113,933.0**	128.4	3,282.4			**3,410.8**	1,236.0	180.9			**1,416.9**	**23,660.6**
1982	523.1	40,665.1	1,546.8		**42,735.0**	25.0	1,951.9	20.3		**1,997.3**	692.6	580.6	68.9		**1,342.1**	**4,263.8**
1983	3.0	8,018.5	1,066.8		**9,088.3**	3.7	1,705.2	16.8		**1,725.6**	119.1	252.7	94.1		**465.9**	**990.0**
1984	75.4	11,562.9	709.7		**12,348.0**	9.6	1,593.7	9.6		**1,612.9**	208.5	327.8	41.1		**577.4**	**675.5**
1985	97.6	25,806.4	971.5		**26,875.5**	12.1	1,259.6	13.5		**1,285.3**	578.4	848.3	7.3		**1,434.0**	**2,728.2**
1986	26.3	16,092.0	574.6		**16,692.9**	5.5	540.1	4.2		**549.8**	208.8	538.7	2.7		**750.2**	**1,813.9**
1987	18.9	14,131.0	630.5		**14,780.5**	4.5	476.1	2.2		**482.7**	109.9	497.3	6.4		**613.6**	**1,810.1**
1988	25.7	19,373.4	649.7		**20,048.8**	36.9	2,574.3	1.5		**2,612.8**	159.0	1,028.4	10.1		**1,197.5**	**3,085.8**
1989	28.3	4,117.0	215.0		**4,360.3**	21.7	302.6	14.0		**338.3**	127.8	613.9	17.7		**759.4**	**496.0**
1990	57.0	4,094.0	78.0		**4,229.0**	4.0	294.0	0.0		**298.0**	138.0	361.0	8.0		**507.0**	**240.0**
1991	87.5	4,312.9	173.5		**4,573.9**	12.4	249.3	0.4		**262.1**	276.1	320.5	3.8		**600.4**	**239.6**
1992	106.0	3,289.0	309.0		**3,704.0**	8.0	231.0	0.0		**239.0**	102.0	319.0	8.0		**429.0**	**153.0**
1993	11.0	4,252.0	247.0		**4,510.0**	3.0	319.0	0.0		**322.0**	118.0	583.0	0.0		**701.0**	**121.0**
1994	13.0	2,484.0	133.0		**2,630.0**	4.0	229.0	0.0		**233.0**	141.0	359.0	5.0		**505.0**	**47.0**
1995	71.0	1,478.0	271.0		**1,820.0**	11.0	145.0	0.0		**156.0**	154.0	206.0	9.0		**369.0**	**9.0**
1996	11.7	2,693.0	297.0		**3,001.7**	3.2	234.0	0.0		**237.2**	130.4	249.0	0.0		**379.4**	**65.0**
1997	7.7	1,533.2	890.0		**2,430.9**	5.0	88.3	48.5		**141.8**	116.7	192.3	247.8		**556.8**	**31.3**
1998	10.0	2,482.0	1,455.0		**3,947.0**	3.0	156.0	111.0		**270.0**	126.0	225.0	292.0		**643.0**	**27.0**
1999	5.0	1,407.0	1,406.0		**2,818.0**	2.0	99.0	184.0		**285.0**	66.0	272.0	478.0		**816.0**	**54.0**
2000	7.9	1,606.9	527.4		**2,142.2**	2.2	138.9	65.9		**207.0**	121.0	335.6	174.4		**631.0**	**61.2**
2001	7.3	3,392.7	235.5	2.9	**3,638.4**	1.8	1,045.4	102.2	0.3	**1,149.7**	104.0	419.7	267.7	5.4	**796.8**	**50.6**
2002	13.0	3,793.5	150.3	7.4	**3,964.3**	2.6	734.5	38.8	1.8	**777.7**	127.1	326.9	132.4	4.0	**590.4**	**32.3**
2003	17.5	2,040.5	241.2	15.5	**2,314.7**	0.0	146.1	225.5	0.9	**372.4**	134.3	315.0	277.0	6.3	**732.7**	
2004	8.7	1,649.9	457.7	46.5	**2,162.8**	1.5	146.0	78.2	25.5	**251.2**	175.5	323.1	99.8	43.5	**641.9**	**20.2**
2005	5.2	1,648.8	78.6	39.7	**1,772.2**	1.8	155.5	5.5	45.8	**208.5**	101.0	416.8	24.0	74.5	**616.3**	
2006	4.1	1,595.7	817.3	10.3	**2,427.4**	1.3	132.8	89.8	39.4	**263.4**	94.0	559.8	198.0	43.3	**895.1**	
2007	2.8	893.5	1,628.3	3.3	**2,527.9**	0.9	54.8	163.7	21.1	**240.5**	51.7	461.5	324.9	18.4	**856.6**	
2008	3.2	571.4	1,362.8	1.2	**1,938.7**	0.8	26.3	115.8	15.4	**158.2**	54.1	342.9	280.2	13.2	**690.4**	
2009	2.2	836.1	1,845.3	1.2	**2,684.8**	0.4	23.8	156.8	16.9	**198.0**	41.2	427.8	315.4	16.7	**801.1**	
2010	1.4	775.8	1,457.9	1.0	**2,236.2**	0.4	16.9	121.2	16.9	**155.3**	29.9	470.6	270.8	12.3	**783.6**	
2011	2.1	685.0	1,063.6	1.8	**1,752.5**	0.6	24.8	88.2	19.7	**133.3**	45.7	518.3	206.8	41.4	**812.3**	
2012	1.5	1,603.2	1,321.5	2.1	**2,928.3**	0.4	24.5	106.2	17.9	**149.0**	32.2	699.0	244.9	172.7	**1,148.9**	
2013	1.3	1,029.3	1,793.1	1.7	**2,825.5**	0.4	13.3	140.0	14.9	**168.6**	31.2	518.2	311.0	27.8	**888.2**	
2014	4.8	1,330.0	1,175.1	2.0	**2,511.9**	0.6	15.3	102.3	9.1	**127.3**	105.8	563.5	216.1	15.1	**900.5**	
2015	9.6	1,183.5	1,454.6	5.5	**2,653.2**	0.5	11.4	100.5	9.2	**121.6**	107.2	581.2	277.3	18.5	**984.1**	
2016	39.7	556.7	1,131.1	4.5	**1,732.0**	0.5	1.1	97.9	7.8	**107.3**	196.4	286.3	394.4	31.6	**908.7**	
2017	204.2	341.5	1,035.3	7.7	**1,588.8**	0.4	0.7	63.1	10.4	**74.7**	249.4	291.9	490.3	24.6	**1,056.2**	
	Total Mass of 111-TCA, 1980-2017 (pounds):				**724,286.5**	**Total Mass of TCE, 1980-2017 (pounds):**				**23,136.1**	**Total Mass of Other VOCs, 1980-2017 (pounds):**				**28,948.2**	**41,447.6**

