



SDMS DocID

457977

**THIRD FIVE-YEAR REVIEW REPORT** Superfund Records Center  
**FOR** SITE: NORWOOD PCBs  
**NORWOOD PCBs SUPERFUND SITE** AREA: 8.3  
Norwood, Massachusetts OTHER: 457977

December 2009

*Prepared by:*

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*fa*  
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Date: 12-28-09

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## ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
AWQC	Ambient Water Quality Criteria
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOT	Department of Transportation
FS	Feasibility Study
GSA	General Services Administration
GZA	GZA Geo Environmental, Inc.
IRM	Interim Remedial Measure
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
NCP	National Contingency Plan
NPL	National Priorities List
NRWQC	National Recommended Water Quality Criteria
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PPA	Prospective Purchaser Agreement
ppm	part per million
PRP	Potentially Responsible Party
RA	Remedial Action
RBAL	Risk Based Action Level
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SVOC	Semi-Volatile Organic Compound
TAT	Technical assistance team
TBC	To Be Considered
TCB	Trichlorobenzene
TCE	Trichloroethylene
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
yd <sup>3</sup>	cubic yards

## EXECUTIVE SUMMARY

The United States Environmental Protection Agency, Region 1 (USEPA) has conducted a Five-Year Review of the Remedial Actions implemented at the Norwood PCBs Superfund Site (Site) in Norwood, Massachusetts, in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601 *et seq.* USEPA conducted this review between May 2009 and December 2009. This is the third Five-Year Review for the Site. The triggering action for the first Five-Year Review was the start of remedial construction in 1994. Subsequent reviews have been conducted every five years. The purpose of the Five-Year Review is to evaluate whether response actions and original performance standards remain protective of human health and the environment.

Remedial activities at the Site were implemented in three phases, with the third phase (Phase 3) consisting of an "A" and "B": Phase 1 – groundwater treatment; Phase 2 – building demolition; Phase 3A – cap and cover; and Phase 3B – Meadow Brook restoration. On January 11, 1996, construction of the groundwater treatment facility (Phase 1) was completed. On February 6, 1997, the building demolition (Phase 2) was completed. On August 11, 1998, the Cap and Cover (Phase 3A) was completed. On August 11, 1999, Meadow Brook restoration (Phase 3B) was completed. The groundwater treatment facility operated from January 1996 until June 2000 at which time it was shut down; quarterly groundwater monitoring continued until October 2002. At this time, the clean-up goals published in the 1989 Record of Decision (ROD) and the 1996 Amended ROD had not been met; however, new clean-up goals based on a reclassification of the groundwater by the Commonwealth of Massachusetts (the Commonwealth) were established in a 2005 Explanation of Significant Differences (ESD). These have been met and routine monitoring has been [and will continue to be] performed to confirm they continue to be met. In March 2008, institutional controls (ICs) in the form of a Grant of Environmental Restriction and Easement (Grant) were recorded for the Laham (*i.e.*, the former Reardon) property, the area of the Site encompassing former industrial operations. Subsequent to their recording, EPA and MassDEP approved a Redevelopment Work Plan (RWP) thus allowing a commercial retail redeveloper to complete their construction of 56,000-square feet of commercial/retail space on the property. In the adjacent, Town of Norwood-owned Meadow Brook parcel within the Site, land use restrictions required under a Consent Decree with the Town (Book No. 25628, Page No. 534) have been recorded at the Norfolk County Registry of Deeds. Moreover, copies of Town Master Plans (sewer and water) have been annotated to alert any future public works project of the existence of property use restrictions within the Meadow Brook parcel due to Site contamination.

The remedy at Norwood PCBs Superfund Site protects human health and the environment through meeting groundwater clean-up goals, the establishment of institutional controls, and the maintenance of remedy infrastructure concurrently and during redevelopment of the Site. In order for the remedy to remain protective, the Operation & Maintenance (O&M) Plan and Environmental Monitoring Plan (EMP) must be updated to reflect changes in site conditions as a result of the redevelopment. Periodic inspection of the Site and abutting Meadow Brook will be conducted to insure compliance with the recently recorded ICs.

## Five-Year Review Summary Form

SITE IDENTIFICATION		
<b>Site name (from WasteLAN):</b> Norwood PCBs		
<b>USEPA ID (from WasteLAN):</b> MAD980670566		
<b>Region:</b> 1	<b>State:</b> MA	<b>City/County:</b> Norwood/Norfolk County
SITE STATUS		
<b>NPL status:</b> Final		
<b>Remediation status</b> (choose all that apply): Operating		
<b>Multiple OUs?*</b> No	<b>Construction completion date:</b> September 1999	
<b>Has site been put into reuse?</b> Yes		
REVIEW STATUS		
<b>Lead agency:</b> USEPA		
<b>Author name:</b> Dan Keefe and Shamus Keohane		
<b>Author title:</b> Remedial Project Manager	<b>Author affiliation:</b> USEPA	
<b>Review period:</b> 05/09 to 12/09		
<b>Date(s) of site inspection:</b> 7/8/09		
<b>Type of review:</b> <div style="text-align: center; margin-top: 5px;"> <input checked="" type="checkbox"/> <u>Post-SARA</u>     , <input type="checkbox"/> Pre-SARA     , <input type="checkbox"/> NPL-Removal only         </div>		
<b>Review number:</b> 3		
<b>Triggering action:</b> Completion of second Five Year Review		
<b>Triggering action date (from WasteLAN):</b> 2004		
<b>Due date (five years after triggering action date):</b> 12/30/09		

## Five-Year Review Summary Form (cont)

### Issues:

- 1) The existing O&M and EMP are out-of-date as a result of redevelopment.
- 2) Punch list items associated with redevelopment need to be completed.

### Recommendations and Follow-up Actions:

- 1) Complete revisions to the O&M and EMP that accurately reflects the post-redevelopment changes.
- 2) Completed all punch list items associated with the redevelopment within the 2 years period that was contemplated in the approved Redevelopment Work Plan (i.e., by March 2010).

### Protectiveness Statement:

The remedy at Norwood PCBs Superfund Site remains protective of human health and the environment because 2005 revised groundwater clean-up goals continue to be met, remedial infrastructure is being maintained, the Redevelopment Work Plan has been successfully completed (pending completion of punch list items), and institutional controls are in place.

### Other comments:

The existing Prospective Purchaser Agreement with the Landowner needs to be amended to reflect revised institutional control obligations under the Grant to the Commonwealth.

## 1.0 INTRODUCTION

### 1.1 PURPOSE

The purpose of this Five-Year Review is to determine whether the remedy at the Norwood PCBs Superfund Site (Site) is protective of human health and the environment. In addition, this report identifies issues found during the review and recommendations to address them. The U.S. Environmental Protection Agency, Region 1 (USEPA) prepared this Five-Year Review pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9631 and the National Contingency Plan (NCP), 40 C.F.R. Part 300. CERCLA Section 121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The USEPA interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead Agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

### 1.2 AUTHORITY FOR CONDUCTING THE FIVE-YEAR REVIEW

Pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9631(c), and 40 C.F.R. §300.430(f)(4)(ii) of the NCP, Five-Year Reviews are required at sites for which, upon attainment of the Record of Decision (ROD) clean-up levels, there are remaining hazardous substances, pollutants, or contaminants remaining on the site that will not allow for unlimited use and unrestricted exposure. Since the ROD for this Site was signed in 1989, and because wastes remaining in the capped on-site landfill and within the adjacent Meadowbrook Parcel will not allow for unlimited use, future Five-Year Reviews for this Site will continue to be required.

This review reassesses Applicable or Relevant and Appropriate Requirements (ARARs) for substances identified as contaminants of concern, and considers whether ARARs have been changed such that the remedy is no longer protective. The review also considers pending or actual changes in zoning or land uses that could undermine the remedy and the need for institutional controls at and near the Site. This review has been performed in accordance with USEPA's June 2001 Comprehensive Five-Year Review Guidance.

## 2.0 SITE CHRONOLOGY

Major site activities are summarized in **Table 2-1**

**Table 2-1**  
**Site Chronology**

06/83	Initial discovery of contamination on the property
06/83	Initial Removal Actions begin
08/83	Removal Actions complete
06/86	Site listed on National Priorities List (NPL)
05/87	Remedial Investigation/Feasibility Study (RI/FS) complete
09/89	Record of Decision (ROD) signed
04/94	Remedial Design complete
11/94	On-site construction begins for first phase, groundwater treatment plant
01/96	Groundwater treatment plant construction complete (Phase 1)
03/96	Operation and Maintenance of treatment system begins
05/96	ROD Amendment Signed
02/97	USEPA and MADEP performed final inspection of building demolition (Phase 2)
04/97	PRP initiated Cap/Cover activities
10/97	Meadow Brook Restoration begins
08/98	USEPA and MassDEP performed a final inspection of Cap/Cover (Phase 3A)
08/99	USEPA and MassDEP performed a final inspection of Meadow Brook Restoration – Phase 3B
09/99	Construction Completion designation achieved
12/99	First 5-Year Review complete
04/00	Final Supplemental Risk Assessment submitted
06/00	Groundwater treatment system temporarily shut down
05/01	Groundwater Use and Value determination prepared by MassDEP
05/02	Final Amendment to the Risk Assessment submitted
12/04	Final Cap & Cover Operation and Maintenance Plan approved
12/04	Second Five-Year Review complete
02/05	ESD signed memorializing new Groundwater Clean-Up Levels
07/05	28 <sup>th</sup> Comprehensive Groundwater Monitoring Report
10/06	Redevelopment Work Plan Submitted
05/07	Wastewater Treatment Plant Decommissioned
03/08	ICs(Grant) recorded for the Laham property
03/08	Redevelopment Work Plan Approved
05/08	Redevelopment Begins
11/08	Redevelopment substantially completed
03/09	ICs (Notice) recorded for Town-owned Meadow Brook parcel
09/09	Final Close-out Report complete
12/09	Third Five-Year Review complete

## 3.0 BACKGROUND

### 3.1 SITE DESCRIPTION

The Norwood PCBs Superfund Site (referred to as the "Site") is located in Norwood, Massachusetts approximately 14 miles southwest of the City of Boston. See Figure 1 for a Site Locus Plan and Figure 2 for a Site Plan. Historically, the site encompassed approximately 20 acres consisting of several parcels of land, including industrial/commercial properties and associated parking areas in an industrial/commercial area adjacent to a residential area. To the north, the Site is bordered by residential properties on Audubon Road; to the east by the heavily commercial U.S. Route 1 and the Dean Street access road; to the south by Dean Street; and to the west by residential properties on Pellana Road. Properties along U.S. Route 1 in the vicinity of the Site are primarily commercial, and include automobile dealerships, an equipment rental business, a pet shop, restaurants, and gasoline stations. A pharmacy, an auto parts store, a Direct Tire dealership, and a Mobil gasoline station are located to the southeast of the Site, near the Dean Street access road and Route 1. A shopping plaza, a car wash, and two restaurants are located across Dean Street to the south of the Site. The northern portion of the Site consists of a portion of Meadow Brook surrounded by a small wooded area. Meadow Brook is a shallow stream approximately 6 to 8 feet wide and 6 to 12 inches deep. The Brook serves as a drainage way for over 900 acres of densely developed land and discharges eastward into the Neponset River approximately 1,600 feet downstream of the Site.

### 3.2 SITE HISTORY

Contamination at the Site originated from disposal practices of the parties who owned the property or operated businesses on the Site. The former on-site building was constructed in 1942 by Bendix Aviation Corporation, which produced navigational control systems and conducted other electronic research for the U.S. Navy. In October 1947, the land was purchased by Tobe Deutschman Corporation, which manufactured electrical equipment at the Site, including capacitors and transformers. The property was purchased in October 1956 by Cornell-Dubilier Electronics, Inc., which also manufactured electrical equipment at the facility. In January 1960, the property was briefly owned by Maryvale Corporation, and was then purchased by the Friedland brothers. The Friedland brothers leased the property to Federal Pacific Electric Company, which held the lease on the property until October 1979. During the period from 1960 to 1979, Federal Pacific Electric Company operated a business at the Site, and sublet portions of the facility to Cornell-Dubilier Electronics, Inc. and to Arrow Hart Corporation, which also manufactured electrical equipment at the facility. In 1979, the Site was subdivided. The northeastern portion of the Site, approximately 9 acres, was purchased by Grant Gear Realty Trust, which leased the facility to Grant Gear Works, Inc., to produce gears for industry. The southern and western portions of the Site, approximately 16 acres, were purchased by Paul Birmingham, Paul Reardon, and Jack Reardon who further subdivided the property into seven lots and added a new private way, Kerry Place.

On April 1, 1983, the MassDEP, then known as the Massachusetts Department of Environmental Quality Engineering, received a telephone call from a citizen living on Pellana Road reporting past industrial waste dumping and contamination in the then vacant field of Kerry Place between Pellana Road and the Grant Gear property. As a result of this call, an initial field investigation by MassDEP was conducted. On April 6, 1983, MassDEP collected soil and sediment samples. The initial MassDEP investigations confirmed the presence of PCBs. The MassDEP immediately moved to restrict public access to the field area and marked areas within the Grant Gear fence to alert workers of the possible danger. Because of limited state funds, the MassDEP requested USEPA involvement. Subsequently, USEPA contractors assisted MassDEP with the collection of confirmatory samples of the oil-stained areas along the western fence line and in other areas on both the Grant Gear and Reardon properties. Based on these findings, it

was determined that an emergency removal action was warranted to address soils outside the Grant Gear Property with PCB concentrations greater than 50 parts per million (ppm).

Beginning June 23, 1983, the USEPA began removal of contaminated soils on the Site. A total of 518 tons of contaminated soil were removed and disposed of off-site. The soils were removed from locations within Kerry Place and Grant Gear properties. Reported excavation depths were up to 30 inches. During the removal action, water samples taken from the storm drain system behind the Grant Gear Building indicated low levels of PCBs. The removal action was completed on August 5, 1983. In December 1983, the Site was further evaluated by USEPA and subsequently proposed for inclusion on the National Priorities List (NPL) on October 15, 1984. On June 10, 1986, the site was formally added to the NPL.

Based on the preliminary findings, MassDEP implemented an Interim Remedial Measure (IRM) at the Site in January 1986. The IRM was considered necessary to limit access to areas of highest surface soil contamination within the fenced area of the Grant Gear Property. Specifically, a MassDEP contractor installed a cap over a 1.5-acre portion of the northwest and southwest corners of the Grant Gear Property. The contaminated surface soils were covered with a filter fabric liner and 6 inches of crushed stone. The capped areas were enclosed with a 4-foot high wire mesh fence and the areas were delineated with yellow hazard tape.

### **3.3 INITIAL RESPONSE - PRE-ROD CLEAN UP ACTIVITIES / REMOVAL ACTIONS**

The following Pre-ROD Removal Actions were performed at the Site

1. Removal Action completed in the summer of 1983 by USEPA - 518 tons of contaminated soil were removed from locations within the Kerry Place and Grant Gear properties.
2. Removal Action completed January 1986 by MassDEP - an IRM was implemented to limit access to areas of highest surface soil contamination by installing a cap over a 1.5-acre portion of the Grant Gear Property and fencing the capped areas.

### **3.4 BASIS FOR TAKING ACTION**

The groundwater, soil, sediment, and surface water on and adjacent to the Site were found to be contaminated with volatile organic compounds (VOCs), polyaromatic hydrocarbons (PAHs), and PCBs. Health threats include direct contact with or accidental ingestion of contaminated groundwater or soil, as well as inhalation of airborne contaminants volatilized from groundwater. Remedial actions were also necessary to prevent future migration of contaminants in groundwater.

#### **3.4.1 Summary of Remedial Investigations Results**

Remedial investigations at the Site revealed that contamination was present in sediment, soil, groundwater, surface water, and sludges. **Table 1** presents the contaminants found on the Site, the media in which they were found, and the group to which the contaminant belongs.

**Table 3-1  
 Norwood PCBs Superfund Site  
 List of Contaminants**

<b>Contaminant</b>	<b>Media</b>	<b>Contaminant Group</b>
1,1,1-Trichloroethane	Groundwater, Sediment, Soil	VOC
1,2,4-Trichlorobenzene	Groundwater, Sediment, Soil	SVOC
1,2-Dichlorobenzene	Groundwater, Sediment, Soil	VOC
1,2-Dichloroethane	Groundwater, Sediment, Soil	VOC
1,2-Trans-dichloroethylene	Groundwater, Sediment, Soil	VOC
1,3-Dichlorobenzene	Groundwater, Sediment, Soil	VOC
1,4-Dichlorobenzene	Groundwater, Sediment, Soil	Base Neutral Acids
Aroclor 1016	Groundwater, Sediment, Soil	PCBs
Aroclor 1254	Groundwater, Sediment, Soil	PCBs
Aroclor 1260	Groundwater, Sediment, Soil	PCBs
Base neutral acids	Groundwater, Sediment, Soil	Base Neutral Acids
Benzoic acid	Groundwater, Sediment, Soil	Base Neutral Acids
Chlorobenzene	Groundwater, Sediment, Soil	VOC
Chloroform	Groundwater, Sediment, Soil	VOC
PAH	Groundwater, Sediment, Soil	PAH
PCBs	Groundwater, Sediment, Soil	PCBs
Pentachloroethane	Groundwater, Sediment, Soil	VOC
Phenol	Groundwater, Sediment, Soil	Base Neutral Acids
Silver	Groundwater, Sediment, Soil	Metals
Vinyl chloride	Groundwater, Sediment, Soil	VOC
Zinc	Groundwater, Sediment, Soil	Metals

## 4.0 REMEDIAL ACTIONS

### 4.1 REMEDY SELECTION

Under its legal authorities, the USEPA's primary responsibility at Superfund sites is to undertake Remedial Actions (RAs) that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including:

- RAs, when complete, must comply with all Federal environmental and more stringent State environmental or facility siting standards, requirements, criteria, or limitations, unless a waiver is invoked.
- Select RAs shall be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a preference for remedies wherein treatment permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances.