All units are in pounds.
* Includes 240,030 pounds attributable to "Drums" from 1980 to 1982.

Total Mass of VOCs Removed, 1980-2017 (pounds): **817,818.4**

TABLE E.2.1
VOC Mass Removed by Constituent in the Western RCSA (1980 through 2017)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Year	111-TCA	11-DCA	11-DCE	CEA	PCE	TCE	C12-DCE	VC	FR113	FR123a	Other
1980	14.6	▨	▨	▨	43.7	3.3	▨	▨	▨	▨	57.6
1981	1301.2	▨	▨	▨	1063.2	128.4	▨	▨	▨	▨	172.8
1982	523.1	▨	▨	▨	585.2	25.0	46.5	▨	▨	▨	60.9
1983	3.0	▨	▨	▨	94.0	3.7	18.2	▨	▨	▨	7.0
1984	75.4	▨	▨	▨	152.2	9.6	41.3	▨	▨	▨	14.9
1985	97.6	▨	▨	▨	528.8	12.1	33.2	▨	▨	▨	16.5
1986	26.3	▨	▨	▨	113.2	5.5	35.8	▨	▨	▨	59.8
1987	18.9	▨	▨	▨	63.9	4.5	32.1	▨	▨	▨	13.9
1988	25.7	▨	▨	▨	116.5	36.9	34.9	▨	▨	▨	7.6
1989	28.3	▨	▨	▨	67.2	21.7	44.8	3.3	▨	▨	12.5
1990	57.0	7.0	▨	▨	54.0	4.0	58.0	▨	10.0	▨	9.0
1991	87.5	6.0	▨	▨	171.6	12.4	76.6	▨	9.0	▨	12.9
1992	106.0	4.0	▨	▨	28.0	8.0	56.0	▨	5.0	▨	9.0
1993	11.0	▨	▨	▨	29.0	3.0	72.0	▨	3.0	▨	14.0
1994	13.0	▨	▨	▨	37.0	4.0	83.0	▨	4.0	▨	17.0
1995	71.0	13.0	▨	▨	26.0	11.0	101.0	▨	3.0	▨	11.0
1996	11.7	▨	▨	▨	47.0	3.2	60.0	▨	3.6	▨	19.8
1997	7.7	▨	▨	▨	44.0	5.0	52.0	▨	3.9	▨	16.8
1998	10.0	▨	▨	▨	29.0	3.0	82.0	▨	5.0	▨	10.0
1999	5.0	▨	▨	▨	10.0	2.0	46.0	2.0	4.0	▨	4.0
2000	7.9	▨	▨	▨	26.6	2.2	74.1	1.7	4.8	▨	13.8
2001	7.3	▨	▨	▨	18.1	1.8	72.7	1.7	4.9	▨	6.6
2002	13.0	▨	▨	▨	33.0	2.6	68.2	2.4	5.4	▨	18.2
2003	17.5	▨	▨	▨	44.9	▨	80.8	▨	1.2	▨	7.4
2004	8.7	0.2	0.2	0.01	48.6	1.5	103.4	1.4	6.8	▨	14.9
2005	5.2	0.3	0.3	0.03	20.8	1.8	62.0	1.2	5.0	0.2	11.1
2006	4.1	0.2	0.2	0.02	19.4	1.3	56.9	1.0	3.7	0.2	12.5
2007	2.8	0.1	0.1	0.02	6.6	0.9	34.6	0.8	2.2	0.1	7.1
2008	3.2	0.1	0.1	0.01	5.1	0.8	37.9	0.9	2.5	0.1	7.5
2009	2.2	0.1	0.1	▨	1.4	0.4	32.1	0.8	2.0	0.1	4.6
2010	1.4	0.04	0.1	▨	0.9	0.4	24.0	0.5	1.3	0.01	3.1
2011	2.1	0.1	0.1	▨	1.2	0.6	37.2	1.0	2.0	0.02	4.2
2012	1.5	0.02	0.1	▨	0.7	0.4	26.3	0.8	1.6	0.03	2.6
2013	1.3	0.003	0.1	▨	0.9	0.4	24.3	1.3	1.4	0.003	3.3
2014	4.8	6.4	0.5	0.01	0.3	0.6	70.7	18.9	6.3	1.0	1.8
2015	9.6	4.8	0.7	0.0002	0.3	0.5	77.8	13.9	8.2	0.7	0.7
2016	39.7	9.2	1.7	0.05	0.5	0.5	147.2	22.0	13.0	1.1	1.6
2017	204.2	47.0	4.5	0.9	0.5	0.4	139.0	40.5	13.3	1.3	2.4

All units are in pounds.

▨ Indicates that VOC mass was not calculated because the VOC was not detected.

The Western Railroad Corridor Source Area comprises historical extraction wells EN-50, EN-107 and EN-107R plus current extraction well EN-114T.

TABLE E.2.2
VOC Mass Removed by Constituent in the Central RCSA (1980 through 2017)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Year	111-TCA	11-DCA	11-DCE	CEA	PCE	TCE	C12-DCE	VC	FR113	FR123a	Other	MeCl
1980	223771.8				48.4	1809.5						772.3
1981	51789.2				180.9	3282.4						23660.6
1982	23649.4				140.9	1951.9	439.7					4263.8
1983	8018.5				26.5	1705.2	226.2					990.0
1984	11562.9				34.1	1593.7	293.7					675.5
1985	25806.4				168.6	1259.6	679.7					2728.2
1986	16092.0				228.2	540.1	310.5					1813.9
1987	14131.0				200.0	476.1	297.3					1810.1
1988	19373.4				440.6	2574.3	587.8					3085.8
1989	4117.0				131.0	302.6	482.9					496.0
1990	4094.0	99.0			7.0	294.0	255.0					240.0
1991	4312.9	46.0	14.0		27.6	249.3	232.9					239.6
1992	3289.0	94.0			9.0	231.0	200.0				16.0	153.0
1993	4252.0	108.0			9.0	319.0	379.0				87.0	121.0
1994	2484.0	82.0			13.0	229.0	249.0				15.0	47.0
1995	1478.0	34.0				145.0	145.0				27.0	9.0
1996	2693.0	32.0				234.0	217.0					65.0
1997	1533.2	84.5				88.3	77.0				30.8	31.3
1998	2482.0	40.0				156.0	185.0					27.0
1999	1407.0	87.0	9.0	6.0	10.0	99.0	152.0	1.0	5.0		2.0	54.0
2000	1606.9	121.4	7.0		7.7	138.9	178.3	7.0			14.2	61.2
2001	3392.7	108.1			4.5	1045.4	280.7	2.7			23.7	50.6
2002	3793.5	149.2			2.4	734.5	158.8				16.5	32.3
2003	2040.5	42.2				146.1	264.7				8.2	
2004	1649.9	63.0	25.2	8.0	2.6	146.0	206.6	5.2	6.6		5.8	20.2
2005	1648.8	108.9	19.3	19.1	1.2	155.5	217.7	11.4	1.9	2.3	35.0	
2006	1595.7	138.2	26.8	28.0	8.3	132.8	258.5	15.9	23.7	4.8	55.6	
2007	893.5	189.9	13.3	33.5	0.6	54.8	180.9	7.3	5.4	2.0	28.6	
2008	571.4	156.1	10.0	33.1	0.2	26.3	108.3	5.9	3.3	1.8	24.2	
2009	836.1	204.7	17.9	49.0	0.2	23.8	104.2	7.2	0.8	1.7	42.1	
2010	775.8	225.0	15.0	57.5	0.1	16.9	125.2	8.1	0.6	1.3	37.8	
2011	685.0	250.6	14.4	70.5		24.8	150.7	6.9	0.2	0.9	24.1	
2012	1603.2	337.2	21.5	124.0		24.5	168.0	10.1	0.8	2.7	34.8	
2013	1029.3	289.9	15.2	60.1	0.1	13.3	123.1	5.8	2.0	0.2	21.9	
2014	1330.0	285.1	24.8	75.4	0.7	15.3	138.6	5.0	3.3	1.2	29.4	
2015	1183.5	375.9	11.6	91.8	1.2	11.4	81.4	5.0	2.2	1.0	11.1	
2016	556.7	212.3	7.8	43.1	0.01	1.1	16.2	1.6	0.8	0.4	3.9	
2017	341.5	189.5	3.3	73.3	0.2	0.7	15.3	1.9	0.9	0.6	7.0	