The ROD for the Norwood PCBs site was signed in September 1989. The 1989 ROD included pumping and treating contaminated groundwater, excavating and treating soils and sediments by solvent extraction, and decontaminating the Grant Gear building. Due to higher than anticipated costs for solvent extraction, an amendment to the ROD was published and signed in May 1996. The amended ROD included demolition of the Grant Gear building, excavation and consolidation of contaminated soils and sediments under an asphalt cap and cover areas, and restoration of Meadow Brook in conjunction with the Town of Norwood's flood control project within the area of the Site. Remedial alternatives at the Site were developed to be consistent with the NCP, 40 C.F.R. § 300.68(j), which states that the selected alternative shall be cost effective; technologically feasible and reliable; and effectively mitigate and minimize damages to, and provide adequate protection of, public health, welfare, and the environment.

#### 4.1.1 Remedial Action (RA) Objectives: Soil and Sediment

The RA objectives selected in the 1989 ROD to address contaminated soils and sediments at the Site are as follows:

- Reduce risks posed by direct contact with soil contaminated with PCBs and PAHs.
- Reduce risks posed by incidental ingestion of soils contaminated with PCBs and PAHs.
- Minimize migration of VOCs to groundwater.

The remedy selected in the 1989 ROD included soil and sediment excavation, treatment using solvent extraction, and on-site disposal.

The USEPA issued a Request For Proposal (RFP) regarding the soil/sediment solvent extraction portion of the remedy as outlined in the 1989 ROD. In 1995, the USEPA received a proposal for the implementation of this work; however, the cost greatly exceeded prior cost estimates. Also based upon that proposal, the USEPA believed that there would be difficulties in properly locating the appropriate solvent extraction equipment on the Site due to space constraints and safety issues. Based upon these mitigating factors, the USEPA determined that it was necessary to amend the remedy for the Site and a ROD Amendment was issued in 1996.

The amended ROD proposed the excavation of high concentrations of chlorinated organic compounds to eliminate a continuous source of groundwater contamination, excavation and consolidation of PCB

contaminated soil from portions of the Grant Gear property and from other surrounding properties, including sediments from the Meadow Brook, restoration of Meadow Brook consistent with the Town's flood control project, and finally cap and cover the consolidated contaminated soil and sediment. Clean-up levels for five main categories of PCB contaminated soil were set:

- Surficial soil on commercial/industrial properties: 40 parts per million (ppm) PCBs;
- Subsurface soil on commercial/industrial properties: 70 ppm PCBs;
- Surficial soil in wooded area north of Meadow Brook: 10 ppm PCBs;
- Subsurface soil in wooded area north of Meadow Brook: 50 ppm PCBs;
- Soils and sediment in Meadow Brook and its banks: 1 ppm PCBs

#### **4.1.2 Remedial Action Objectives: Groundwater**

The RA objectives selected in the 1989 ROD to address groundwater contamination at the Site are as follows:

- To reduce, within a reasonable time frame, risks to workers posed by inhalation of airborne contaminants volatilized from groundwater.
- To reduce risks to human health and the environment from current and future migration of contaminants in groundwater.

Groundwater at the Site is contaminated with PCBs, VOCs (such as trichloroethylene and vinyl chloride), and SVOCs. The 1989 ROD proposed that contaminated groundwater in the overburden and shallow bedrock aquifers would be collected by a barrier drain. The groundwater collection system would be designed to intercept contaminated groundwater both in the overburden aquifer that is moving toward Meadow Brook and in the shallow bedrock aquifer that, at the point of collection, would be discharging to the overburden aquifer. The barrier drain would be designed to collect contaminated on-site groundwater, but not draw in off-site groundwater and surface water. Contaminated groundwater collected would be treated by a groundwater treatment system, including the following treatment components: activated carbon, air stripping with vapor phase controls, and precipitation/filtration.

The ROD Amendment did not change the plan to construct the GWTP; however, it did change the method of contaminated groundwater collection, calling for a series of extraction wells in lieu of the barrier drain specified in the ROD and specified discharge of treated effluent to Meadow Brook rather than re-charge to the groundwater. The GWTP was operational in January 1996 and treatment continued until it was shut down in June 2000.

In accordance with EPA's 1996 Final Ground Water Use and Value Determination Guidance, in May 2001, MassDEP submitted a "low" use and value determination for the groundwater at and in the vicinity of the Site. This determination was made based on the aquifer's classification as a low yield, non-potentially drinking water source area, as well as the fact that nearby residential and commercial properties are supplied by public, municipal drinking water sources.

As a result of MassDEP's "low" use and value determination, the contaminant exposure pathways and exposure assumptions used for the ROD were re-evaluated. Accordingly, supplemental risk assessment activities were initiated in 2001 and were completed in 2004. As the result of these assessments, revised groundwater clean-up levels, or risk-based action levels (RBALs), were calculated for the Site groundwater in March 2003. In issuing the 2005 ESD, EPA determined that those RBALs, which

established standards protective for non-potable groundwater, would be the new groundwater clean-up levels for this Site.

#### **4.1.3 Remedial Action Objectives: Meadow Brook Sediment**

As per to the 1989 ROD, steps were taken to minimize the destruction, loss, and degradation of wetlands during implementation of the remedy, including the use of sedimentation basins or silt curtains to prevent downstream transport of contaminated sediments. A wetland restoration program was implemented upon completion of the remedial activities in wetland areas adversely impacted by the remedial action and ancillary activities.

The RA objectives selected in the 1989 ROD to Meadow Brook Restoration are as follows:

- Mitigate any future impacts of such remedial activities to Meadow Brook and the surrounding wetland areas.

Measures used included adequate sloping of stream banks to prevent excessive soil erosion into Meadow Brook. The remedy did not propose to restore the excavated Meadow Brook streambed to similar conditions existing prior to excavation. Comments from the Town of Norwood indicated that the Meadow Brook flood control project, which would include all portions of Meadow Brook targeted for sediment excavation was slated for construction upon completion of the Remedial Action. Therefore, upon completion of the soil and sediment excavation of the Meadow Brook, the brook streambed and adjacent banks from these areas were restored, to the maximum extent feasible, in a manner consistent with the Meadow Brook Flood Control Project plans and specifications. The amended ROD in 1996 did not change the proposed remedial alternative for Meadow Brook Restoration.

#### **4.1.4 Remedial Action Objectives: Drainage System and Roof Decontamination & Grant Gear Machinery/Equipment and Floor Surfaces Decontamination**

Flushing, cleaning, and/or containment and replacement of portions of Grant Gear drainage system, and cleaning and sealing of roof surfaces was proposed in the 1989 ROD. The RA objectives selected in the 1989 ROD to address drainage system and roof contamination at the Site are as follows:

- To minimize the continued release of hazardous substances to Meadow Brook.

Decontamination of surfaces of machinery, equipment, and floor surfaces within the plant areas of the Grant Gear Building were also part of the 1989 ROD. The RA objectives selected in the 1989 ROD to address grant gear machinery/equipment and floor surface contamination at the Site are as follows:

- To reduce risks to workers associated with direct contact with PCB-contaminated surfaces.
- To reduce risks to workers associated with inhalation of airborne PCBs within the Grant Gear Building.

Due to the fact that Grant Gear was no longer in operation and it was unlikely that the existing building would be used, the Amended ROD in 1996 called for demolition of the building and on-site disposal in several ways. PCB-contaminated building material was to be consolidated in the boiler room and disposed on-site under the cap. Any material, in excess of the capacity of onsite disposal areas would be disposed at an appropriate off-site property. Certain materials, which are subject to federal Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6901 *et seq.*, requirements, would be disposed at an appropriate off-site facility complying with RCRA and Toxic Substances Control Act (TSCA), 15 U.S.C. § 2601 *et seq.*, requirements. Debris that was uncontaminated could be reused or recycled as appropriate.

## 4.2 REMEDY IMPLEMENTATION

The USEPA issued a ROD in 1989, an Amended ROD in 1996, and an ESD in 2005. Three separate remedial action phases were completed, with the third phase consisting of a phase "A" and "B". Phase 1 was completed by the USEPA and consisted of groundwater treatment. Phase 2 was conducted by the Settling Defendants and consisted of the Grant Gear building demolition. Phase 3A was conducted by the Settling Defendants and consisted of the construction of a cap and cover over consolidated contaminated soil and sediments. Finally, Meadow Brook Restoration Phase (Phase 3B) was completed by USEPA. Remedies implemented at the Site are briefly described in the following subsections.

### 4.2.1 Source Control and Soil and Sediment / Cap and Cover

The Settling Defendants performed excavation of sediments in Meadow Brook as per the 1989 ROD from April 28, 1997 through July 30, 1998, with a temporary work stoppage from February 19 to May 3, 1998 during winter conditions. The Meadow Brook Remediation was divided into three sections referred to as Reach 1, 2, and 3. Excavation activities within Meadow Brook required the temporary diversion of the stream. Dewatering cells were constructed in the northern portion of the Hurley property, located west of the existing groundwater treatment plant. Two dewatering cells were constructed - one located to the west, which received sediment from Reach 1 only, and one located to the east, which received sediment from Reaches 2 and 3 only. The excavated sediment was segregated in this manner due to the lower concentrations of PCBs expected for the sediments removed from Reaches 2 and 3. On June 7, 1997, excavation of Reach 1 of Meadow Brook was completed. Approximately 2,400 cubic yards (yd<sup>3</sup>) of material was excavated from Reach 1. On July 23, 1997, the excavation of Reach 2 was completed. The excavation of Reach 3 was performed in two phases - the first consisted of sediment removal from the arched culvert section at Dean Street, and the second consisted of sediment removal from the box culvert section. Once clean-up levels (1 ppm in sediment) were achieved at 160 feet into the culvert, sediment removal activities were terminated. Approximately 2,300 yd<sup>3</sup> of material was excavated from Reach 2 and Reach 3.

Following the excavation of Reach 1 to the excavation grades, an area of stained soils was observed below the elevation of the design excavation grade at the former drainage outfall pipe. On June 11, 1997, after receiving direction from the USEPA, GZA collected a soil sample from the area and submitted it for laboratory analysis. Based on the analytical results, a decision was made to perform a limited removal of this stained sediment. The limited removal of the stained sediment was performed between August 14 and August 19, 1997. The estimated volume of stained soil removed is 85 yd<sup>3</sup>.

Soils with PCB concentrations exceeding the appropriate clean-up levels were targeted for excavation from several on-property areas. Trichlorobenzene (TCB)-contaminated soil identified near soil boring location SS-012, west of the former Grant Gear building, was excavated. The excavated unsaturated zone soils were backfilled from the base of the excavation to above the water table, and saturated zone soils were backfilled from above the water table in the area of the excavation to existing grade. Approximately 5,900 yd<sup>3</sup> of PCB-contaminated soil was excavated from the North Cover Area and stockpiled on-site for placement under the cap/cover. Approximately 2,600 yd<sup>3</sup> of PCB-contaminated soil was excavated from the South Cover Area and stockpiled on-site for placement under the cap/cover.

Soils with PCB concentrations exceeding the appropriate clean-up levels were targeted for excavation from several off-property areas. During the activities performed for the remediation of Reach 1 of Meadow Brook, areas containing PCB-contaminated soils along the North Bank Wooded Area were discovered. Approximately 100 yd<sup>3</sup> of soil was excavated from the southern half of the western North Bank Wooded Area and stockpiled on-site for placement under the cap/cover. After the conclusion of the Reach 1 remediation activities, areas containing PCB-contaminated soils were discovered along the South

Bank Wooded Area. Approximately 780 yd<sup>3</sup> of soil was excavated from the South Bank Wooded Area and stockpiled on-site for placement under the cap/cover. Previously stockpiled soils from the Reardon property were relocated to the Hurley property. The approximately 1,600 yd<sup>3</sup> of material was stockpiled in two areas of the Reardon property - one at the south end of the property adjacent to Dean Street, and the other located on the north end of the property adjacent to the south end of the Hurley property. Both stockpiles were excavated, transported, and stockpiled near the southwest corner of the Hurley property.

Beginning on April 30, 1997, the stockpiled soils were consolidated on-site. Criteria were used for identifying how and where the materials should be placed. Materials with PCB concentrations exceeding the risk-based, site-specific industrial/commercial clean-up levels were placed within the limits of the proposed asphalt cap. Materials with PCB concentrations below clean-up levels were placed within the limits of the proposed cover areas. During soil excavation and consolidation, on-site underground storage tanks (USTs) were removed before the caps were installed. The existing 10,000-gallon underground heating fuel tank located at the southwest corner of the former Grant Gear building and the 20,000-gallon UST discovered adjacent to the 10,000-gallon tank during the building demolition phase of work at the Site were both decommissioned. Both USTs were cleaned, removed, and disposed off-site. While excavating to remove the 20,000-gallon UST, an area in the northeast corner against the former building foundation appeared to have petroleum-contaminated soil. Based on visual observations, this area with the contaminated soils was then excavated. The material was stockpiled with the previously stockpiled solids from the 20,000-gallon UST.

After the PCB-contaminated materials had been placed in accordance with the site-specific clean-up levels and consolidated on-property, the areas were prepared for the installation of the cap and covers. Once the fill was placed to the appropriate grade (i.e., approximately 12 inches below the final grade in capped and covered areas), a non-woven geotextile filter fabric was laid across the cap and cover areas. An asphalt Cap or gravel cover was installed in the appropriate areas.

A detention basin and surface drainage system was designed and located to conduct runoff across the cap and cover to adequately manage the discharge of runoff, and to maximize the area of the property suitable for redevelopment. The subsurface drainage structures, oil and gas separators, catch basin, drainage manholes, drainage lines, flared-end sections, and outlet control structures were designed to convey overland stormwater flow to the stormwater detention basin.

#### **4.2.2 Groundwater Treatment**

The selected remedy for the management of migration of groundwater included the collection of groundwater using an extraction system consisting of nine shallow extraction wells and groundwater treatment consisting of carbon adsorption for PCB removal, air stripping for VOCs removal, and precipitation filtration for metals removal. The Groundwater Extraction and Treatment System was designed in 1994 and constructed in 1995. The objective of the system was to minimize migration by providing an integrated long-term groundwater remediation facility.

Nine groundwater extraction wells were installed in August 1995, concurrent with the construction of the treatment system. The facility was designed to operate up to 25 years. On January 11, 1996, the USEPA and the MassDEP conducted a pre-final inspection of the treatment facility and it was deemed operational and functional on February 23, 1997.

Metals were removed from groundwater using a chemical precipitation and multi-media filtration process. Sodium hydroxide was added to the collected groundwater to cause the dissolved metals to precipitate out of solution and form coagulated solids. The solids from the chemical precipitation and filtration process were collected as sludge and dewatered to facilitate handling. Dewatered solids were disposed off-site in an approved landfill, which operated in compliance with RCRA. The contaminated water was then

pumped to the top of an air stripping tray tower where air was blown into the bottom of the tower, as the water was introduced at the top and cascaded down. This counter current flow through the tray tower transferred VOCs from the groundwater into the air stream. The air stream was then passed through a catalytic oxidizer to destroy contaminants before being released into the atmosphere. An activated carbon unit was used to remove PCBs as a final polishing step after the air stripper. All hazardous wastes transported off-site were disposed in accordance with RCRA, Department of Transportation (DOT), and Massachusetts Hazardous Waste regulations. Water extracted from the sludge during dewatering was pumped back to the inlet equalization tank and mixed with the collected groundwater for treatment.

The groundwater treatment system was operational until it was shut down (at that time temporarily) in June of 2000. As a result of the revised groundwater classification (from potable to non-potable) and "low" use and value ascribed by MassDEP, in the 2005 ESD EPA determined that no further groundwater clean-up was necessary, as revised clean-up goals were already being met. A final comprehensive groundwater monitoring report was completed in 2005, 5 years after GWTP shut down, to ensure that the goals were being met. This report revealed that groundwater clean-up goals were continuing to be met and EPA subsequently began GWTP decommissioning activities in 2007. As per the Prospective Purchaser Agreement (PPA) signed with the property owner, EPA decommissioning activities included the removal of all process equipment and termination of utilities and extraction well piping. This was substantively completed during the Spring 2007, after which the shell of the building was transferred on April 5, 2007 to the owner who subsequently notified EPA of his intention to demolish the GWTP in favor of other redevelopment plans. The GWTP was dismantled in March 2008 just prior to the beginning of construction of the commercial/retail buildings

#### **4.2.3 Meadow Brook Restoration**

In accordance with the 1996 Amended ROD, and after the Settling Defendants finished excavation of contaminated brook sediments, the USEPA restored and stabilized the side slopes and bottom of Meadow Brook in order to complete the Town of Norwood's flood control project within the area of the Site. The brook was excavated to the depths required to meet the contours of the flood control project. The side slope and bottom of the brook were then restored with a layer of geotextile fabric and appropriate restoration materials (riprap, interlocking concrete blocks or precast concrete), which covered any residual contamination located at depths below the flood control contours of the restored brook channel.

Restoration activities along Reach 1, adjacent to the Site, took place between October and December 1997. Due to concerns related to the use of interlocking concrete blocks on the steeper slopes of Reach 2, precast concrete channel sections were used. This redesign effort, as well as several high water conditions, resulted in delays in completing restoration activities in Reach 2. Reach 2 activities took place between April and July 1999. No restoration activities were required for Reach 3, as those culverted sections remained intact.

The USEPA and the MADEP performed a final inspection of the Meadow Brook Restoration project on August 11, 1999. Plantings and reseeding were completed and accepted in October 1999. On August 18, 2000, Meadow Brook O&M responsibilities and the Operation and Maintenance Manual for the Meadow Brook Restoration were transferred to the Town of Norwood.

In addition to these clean-up activities, a Notice of Right of Access and Declaration of Covenants, Condition, and Restrictions ("Notice"), which is an Attachment in the Town's Consent Degree, was recorded in the Norfolk County Registry of Deed (Book No. 25628, Page No. 534). This Notice describes various restrictions on the Meadow Brook parcel including, but not limited to, the following:

1. The restriction of groundwater extraction, except for the purpose of monitoring contamination levels. Groundwater wells for such purposes can only be installed pursuant to a plan approved by EPA.
2. No use or activity shall be permitted on any portion of the property which may disturb or adversely affect any of the remedial measures implemented at the Site.