All units are in pounds.

▨ Indicates that VOC mass was not calculated because the VOC was not detected.

The Central Railroad Corridor Source Area comprises historical extraction wells EN-4, EN-7, EN-8, EN-9, EN-11, EN-25, EN-38, EN-39, EN-42, EN-43, EN-46, EN-47, EN-118, SUMP-2, EN-253, EN-428P and current extraction wells EN-253R and EN-428. Data from 1980 to 1982 includes 240,030 pounds of 111-TCA attributable to "Drums".

TABLE E.2.3
VOC Mass Removed by Constituent in the Eastern RCSA (1982 through 2017)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Year	111-TCA	11-DCA	11-DCE	CEA	PCE	TCE	C12-DCE	VC	FR113	FR123a	Other
1982	1546.8				5.8	20.3	54.9				8.2
1983	1066.8					16.8	86.6				7.5
1984	709.7					9.6	41.1				
1985	971.5					13.5	7.3				
1986	574.6					4.2	2.7				
1987	630.5					2.2	6.4				
1988	649.7					1.5	9.2				0.9
1989	215.0				17.7	14.0					
1990	78.0	1.0							7.0		
1991	173.5				3.8	0.4					
1992	309.0	4.0									4.0
1993	247.0										
1994	133.0	2.0									3.0
1995	271.0	4.0					4.0				1.0
1996	297.0										
1997	890.0	42.5				48.5	153.0		41.3		11.0
1998	1455.0					111.0	259.0		33.0		
1999	1406.0	65.0				184.0	331.0		82.0		
2000	527.4	25.2				65.9	114.9		34.3		
2001	235.5	35.9				102.2	165.3		49.6		16.9
2002	150.3	22.0	1.9			38.8	73.1		26.3		9.1
2003	241.2	40.1	2.9			225.5	230.3		3.7		
2004	457.7	23.0	3.9	0.1	0.1	78.2	62.1	0.1	9.8		0.6
2005	78.6	4.2	2.3	0.03	0.1	5.5	8.8	0.2	7.3	0.4	0.7
2006	817.3	25.9	9.6	0.1	0.3	89.8	123.0	2.7	25.8	3.2	7.5
2007	1628.3	27.6	12.9	0.2	0.5	163.7	221.2	10.8	38.8	4.4	8.6
2008	1362.8	30.0	19.3	1.7	0.3	115.8	173.6	12.2	35.5	1.7	6.0
2009	1845.3	31.6	27.7		0.1	156.8	199.3	15.7	39.3	0.7	1.0
2010	1457.9	25.5	18.8			121.2	182.2	12.1	27.6	2.4	2.2
2011	1063.6	19.4	14.9			88.2	140.1	7.9	21.2	1.8	1.5
2012	1321.5	21.0	12.1	0.3		106.2	174.3	12.4	22.0	1.8	1.0
2013	1793.1	39.7	18.7	0.9		140.0	204.9	14.4	25.8	3.1	3.5
2014	1175.1	22.1	18.6			102.3	141.8	8.4	20.7	2.7	1.6
2015	1454.6	41.1	14.7	3.8		100.5	182.1	11.6	20.2	2.6	1.2
2016	1131.1	103.1	23.9	34.2		97.9	192.5	21.9	14.9	1.2	2.7
2017	1035.3	132.6	15.8	97.1		63.1	197.9	31.7	13.1	1.2	0.9

All units are in pounds.