#### **4.2.4 Grant Gear Building Demolition**

The former Grant Gear facility was demolished during the demolition phase of the RA performed between October 1996 and February 1997. Elevated concentrations of PCBs were detected in or on much of the building materials, including structural steel, equipment, concrete/brick, and roof decking. Brick, concrete block, and wallboard materials were crushed and stockpiled on the building slab. Contaminated wood decking was shredded and stockpiled in the loading dock area west of the building slab. All other building materials, including asbestos-containing material, structural steel, and office and manufacturing equipment were either placed in the subgrade boiler room or disposed/recycled off-site. As the boiler room was filled, care was taken to limit void spaces. Remaining voids were filled with "flowable fill" and a 14-inch-thick reinforced concrete slab designed for anticipated loading (vehicle traffic) was constructed over the boiler room opening.

#### **4.2.5 Redevelopment**

In addition to these remedial actions, redevelopment resulted in additional protectiveness of the soil and sediments under the cap. To ensure the integrity of the original cap, the developers constructed new buildings around the cap thus utilizing the remedial cap as the area to be used as a parking lot. In order to make necessary surface grades as part of the redevelopment, an additional 6 to 12 inches of gravel and 4 inches of asphalt were installed over the remedial cap, thereby increasing its protectiveness. In addition, as an added layer of protectiveness to future building occupants, the buildings were constructed with a passive vapor mitigation system consisting of a layer of gravel, a network of transmission lines in the gravel layer which are passively vented to the exterior, and the application of Liquid Boot™ (a spray-applied membrane system).

### **4.3 OPERATION AND MAINTENANCE**

The Cap and Cover O&M Plan, detailed in the following section, was finalized in 2004, prior to the redevelopment of the Site. Accordingly, the O&M plan should be updated as soon as possible to reflect the components of the site that have been modified (such as well locations) as a result of redevelopment.

#### **4.3.1 Cap/Cover**

The purpose of the O&M Plan is to outline the actions that will be taken by the Settling Defendants and property owner (if redevelopment related) following the completion of remedial activities at the Site to monitor the long-term effectiveness of the RA. The O&M Plan presents a description of cap inspection and maintenance activities; potential operational problems; the operational safety plan; necessary equipment; record keeping procedures; groundwater, surface water, and sediment monitoring requirements; and a monitoring well maintenance program. The final (pre-development) O&M Plan was approved in December 2004.

#### **4.3.2 Groundwater Treatment**

Since the groundwater clean-up goals were achieved and the GWTP decommissioned there is no GWTP O&M.

### **4.3.3 Meadow Brook Restoration**

A Meadow Brook O&M Manual was prepared by the United States Army Corps of Engineers (USACE) in June 2000 for the Meadow Brook restoration. The O&M of the Meadow Brook Restoration was transferred to the Town of Norwood in August 2000. The O&M Manual is intended to enable the Town to maintain the flood control project, as well as a municipal sewer easement that runs through the parcel, while preventing the release of any remaining contaminants that were left in place underneath the flood control structures. The project is mostly self-regulating and O&M is limited to preventing excessive vegetation or debris accumulation, and repairing damage caused by erosion and vandalism.

Walking inspections are recommended at least every three months to detect deterioration of project features. Banks should be inspected for damage by rain, wave wash, sloughing, or vandalism. Obstructions caused by debris should be removed. Vegetation should be allowed to grow in certain areas, but not others. Details are discussed in the Meadow Brook O&M Manual.

Monitoring of water quality and sediment in within Meadow Brook is conducted by the non-municipal Settling Defendants to assess whether the remedy is remaining protective and is, therefore, part of the Cap and Cover O&M Plan.

## 5.0 PROGRESS SINCE THE LAST REVIEW

### 5.1 PROTECTIVENESS STATEMENT FROM PREVIOUS FIVE-YEAR REVIEW

The following sections contain the protectiveness statements from the previous 2004 Second Five-Year Review.

#### 5.1.1 2004 Protectiveness Statement

The following statement was included in the 2004 Second Five-Year Review Report: *“The remedy at Norwood PCBs Superfund Site protects human health and the environment because new clean-up goals have been met, Operation & Maintenance (O & M) Plans have been submitted by the PRPs and approved for the Grant Gear Property, and institutional controls are in place. Meadow Brook O&M has been transferred to the Town of Norwood. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: institutional controls for the industrial site and Meadow Brook must be updated and implemented and monitoring and Operation and Maintenance at the site must be conducted regularly.”* The 2004 Second Five-Year Review Report was signed on December 29, 2004 by Susan Studlien, Director, Office of Site Remediation and Restoration.

### 5.2 PROGRESS SINCE PREVIOUS FIVE-YEAR REVIEW

Below is a summary of progress since the last Five-Year Review.

Shortly after the 2004 Five-Year Review was completed, EPA released an ESD to document new clean-up goals. These new clean-up goals for groundwater were based upon “RBALs” which were calculated for the protection of ecological receptors predominately that utilize Meadow Brook (which receives contaminated groundwater) and detailed in a Technical Memorandum in 2003. PCBs do not have a clean-up goal established in either the ROD or ESD. Moreover, the 1989 ROD acknowledged that clean-up of PCBs in groundwater would be “technically infeasible.” Notwithstanding this, an RBAL was calculated [for PCBs] and which was exceeded in groundwater. PCBs were also detected in surface water above the Ambient Water Quality Criterion. Accordingly, a supplemental risk evaluation (Phase II Ecological and Human Health Risk Summary) was completed in 2004. This assessment concluded “that the existing conditions and levels of contaminants present in Meadow Brook do not represent a risk to the environment.” In regards to human health, “no health concerns were indicated by the groundwater data relative to current or projected land use” and “no human health concerns [were identified] relative to the sediment samples from Meadow Brook or the Neponset River.”

In 2005, a final comprehensive groundwater evaluation was completed and the resulting report documented no ROD-specified contaminants in groundwater above their respective groundwater clean-up goals established in the ESD. Having confirmed that all groundwater clean-up goals were being met (approximately 5 years after GWTP shut down), it was determined by USEPA and MassDEP that the GWTP was no longer necessary. The GWTP was subsequently decommissioned. As per the 1997 PPA with the property owner, EPA maintained responsibility for removing all chemical process equipment; this was done under contract by the USACE in 2007. As per the PPA, the building structure (shell) was left for the property owner to either reuse or dismantle; it was subsequently dismantled by the owner in 2008.

In 2006, a developer proposed a large (>150,000 sf) redevelopment which would have been situated predominantly on/over the Cap and would have required excavation in the “capped material”. Based on local concerns associated with disturbing contaminants from under the cap, this redevelopment was not

approved by the Town. Subsequently, the developer modified their redevelopment plans including, notably, the construction of commercial/retail buildings around the footprint of the capped portion of the Site. This reuse would ensure that none of the highest-contaminated material would be exposed during construction. The revised Work Plan for Redevelopment was approved by EPA and MassDEP in March 2008, after which the developer received the necessary Town approvals.

As required by the PPA, the Owner updated and recorded (with the Norfolk County Registry of Deeds) institutional controls in the form of a Grant of Environmental Restrictions and Easement (the "Grant") prior to the redevelopment. The Grant was recorded on March 27, 2008 and entered into Book No. 25628, Page No. 534. The Grant prohibits certain activities such as:

1. Agricultural use
2. residential use
3. day care or educational use
4. recreational use
5. extraction of groundwater
6. excavation of material from the site (including soils, minerals, and resources)
7. construction of buildings on the cap
8. any activities that would interfere with the effectiveness of the selected remedy

Any request to allow or modify the Grant restrictions must be made to the Grantee, the Commonwealth represented by MassDEP, with notice to the USEPA. With these institutional controls in place, and with EPA's and the Town's approval, redevelopment began in May 2008 and was substantively completed by November 2008. The PPA with the landowner needs to be amended so that reporting requirements under the PPA are consistent with requirements under the Grant.

In 2009, the Town of Norwood recorded a copy of the Consent Decree entered into by the Town, USEPA, and the Commonwealth. Included in the recorded CD is a *Notice of Right of Access and Declaration of Covenants, Conditions, and Restrictions* which provide long-term restrictions on the Meadow Brook parcel. Additional details of these restrictions are provided in Section 4.2.3 of this Five-year Review. With the Notice and Grant recorded, ICs exist throughout the site to ensure the safety of human health and the environment into the future.

The PRPs continue to conduct O&M including cap maintenance and periodic collection of surface water, sediment and groundwater. In September 2009, EPA completed a Final Closeout Report (FCOR) which states that remedial activities were complete, all institutional controls were in place, and clean-up levels were being met.

### **5.3 STATUS OF RECOMMENDATIONS FROM PREVIOUS FIVE-YEAR REVIEW**

In the previous Five-Year Review, a list of recommended actions for continued O&M of the remedies and associated features was developed. These issues and recommendations are presented in **Table 5-1**, which also includes a description of how the issues have been resolved.