▨ Indicates that VOC mass was not calculated because the VOC was not detected.

The Eastern Railroad Corridor Source Area comprises historical extraction wells EN-119 and EN-219 plus current extraction well EN-219R.

TABLE E.2.4

VOC Mass Removed by Constituent in the North St. Area (2001 through 2017)

OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

Year	111-TCA	11-DCA	11-DCE	CEA	PCE	TCE	C12-DCE	VC	FR113	FR123a	Other	MeCl
2001	2.9	0.1			1.0	0.3	0.4		3.8		0.1	
2002	7.4	0.3	0.1		1.3	1.8	0.2		2.0		0.1	0.1
2003	15.5	0.5	0.5		1.3	0.9	1.3		2.6		0.0	
2004	46.5	5.3	3.7	0.01	3.9	25.5	22.3	0.5	3.0		0.5	4.2
2005	39.7	6.7	4.2	0.03	4.5	45.8	42.0	0.4	4.1	0.2	12.3	
2006	10.3	6.9	1.9		2.8	39.4	28.1	0.1	2.5	0.2	0.8	
2007	3.3	2.6	0.8		1.4	21.1	12.5	0.1	0.6	0.1	0.3	
2008	1.2	1.5	0.5	0.0005	1.8	15.4	7.9	0.01	1.3	0.1	0.2	
2009	1.2	1.8	0.7		2.4	16.9	8.4	0.01	3.2	0.1	0.1	
2010	1.0	1.5	0.5		1.9	16.9	5.9	0.01	2.1	0.1	0.2	
2011	1.8	6.2	2.3	0.01	24.2	19.7	6.6	0.0002	1.5	0.1	0.5	
2012	2.1	6.7	21.1	0.1	133.1	17.9	8.5		1.8	0.1	1.3	
2013	1.7	3.9	4.3	0.02	13.3	14.9	4.3		1.4	0.1	0.6	
2014	2.0	2.3	2.1	0.02	4.4	9.1	3.9		2.2	0.1	0.2	
2015	5.5	5.1	1.3	0.01	1.0	9.2	9.0		1.9	0.1	0.1	
2016	4.5	6.5	3.8	0.02	12.8	7.8	7.6		0.6	0.1	0.1	
2017	7.7	9.3	1.3		2.1	10.4	9.3	0.009	2.3	0.1	0.1	

All units are in pounds.

▨ Indicates that VOC mass was not calculated because the VOC was not detected.

The North St. Area comprises historical extraction well EN-284TD plus current extraction wells EN-276, EN-276R, and EN-284P.

VOC mass removed by EN-284P and EN-284TD includes only the estimated portion attributable to flux crossing North St. and not the portion attributable to plume reduction south of North St.

TABLE E.3
Groundwater Pumping Volumes (1980 through 2017)
OU#1 and OU#2 FFS Report
Former IBM Endicott Site, Endicott, NY