**Table 5-1  
 Issues & Recommendations from Previous Review**

Issues from Previous Review	Action Taken and Outcome
New groundwater monitoring data should be collected and evaluated relative to revised clean-up standards.	Groundwater data continues to be collected and compared to clean-up goals.
Meadow Brook surface water and sediment should continue to be monitored to determine compliance with ARARs; ensure that there is not an unacceptable risk to human health and the environment and that the remedy remains protective.	Meadow Brook surface water and sediment data continues to be collected and monitored.
Updated institutional controls have not been recorded.	Institutional controls have been updated and recorded for both privately-owned (Laham) and municipally-owned (Meadow Brook) parcels
A monitoring well was observed without a lock in the north cap area.	As a result of GWTP demolition, the majority of the wells have been decommissioned. However, several monitoring wells were selected for long-term monitoring and required relocation as a result of the redevelopment. This has been completed.
No O&M procedures have been conducted in the Meadow Brook.	In 2000, an O&M plan was given to the Town. This maintenance is recommended to ensure functionality of the drainage improvements. To date, this has not been performed.
Cracks were noted in the cap, which need to be investigated	All cracks have been repaired.
Cape Cod berms were damaged during plowing.	Cape Cod berms were eliminated as a result of redevelopment.

## **6.0 FIVE-YEAR REVIEW PROCESS**

### **6.1 ADMINISTRATIVE COMPONENTS**

The USEPA Remedial Project Manager led the Norwood PCBs Superfund Site Five-Year Review team, while risk assessor Rick Sugat provided technical assistance. The review was conducted between April 2009 and December 2009. The scope of the review included:

- Document Review
- Standards (ARAR) Review
- Site Interviews
- Site Inspection
- Community Relations
- Five-Year Review Report

### **6.2 COMMUNITY NOTIFICATION AND INVOLVEMENT**

Community notification was initiated by a meeting held on April 6, 2009 between Remedial Project Manager Daniel Keefe and representatives from the Town of Norwood. A public notice was subsequently prepared and released on July 27, 2009 to the Daily News Transcript. Another notification to the newspaper will be issued announcing the completion of the report and the results of the review. A copy of the final report will be available for review at the Morrill Memorial Library in Norwood, MA; the USEPA's Region 1 Office; and the USEPA's website: <http://www.epa.gov/region1/superfund/sites/norwood>.

### **6.3 DOCUMENT REVIEW**

The project team reviewed documents and site files to become knowledgeable with the history and status of clean up, and to assess the protectiveness of RAs at the site. Specific documents reviewed included:

1. September 29, 1989 Record of Decision
2. May 17, 1996 Amended Record of Decision
3. September 23, 1999 Preliminary Close-Out Report
4. December 30, 1999 Five-Year Review Report
5. April 2000 Final Supplemental Risk Assessment (Foster Wheeler)
6. June 2000 Operation and Maintenance Manual – Meadow Brook Restoration (USACE)
7. August 2000 Interim Remedial Action Report for the Groundwater Treatment Plant (Foster Wheeler)
8. May 11, 2001 MassDEP Groundwater Use and Value Determination
9. January 2002 Meadow Brook Restoration Remedial Action Report (USACE)
10. May 2002 Final Amendment to the Supplemental Risk Assessment (Foster Wheeler)

11. March 2003 Final Technical Memorandum – Development of Risk-Based Action Levels (Foster Wheeler)
12. March 2003 27<sup>th</sup> Quarterly Groundwater Monitoring Report (Nobis)
13. September 2003 Soil/Brook Remedial Construction Report (GZA)
14. January 2004 Environmental Monitoring Work Plan (GZA)
15. January 2004 Operation and Maintenance Plan (GZA)
16. July 2004 Draft Phase II Ecological and Human Health Risk Summary Report (Tetra Tech FW)
17. December 2004 Operation & Maintenance Plan (GZA)
18. December 2004 Five-Year Review Report (USACE/EPA)
19. February 2005 Explanation of Significant Differences (EPA)
20. June/July 2005 28<sup>th</sup> Groundwater Monitoring Report (USACE/Tetra Tech)
21. January 2006 Annual Monitoring Report (GZA)
22. January 2007 Annual Monitoring Report (GZA)
23. January 2008 Annual Monitoring Report (GZA)
24. March 2008 Revised Work Plan For Redevelopment (GZA)
25. March 2008 Grant of Environmental Restriction and Easement (MassDEP)
26. January 2009 Annual Monitoring Report (GZA)
27. March 2009 Notice of Right of Access and Declaration of Covenants, Conditions, and Restrictions contained in Consent Decree in United States and the Commonwealth of Massachusetts v. Town of Norwood
28. September 2009 Final Close-Out Report (EPA)

## **6.4 DATA REVIEW**

### **6.4.1 Groundwater Monitoring Data**

Quarterly groundwater monitoring continued throughout the operation of the groundwater treatment system. In June 2000, the groundwater treatment system was shut down, however, quarterly groundwater monitoring continued for two years beyond the system shutdown. The last comprehensive groundwater monitoring was completed in June 2005 (the 28<sup>th</sup> monitoring round).

The 28<sup>th</sup> quarterly groundwater monitoring round involved the collection and analysis of samples from thirty-one monitoring wells, nine extraction wells, and three surface water sample locations. Groundwater gauging rounds continue to indicate east to northeast flow in the overburden aquifer and east with a southeast component in the bedrock aquifer. The results revealed no contaminant exceeding the revised groundwater clean-up goals, which subsequently allowed EPA to decommission the GWTP. In addition to the last comprehensive round, the Settling Defendants continue to collect bi-annual

groundwater data as per the final Cap and Cover O&M Plan. These results are reported in annual monitoring reports which have also demonstrated that clean-up goals are being met. A summary of highest detected concentrations of contaminants in groundwater over the last 5 years is given in **Table 6-1**. It should be noted that redevelopment took place between the Spring and Fall 2008 monitoring rounds. The most recent groundwater data (Fall 2008) reflects the condition of groundwater post-redevelopment. Sample results from 2009 are anticipated in January 2010. All of contaminants in groundwater (for which there was a ROD-specified clean-up goal) continue to meet their revised clean-up goals.

#### **6.4.2 Surface Water/Sediment**

Surface water and sediment samples are collected every 2 years as per the approved EMP. During this five-year review period, samples were collection in 2006 and 2008. During each sampling event, three samples were collected (one each from northwest corner of the property, the mid-point of Meadow Brook and from the brook just prior to the Dean Street culvert). The maximum concentration detection in sediment were 0.21 and 0.48 ppm of PCBs in 2006 and 2008, respectively. In regards to surface water, three samples were collected during each of the events and no PCBs were reported (typical reporting limit 0.5 ug/L).

**Table 6-1**  
**Maximum Observed Groundwater Analytical Results (2005 – 2008)**

Contaminants of Potential Concern	Site-Specific RBAL	2005 Groundwater Data*		2006 Groundwater Data		2007 Groundwater Data		2008 Groundwater Data	
		Jun-05	Nov-05	1-May-06	17-Nov-06	25-Jun-07	Nov/Dec 2007	10-Apr-08	13-Nov-08
<b>Volatile Organic Compounds (VOCs)</b>	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
1,2,4-Trichlorobenzene	34,000	1,500	490	670	850	1,313	69	9	980
1,2,3- Trichlorobenzene		ND	ND	ND	ND	373	17	2.7	230
1,2- Dichlorobenzene		ND	ND	ND	ND	31	ND	5.3	19
1,3- Dichlorobenzene		ND	ND	ND	ND	54	20	27	89
1,4-Dichlorobenzene	4,600	25	96	78	36	74	22	39	72
Total 1,2-Dichloroethenes	3,660,000	420	369	448	468	514	518	460.4	103.6
1,1- Dichloroethene		ND	ND	ND	ND	6.8	7.3	6.4	15
1,1- Dichloroethane		ND	ND	ND	ND	10	ND	ND	ND
Chlorobenzene		ND	ND	ND	ND	187	260	100	130
Tetrachloroethene	37,000	58	ND	ND	ND	ND	ND	3.3	11
Trichloroethene	108,000	2,100	1,800	1,100	1,100	1,922	250	84	970
tert- Butyl alcohol (TBA)		ND	ND	ND	ND	ND	51	ND	ND
Acetone		ND	ND	ND	ND	ND	ND	65	ND
1,2,4-Trimethylbenzene		ND	ND	ND	ND	ND	ND	ND	1.2
Tetrahydrofuran		ND	ND	ND	ND	ND	ND	ND	11
Vinyl Chloride	310,000	120	99	76	75	131	91	90	61
<b>Polychlorinated Biphenyls (PCBs)</b>									
Total PCBs	4.3	30	16.8	8.6	13	34.4	61.5	39	5.6
Wells exceeding PCB RBALs <sup>1</sup>	4.3	ME-17 (B-4)	ME-17 (B-4)	MW-1A, ME-17(B4)	ME-17 (B-4), B-28	MW-1A, ME-17(B4)	ME-17 (B-4), MW-2A, MW-1A	MW-1A, ME-17(B4)	MW-1A

\*Last comprehensive round of sampling (31 wells 9 EW)

<sup>1</sup> While an RBAL for PCBs was calculated, it was not adopted in the 2005 ESD as a "clean-up goal" per se. The ROD acknowledged restoration of PCBs in groundwater as "technically impracticable" and, therefore, identified institutional controls as the means by which exposure to PCBs would be controlled.

## 6.4.2 Risk Assessment Data

A Groundwater Risk Assessment was completed in 1998 that evaluated human health exposure to chemicals that may volatilize from groundwater into indoor air of a proposed building as well as evaluated ecological risks associated with groundwater discharge to Meadow Brook.

A Supplemental Risk Assessment was completed in 2000 by Foster Wheeler as an update to the 1998 Groundwater Risk Assessment (Foster Wheeler, 2000). The Supplemental Risk Assessment consisted of a human health risk assessment and a screening level ecological risk assessment. The human health risk assessment focused on potential inhalation of compounds volatilized from contaminated subsurface soils and groundwater in a future commercial building. The screening level ecological risk assessment focused on the potential impacts of the discharge of contaminated groundwater to the Meadow Brook. The assessment indicated that contributions to the projected carcinogenic risk from the subsurface soil and groundwater exceed the target values for each source medium separately. The risk drivers were vinyl chloride and trichloroethene in groundwater and trichloroethene and methylene chloride in subsurface soil. An assessment of potential indoor inhalation risks under future conditions assuming the shutdown of the groundwater treatment system was also performed. The projected risk and hazard results were generally similar to the current conditions scenario with somewhat higher risk and hazard levels. The human health risk assessment concluded that a possible unacceptable risk exists from the inhalation of volatiles from groundwater and subsurface soils and engineering controls may be necessary if the use of the property changes and/or new structures were built. The screening level ecological risk assessment indicated no apparent risk to receptor species based on the available data and benchmark criteria.

In 2002, Foster Wheeler completed an Amendment to the Supplemental Risk Assessment. The Amendment addressed the potential exposures of a future construction worker to contaminated groundwater. The results indicated that the hazard index exceeded the MassDEP target level and the calculated carcinogenic risk slightly exceeded the MassDEP target level for a hypothetical future construction worker exposed to the Site groundwater. These results were based on an assumption of repetitive dermal and inhalation exposure over the course of typical building construction. The elevated risk and hazard index results relative to the MassDEP target levels are essentially the result of the detected Aroclor compounds in groundwater and the potential direct contact exposure route. Thus, any future excavation activities would likely require appropriate Health and Safety training and Personal Protective Equipment (PPE) to minimize risk to construction workers and be conducted in compliance with applicable laws and regulations and the institutional controls for the site.

In March 2003, Foster Wheeler Environmental Corporation, subsequently performed a Supplemental Risk Analysis for the Site and developed new groundwater clean-up goals [or Risk-Based Action Levels (RBALs)] in light of MassDEP's "low use and value" determination. The results are summarized in a March 2003 Technical Memorandum. The action levels were developed to reflect the protection of ecological receptors associated with the aquatic habitats of Meadow Brook and its associated riparian communities adjacent to the Site. Maximum concentrations of VOCs and semi-volatile organic compounds (SVOCs) in groundwater have all been consistently below the RBALs with a considerable margin. These RBALs were documented as the new groundwater clean-up goals in the 2005 ESD. This risk analysis raised some concerns about the remaining PCB contamination in groundwater and its impacts on Meadow Brook. The RBAL has been met for PCBs in all wells adjacent to Meadow Brook. Surface water Ambient Water Quality Criteria (AWQCs)<sup>1</sup> for PCBs was exceeded at the midstream and downstream stations in the 26<sup>th</sup> sampling round. The Technical Memorandum recommended that the detections of PCBs in surface water of Meadow Brook should be further investigated and a second phase ("Phase II") of investigation was initiated.

<sup>1</sup> Now called "National Recommended Water Quality Criteria ("NRWQC") (40 C.F.R. § 122.44).

In July 2004, Tetra Tech FW prepared a Draft Phase II Ecological and Human Health Risk Summary Report as part of Phase II field investigations for Meadow Brook at the Site. The Phase II investigation was to assess PCB impacts from the Site to Meadow Brook and to examine sediment PCB distribution downstream of the Site. The report concluded that existing conditions and levels of contaminants present in Meadow Brook do not present a risk to human health or the environment. No unacceptable human health risks were indicated by the groundwater data relative to current or projected future land use. A possible human health concern associated with long-term direct contact exposure to soil was indicated at discrete locations off-site and down stream of the site, adjacent to the Neponset River. Additional off-property samples were collected and exposure point concentrations (EPC) calculated (3 ppm); this value was less than the residential surface soil clean-up goal specified in the ROD (10 ppm). No human health concerns relating to sediment samples taken from Meadow Brook and the Neponset River were indicated. Based on this data, and the 1989 ROD determination that it was technically impracticable to reduce PCB concentrations in groundwater to health-based levels, no groundwater clean-up level for PCBs was established by the ROD or the ESD. Any secondary risk to human health from exposure to PCB contamination on the site (in soil or groundwater) will continue to be controlled via institutional controls. Periodic surface water and sediment monitoring in Meadow Brook has been (and will continue to be) collected to evaluate long-term compliance with NRWQCs and the protection of the environment.

## 6.5 SITE INSPECTION

The Five-Year Review Site Inspection to assess the protectiveness of the remedies was conducted on July 8, 2009. The inspection was conducted by Daniel Keefe and Shamus Keohane (USEPA); and Albert Ricciardelli, Senior Principal (GZA GeoEnvironmental Inc.).

**Table 6-2** provides a summary of the Site components that were inspected and a brief description of findings. Issues and recommendations are further discussed in Section 8.0. Photos can be found in **Appendix D**.

<b>Table 6-2 Site Investigation Summary</b>	
Access and Site Roads	The roads and parking lot appear to be in good shape. The Dean St. access roads appear to be used regularly, but the parking lot has little use because there are presently no commercial tenants.
Detention Basin (along Meadow Brook)	The detention basin had some water in it, due to the significant rains during Spring 2009. There was some overgrowth in the basin, but during the site inspection, landscapers hired by the property owner arrived to mow the area as seen in photographs 13-14.
Detention Basin Side Slopes	The slopes along the interior of the basin were in good condition. There was no exposed geotextile fabric and the weirs appeared to be in good shape. The outside slope of the basin, sloping down to the Meadow Brook however was considerably overgrown. Large shrubs and some young trees have taken root.
Cap and Cover Area	The asphalt parking lot over the cap appeared to be in good condition. No cracks or other structural damage were noted.

<b>Table 6-2 Site Investigation Summary</b>	
Cap Area Use	The parking lot and additional utilities such as light posts appeared in good condition.
Monitoring Wells	The monitoring wells were found to be unlocked and easily opened. See photos 22-23. This condition was reflective more so recent relocation of wells (due to redevelopment) and is contained as one of the redevelopment punch list items.
Meadow Brook	There was some debris such as a tire and an old shopping cart found in the brook that could impede flow as organic debris, such as logs and leaves pile up. See photographs 17-18.

## 6.6 INTERVIEWS

EPA conducted interviews of owners and businesses adjacent to the Site, and of local and State officials. The objective of the informal interviews was primarily to obtain general information and to update current understanding of activities at the Site.

A few abutting businesses were visited on July 8, 2009. During these visits, abutters were given a brief summary of the events at the site over the past 5 years and a survey questionnaire. The following abutting businesses were visited: Neponset Valley Child Care, Advance Auto Parts, Walgreens, and Direct Tire. During these interviews, none of the abutters raised any concerns about the site; they were given a questionnaire and contact information should any concerns arise at a future time.

In addition to the abutting businesses, interview questions were provided to the other project stakeholders including: Albert Ricciardelli, Senior Principal of GZA GeoEnvironmental Inc, on behalf of the Settling Defendants; Steve Costello, Director of Community Planning and Economic Development, Town of Norwood; Joe Laham, the owner of the former facility property; and Jim Grafmeyer, Todd Hamula, and Paul Dansczak representing Developers Diversified Realty, the redeveloping company; and Dave Buckley for MassDEP.

Out of all these interviewees, no major concerns were identified. The consensus was that the construction was a very successful project conducted with the coordination of all the parties. Steve Costello, representing the Town of Norwood, had this to say about the Remedial Actions at the site:

“I think the EPA and DEP have done an outstanding job in assisting the Town with rehabilitation of this site. There were absolutely no issues with the Town or abutting neighbors because the EPA and the developer agreed to a Work Plan with Remedial Actions [completed] prior to construction. This Work Plan addressed the Town’s primary concern... and, in my opinion, the final development is very protective of human health and the environment.”

Additional interview notes are provided in **Appendix C**.

## 7.0 TECHNICAL ASSESSMENT

### 7.1 QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

Yes, the review of documents, ARARs, and the results of the July 2009 site inspection indicate that the remedy is operating and functioning as designed. Based on observations during the site inspection, the RA has been determined to be performing as expected. The successful completion of redevelopment at the site created additional safety controls to ensure the success of the implemented remedy. The cap was given additional coverage with the construction of the parking lot, and the passive vapor mitigation system installed under the retail buildings ensure the safety of the occupants.

Indicators of potential issues pointing to a failing remedy would be cap erosion or disturbance, increased contaminant concentrations in groundwater, or increased contaminant concentrations in Meadow Brook. Continued monitoring of groundwater, as well as Meadow Brook surface water and sediment, will be critical in evaluating the functionality and protectiveness of the remedy.