		Operable Unit #1													**Operable Unit #2**				**EN-284TD/EN-284P Flux Control Calculation** (Apportionment from Annual Report Tables)			
	Area:	West	West	West	Central	Central	Central	Central	Central	Central	East	East	East		North St	North St	North St					
Year	**No. of Months**	**EN-107**	**EN-107R**	**EN-114T**	**EN-025**	**EN-038**	**EN-118**	**EN-253**	**EN-253R**	**EN-428/ EN-428P**	**EN-119**	**EN-219**	**EN-219R**	**OU#1 Volume Pumped**	**EN-276**	**EN-276R**	**EN-284P (flux control)**	**OU#2 Volume Pumped**	**EN-284TD (total flow)**	**EN-284P (total flow)**	**Estimated Plume Reduction**	**% to Plume Reduction**
1980	12				824,040	89,880								**913,920**				**0**				
1981	12	1,284,510			2,063,630	1,553,957								**4,902,097**				**0**				
1982	13	1,011,580			1,813,360	1,348,520								**4,173,460**				**0**				
1983	10	267,000			795,000	754,000								**1,816,000**				**0**				
1984	11	483,840			1,451,520	1,451,520								**3,386,880**				**0**				
1985	13	568,800			1,706,400	1,706,400								**3,981,600**				**0**				
1986	13	570,240			1,710,720	1,710,720								**3,991,680**				**0**				
1987	12	525,600			1,576,800	1,576,800								**3,679,200**				**0**				
1988	12	527,040			1,581,120	1,581,120								**3,689,280**				**0**				
1989	12	791,000			1,157,000	664,000	326,000							**2,938,000**				**0**				
1990	11	1,014,000			804,000	1,093,000	334,000				581,000			**3,826,000**				**0**				
1991	12	1,087,000			236,000	1,495,000	419,000				*500,000*			**3,737,000**				**0**				
1992	12	689,000			450,000	1,300,000	453,000				1,139,000			**4,031,000**				**0**				
1993	12	798,000			1,118,000	1,382,000	396,000				1,042,000			**4,736,000**				**0**				
1994	12	1,296,000			1,150,000	570,000	503,000				583,000			**4,102,000**				**0**				
1995	12	1,321,000			981,000	152,000	69,000				987,000			**3,510,000**				**0**				
1996	12	601,000			680,000	1,276,000	704,000				2,062,000			**5,323,000**				**0**				
1997	12	889,000			105,000	749,000	369,000				511,000	5,572,000		**8,195,000**				**0**				
1998	12	1,573,000			287,000	569,000	461,000					7,951,000		**10,841,000**				**0**				
1999	12	916,000			175,000	351,000	942,000					9,313,000		**11,697,000**				**0**				
2000	12	1,701,000			203,000	365,000	1,292,000	33,000				9,575,000		**13,169,000**				**0**				
2001	12	1,504,000			61,000	250,000	994,000	1,646,000				7,789,000		**12,244,000**	1,014,000			**1,014,000**				
2002	12	2,910,000			245,000	293,000	1,034,000	1,660,000				3,762,000		**9,904,000**	2,475,000			**2,475,000**				
2003	12	2,795,230			338,917	297,723	1,802,580	1,464,802				8,020,514		**14,719,766**	1,464,771			**1,464,771**				
2004	12	2,665,884			127,204	117,093	932,812	2,433,050		779,231		6,291,096		**13,346,370**	3,012,125		3,798,062	**6,810,187**	11,398,062		-7,600,000	67%
2005	12	1,957,783						2,249,243		1,131,145		2,321,421		**7,659,591**	3,844,355		7,675,569	**11,519,924**	15,275,569		-7,600,000	50%
2006	12	1,849,628						2,151,852		1,590,867		906,018	7,139,557	**13,637,923**	3,871,470		8,094,308	**11,965,779**	12,294,308		-4,200,000	34%
2007	12	1,061,004						1,195,696		626,057			12,202,032	**15,084,789**	1,420,753		5,673,583	**7,094,335**		7,573,583	-1,900,000	25%
2008	12	1,134,669						814,555		224,965			10,907,509	**13,081,698**	1,884,866		5,733,590	**7,618,456**		7,633,590	-1,900,000	25%
2009	12	205,735	795,925					943,127		243,284			12,524,382	**14,712,452**	2,285,992		5,694,594	**7,980,586**		10,294,594	-4,600,000	45%
2010	12		760,808					993,390		407,802			10,927,327	**13,089,327**	2,351,748		5,658,995	**8,010,743**		19,558,995	-13,900,000	71%
2011	12		1,276,897					1,222,092		651,444			10,147,763	**13,298,196**	1,301,002	1,870,659	5,708,514	**8,880,175**		31,008,514	-25,300,000	82%
2012	12		1,062,330					1,195,803		1,001,412			11,405,386	**14,664,931**	886,291	1,605,308	5,711,170	**8,202,769**		30,911,170	-25,200,000	82%
2013	12		864,674					1,077,231		844,875			13,800,836	**16,587,616**	1,863,160	452,885	5,796,130	**8,112,175**		32,496,130	-26,700,000	82%
2014	12		806,056	10,854,990				1,155,605		795,674			11,733,441	**25,345,766**	2,696,373		5,679,910	**8,376,283**		39,879,910	-34,200,000	86%
2015	12		890,136	9,582,049				429,676	453,835	866,722			12,297,736	**24,520,154**	3,055,090		5,744,750	**8,799,840**		45,744,750	-40,000,000	87%
2016	12		666,287	18,196,904					268,517	745,073			11,115,841	**30,992,622**	752,296	968,894	6,592,619	**8,313,809**		36,492,619	-29,900,000	82%
2017	12		586,529	28,782,797					110,633	459,836			12,401,976	**42,341,771**	2,096,867	2,347,915	6,030,542	**10,475,324**		44,830,542	-38,800,000	87%

Total Volume from OU#1 (gallons): 401,870,000

Total Volume from OU#2 (gallons): 127,114,000

All units are in gallons.

Flows in italics are estimated.

Total Volume Pumped from OU#1 and OU#2 (gallons): 528,984,000

▨ Indicates that flow was not measured because the extraction well was inactive.

APPENDIX F

Cost Estimates for Remedial Alternatives

Table F.1 - Cost Estimate for Alternative #1: No Further Action with Site Management

FFS Report for OUs #1 and #2

Former IBM Endicott Site, Endicott, New York

	Item Description	**Quantity**	**Unit Cost**	**Unit**	**Extension**
CAPITAL COSTS					
	Site Management Plan	1	$75,000	LS	$75,000
	Total Capital Costs				**$75,000**
O&M COSTS					
	SSD Systems Operations and Maintenance	1	$30,000	LS	$30,000
	Total O&M Costs				**$30,000**
ANNUAL MONITORING COSTS					
	Groundwater Sampling	1	$50,000	annual	$50,000
	Subtotal Monitoring Costs				$50,000
	Contingency (15% monitoring)				$7,500
	Total Monitoring Costs				**$57,500**
PRESENT WORTH OF COSTS					
	Total Capital Costs				**$75,000**
	Annual O&M Costs (30 year duration)				**$580,892**
	Annual Monitoring Costs (30 year duration)				**$1,113,376**
	TOTAL PRESENT WORTH				**$1,769,268**

Table F.2 - Cost Estimate for Alternative #2: Enhanced Groundwater Extraction
FFS Report for OUs #1 and #2
Former IBM Endicott Site, Endicott, New York

	Item Description	Quantity	Unit Cost	Unit	Extension
CAPITAL COSTS					
	Site Management Plan	1	$75,000	LS	$75,000
	Additional Sub-Slab Vapor System	1	$100,000	LS	$100,000
	Replacement Conveyance Piping	1	$200,000	LS	$200,000
	Replacement Wells	3	$50,000	LS	$150,000
	Controls Upgrades	1	$18,000	LS	$18,000
	Total Capital Costs				**$543,000**
O&M COSTS					
	Operations Management	1	$50,000	LS	$50,000
	Utilities	1	$3,000	LS	$3,000
	GTF SPDES Sampling & Support	1	$15,000	LS	$15,000
	Treatment Chemical Procurement	1	$50,000	LS	$50,000
	Chemical Handling	1	$10,000	LS	$10,000
	Waste Handling	1	$5,000	LS	$5,000
	Equipment Replacement/Inventory	1	$1,000	LS	$1,000
	Building and Grounds Maintenance	1	$5,000	LS	$5,000
	O&M Documentation Maintenance	1	$1,000	LS	$1,000
	Control & Monitoring System Support	1	$5,000	LS	5,000
	Compliance Consulting	1	$25,000	LS	$25,000
	Dig-Safe Interaction w/ Utilities and Village of Endicott	1	$1,000	LS	$1,000
	Systems Inspections/Monitoring	1	$15,000	LS	$15,000
	Instrument Maint/Cal	1	$5,000	LS	$5,000
	Carbon Changeout Labor	1	$10,000	LS	$10,000
	Carbon Change-out	1	$20,000	LS	$20,000
	Bldg Repairs	1	$10,000	LS	$10,000
	GTF Systems Operations	1	$30,000	LS	$30,000
	Off-Hour Emergency Response	1	$2,000	LS	$2,000
	Chemical Feed Systems	1	$5,000	LS	$5,000
	Extraction Well Maint	1	$75,000	LS	$75,000
	B046S Transfer Station Operations	1	$5,000	LS	$5,000
	Clark Solids Handling	1	$15,000	LS	$15,000
	SSD Systems Operations and Maintenance	1	$30,000	LS	$30,000
	Total O&M Costs				**$393,000**
ANNUAL MONITORING COSTS					
	Groundwater Sampling	1	$50,000	annual	$50,000
	Subtotal Monitoring Costs				$50,000
	Contingency (15% monitoring)				$7,500
	Total Monitoring Costs				**$57,500**
PRESENT WORTH OF COSTS					
	Total Capital Costs				**$543,000**
	Annual O&M Costs (30 year duration)				**$7,609,682**
	Annual Monitoring Costs (30 year duration)				**$1,113,376**
	TOTAL PRESENT WORTH				**$9,266,058**

Table F.3 - Cost Estimate for Alternative #3: Enhanced Biodegradation
FFS Report for OUs #1 and #2
Former IBM Endicott Site, Endicott, New York

	Item Description	Quantity	Unit Cost	Unit	Extension
CAPITAL COSTS					
	Enhanced Groundwater Extraction				
	Site Management Plan	1	$75,000	LS	$75,000
	Additional Sub-Slab Vapor System	1	$100,000	LS	$100,000
	Replacement Conveyance Piping	1	$200,000	LS	$200,000
	Replacement Wells	3	$50,000	LS	$150,000
	Controls Upgrades	1	$18,000	LS	$18,000
	Subtotal Capital Costs				**$543,000**
	Biodegradation				
	Design, Work Plan, Performance Reports	1	$85,000	LS	$85,000
	Management	1	$60,000	LS	$60,000
	Mix Pad ands Injection Equipment Fabrication	1	$70,000	LS	$70,000
	Well Location Characterization (DPT)	1	$25,000	LS	$25,000
	Injection and Monitoring Point Well Installation	1	$30,000	LS	$30,000
	Amendment and Culture Injection	1	$235,000	LS	$235,000
	Performance Monitoring and Reporting (year 1)	1	$25,000	LS	$25,000
	Project Labor/travel/per diem/expenses	1	$250,000	LS	$250,000
	Rental Equipment/Ancillary Materials/Consumables	1	$40,000	LS	$40,000
	Bio-culture/potable water/Vegetable Oil	1	$50,000	LS	$50,000
	Drilling/Surveying	1	$250,000	LS	$250,000
	Analytical	1	$25,000	LS	$25,000
	Subtotal Capital Costs				**$1,145,000**
	Total Capital Costs				**$1,688,000**
O&M Costs					
	Operations Management	1	$50,000	LS	$50,000
	Utilities	1	$3,000	LS	$3,000
	GTF SPDES Sampling & Support	1	$15,000	LS	$15,000
	Treatment Chemical Procurement	1	$50,000	LS	$50,000
	Chemical Handling	1	$10,000	LS	$10,000
	Waste Handling	1	$5,000	LS	$5,000
	Increase chem costs due to bio fouling	1	$20,000	LS	$20,000
	Increase O&M due to fouling	1	$150,000	LS	$150,000
	Increase Solids Handling and Disposal Bio Fouling	1	$20,000	LS	$20,000
	Equipment Replacement/Inventory	1	$1,000	LS	$1,000
	Building and Grounds Maintenance	1	$5,000	LS	$5,000
	O&M Documentation Maintenance	1	$1,000	LS	$1,000
	Control & Monitoring System Support	1	$5,000	LS	5,000
	Compliance Consulting	1	$25,000	LS	$25,000
	Dig-Safe Interaction w/ Utilities and Village of Endicott	1	$1,000	LS	$1,000
	Systems Inspections/Monitoring	1	$15,000	LS	$15,000
	Instrument Maint/Cal	1	$5,000	LS	$5,000
	Carbon Change-out Labor	1	$10,000	LS	$10,000
	Carbon Change-out	1	$20,000	LS	$20,000
	Bldg Repairs	1	$10,000	LS	$10,000
	GTF Systems Operations	1	$30,000	LS	$30,000
	Off-Hour Emergency Response	1	$2,000	LS	$2,000
	Chemical Feed Systems	1	$5,000	LS	$5,000
	Extraction Well Maint.	1	$75,000	LS	$75,000
	B046S Transfer Station Operations	1	$5,000	LS	$5,000

Table F.3 - Cost Estimate for Alternative #3: Enhanced Biodegradation

FFS Report for OUs #1 and #2
Former IBM Endicott Site, Endicott, New York

	Item Description	Quantity	Unit Cost	Unit	Extension
O&M Costs (Continued)					
	Clark Solids Handling	1	$15,000	LS	$15,000
	SSD Systems Operations and Maintenance	1	$30,000	LS	$30,000
	Injection of Amendments for Enhanced Bio	1	$25,000	LS	$25,000
	Repairs/Maint./Replacement of Injection Points	1	$38,000	LS	$38,000
	Total O&M Costs				**$646,000**
ANNUAL MONITORING COSTS					
	Groundwater Sampling	1	$50,000	annual	$50,000
	biodegradation monitoring	1	$15,000	annual	$15,000
	Subtotal Monitoring Costs				$65,000
	Contingency (15% monitoring)				$9,750
	Total Monitoring Costs				**$74,750**
PRESENT WORTH OF COSTS					
	Total Capital Costs				$1,688,000
	Annual O&M Costs (30 year duration)				$12,508,536
	Annual Monitoring Costs (30 year duration)				$1,447,389
	TOTAL PRESENT WORTH				**$15,643,925**