Institutional controls have been recorded on the both the former facility and Meadow Brook properties that will ensure the remedy remains protective in the future. A Grant of Environmental Restriction and Easement was recorded between the property owner (Joe Laham) and the Commonwealth, represented by the MassDEP. In addition a Consent Decree, which includes a *Notice of Right of Access and Declaration of Covenants, and Restrictions* was recorded in the Norfolk County Registry of Deed by the Town for the Meadow Brook Parcel.

### 7.2 QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEAN-UP LEVELS, AND REMEDIAL ACTION OBJECTIVES USED AT THE TIME OF REMEDY SELECTION STILL VALID?

#### Soil and Sediment

Soil and sediment standards identified in the 1989 ROD were updated in the 1996 ROD amendment. These standards have not been revised since the amended ROD and there are no newly promulgated standards that call into question the protectiveness of the remedy.

Intensity and frequency of use of the Site has changed since the last Five-year review as a result of redevelopment. EPA reexamined exposure pathways in its review of the RWP. Due to concerns about vapor intrusion into indoor air, a passive vapor mitigation system was required and installed in each of the commercial building. See Photographs 5 & 7. As required in the RWP, post construction and prior to occupancy, sub-slab air samples were obtained and analyzed and a risk assessment completed. The assessment conservatively assumed that the exposure population would be residential. Based on this analysis, the risks were found to be acceptable (less than  $1 \times 10^{-6}$ ). In the future, as necessary and pending future monitoring results, the sub-slab ventilation systems can be made to be actively vented with the addition of blowers or vacuum pumps.

#### Groundwater

The aquifer beneath the site is no longer classified as a current or potential future drinking water supply by the Commonwealth. Therefore, Maximum Contaminant Levels (MCLs) promulgated under the Safe Drinking Water Act, and Massachusetts Drinking Water Standards are no longer applicable and were removed as ARARs by the 2005 ESD. As a result of the revised aquifer classification and additional risk

assessment activities, the USEPA calculated revised groundwater clean-up goals (i.e., RBALs) which were documented in a 2005 ESD. These clean-up goals have been and are currently being met.

### **7.3 QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?**

No newly identified human health or ecological risks have been identified to date. No other information has come to light since the July 2009 site inspection that could affect the protectiveness of the remedy.

### **7.4 ARARS REVIEW**

A review of ARARs was conducted to evaluate whether the RAs are protective of human health and the environment. The review accounted for updated regulatory standards promulgated since the ROD, amended ROD and ESD were issued.

An analysis of newly promulgated or modified requirements of Federal and State environmental regulations was conducted to determine if these new ARARs change the protectiveness of the remedy. The evaluation includes a determination of whether the regulation is currently an ARAR or TBC, and whether the remediation, as planned in the ROD, amended ROD, and ESD, would be in compliance with the requirements. Action-, location-, and chemical-specific requirements are tabulated and located in Appendix B of this report.

The standards review was based on the review of USEPA-provided documents, as well as published Federal, State, and local rules and regulations. Recommendations are made as to whether any changes to the list of contaminants of concern need to be made. Under Section III.A of Attachment I "Explanation of Five-Year Review Policy" to OSWER Directive 9355.7-02, the Commonwealth should be requested to identify State ARARs promulgated or modified since the ROD, amended ROD, and ESD were signed, which may have a bearing on the protectiveness of the remedy. According to the MassDEP, as of this report, they were not aware of any new or revised State ARARs affecting the protectiveness of the Remedy.

Few changes to the ARARs have occurred since the ESD was signed. Most location and action specific ARARs currently apply to ongoing monitoring and O&M activities rather than the construction activities discussed in the last Five-Year Review. Two location-specific ARARs regarding federal protection of wetlands and protection of floodplain no longer exist as promulgated standards. No other substantive changes were identified for ARARs cited in the ESD. No changes to ARARs have occurred that would affect the protectiveness of the remedy.

## 8.0 ISSUES

**Table 8-1** provides a summary of the issues identified at the Site during this Five-Year Review.

**Table 8-1**  
**Issues**

<b>Issues</b>	<b>Affects Current Protectiveness (Y/N)</b>	<b>Affects Future Protectiveness (Y/N)</b>
The O&M and EMP plans need to be updated to account for changes as a result of redevelopment.	N	Y
Punch list items associated with RWP have not been completed, including, but not limited to, the installation of cap benchmarks and the installation of protective casing around vapor sampling points.	N	Y

## 9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

**Table 9-1** provides recommended follow-up actions for issues discovered at the Site during this Five-Year Review.

**Table 9-1**  
**Recommendations and Follow-up Actions**

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
<b>O&amp;M and EMP plans out of date</b>	Developer to amend, as per the approved Redevelopment Work Plan, the existing final O&M and EMP.	Developer	USEPA	Spring 2010	N	Y
<b>Punch list items associated with redevelopment incomplete</b>	Developer to complete miscellaneous items as described in the approved Work Plan for Redevelopment.	Developer	USEPA	Spring 2010	N	Y

## **10.0 PROTECTIVENESS STATEMENTS**

### **10.1 PROTECTIVENESS**

The remedy at Norwood PCBs Superfund Site protects human health and the environment because clean-up goals are being met and institutional controls have been recorded. The Laham property has been redeveloped and consists of two (2) new buildings totaling 56,000 square feet of commercial/retail space. Gravel and asphalt were added to the Remedial Cap thereby increasing its protectiveness. To be ensure protectiveness in the future, the O&M and EMP plans needs to be updated, punch list items associated with the redevelopment need to be completed.

## **11.0 NEXT REVIEW**

In accordance with the June 2001 Comprehensive Five-Year Review Guidance, the fourth Five-Year Review will be due five years from the signature date of this (third) Five-Year Review.

## 12.0 REFERENCES

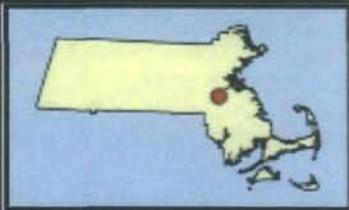
1. Foster Wheeler Environmental Corporation, 2000. Final Supplemental Risk Assessment, Norwood PCB Superfund Site. April 2000.
2. Foster Wheeler Environmental Corporation, 2000. Final Interim Remedial Action Report for the Norwood PCB Superfund Site Groundwater Treatment Plant. August 2000.
3. Foster Wheeler Environmental Corporation, 2002. Final Amendment to the Supplemental Risk Assessment, Norwood PCB Superfund Site. May 2002.
4. Foster Wheeler Environmental Corporation, 2003. Final Technical Memorandum, Development of Risk-Based Action Levels for the Protection of Ecological Receptors for Contaminants of Potential Concern in the Groundwater at the Norwood PCB Superfund Site. March 2003.
5. GZA Geo Environmental, Inc., 2003. Soil/Brook Remedial Construction Report. September 2003.
6. GZA Geo Environmental, Inc., 2004. Operation and Maintenance Plan, Norwood PCB Superfund Site. January 2004.
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11. GZA Geo Environmental, Inc., 2004. Environmental Monitoring Work Plan, Norwood PCB Superfund Site. January 2004.
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15. Nobis Engineering Inc. and Foster Wheeler Environmental Corporation, 2002. 27<sup>th</sup> Quarterly Groundwater Monitoring Report, Norwood PCB Superfund Site, Norwood, Massachusetts, October 2002 Sampling Event. March 4, 2003.
16. Tetra Tech FW, Inc., 2004. Draft Phase II Ecological and Human Health Risk Summary Report, Norwood PCB Superfund Site. July 2004.

17. Tetra Tech FW, INC., 2005. Twenty-Eighth Groundwater Monitoring Report Norwood PCB Superfund Site, Norwood, MA. June/July 2005.
18. Town of Norwood letter re: Master Plans
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21. U.S. Environmental Protection Agency, 1999. Preliminary Close-Out Report. September 23, 1999.
22. U.S. Environmental Protection Agency, 2009. Final Close-Out Report. September 22, 2009.
23. U.S. Environmental Protection Agency, 1999. Five-Year Review, Norwood PCB Superfund Site, Norwood, Massachusetts. December 1999.
24. U.S. Environmental Protection Agency, 2001. Comprehensive Five-Year Review Guidance. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. June 2001.
25. U.S. Army Corps of Engineers, 2000. Operation and Maintenance Manual, Meadow Brook Restoration, Norwood, Massachusetts. June 2000.
26. U.S. Army Corps of Engineers, 2002. Meadow Brook Restoration Remedial Action Report, Norwood, Massachusetts. January 2002.
27. U.S. Environmental Protection Agency, 2004. Five-Year Review, Norwood PCB Superfund Site, Norwood, Massachusetts. December 2004
28. U.S. Environmental Protection Agency, 2005. Explanation of Significant Differences for the Norwood PCB Superfund Site. Norwood, Massachusetts. February 2005.

## **APPENDIX A SITE MAPS**



I:\18605\18605-00.STP\Figures\18605-00\_SiteLocus\_FD1.mxd



SOURCE : SCANNED USGS TOPOGRAPHIC QUADRANGLES  
 SCANNED BY THE MASSACHUSETTS EXECUTIVE OFFICE OF  
 ENVIRONMENTAL AFFAIRS, MASSGIS. DISTRIBUTED JUNE, 2001.

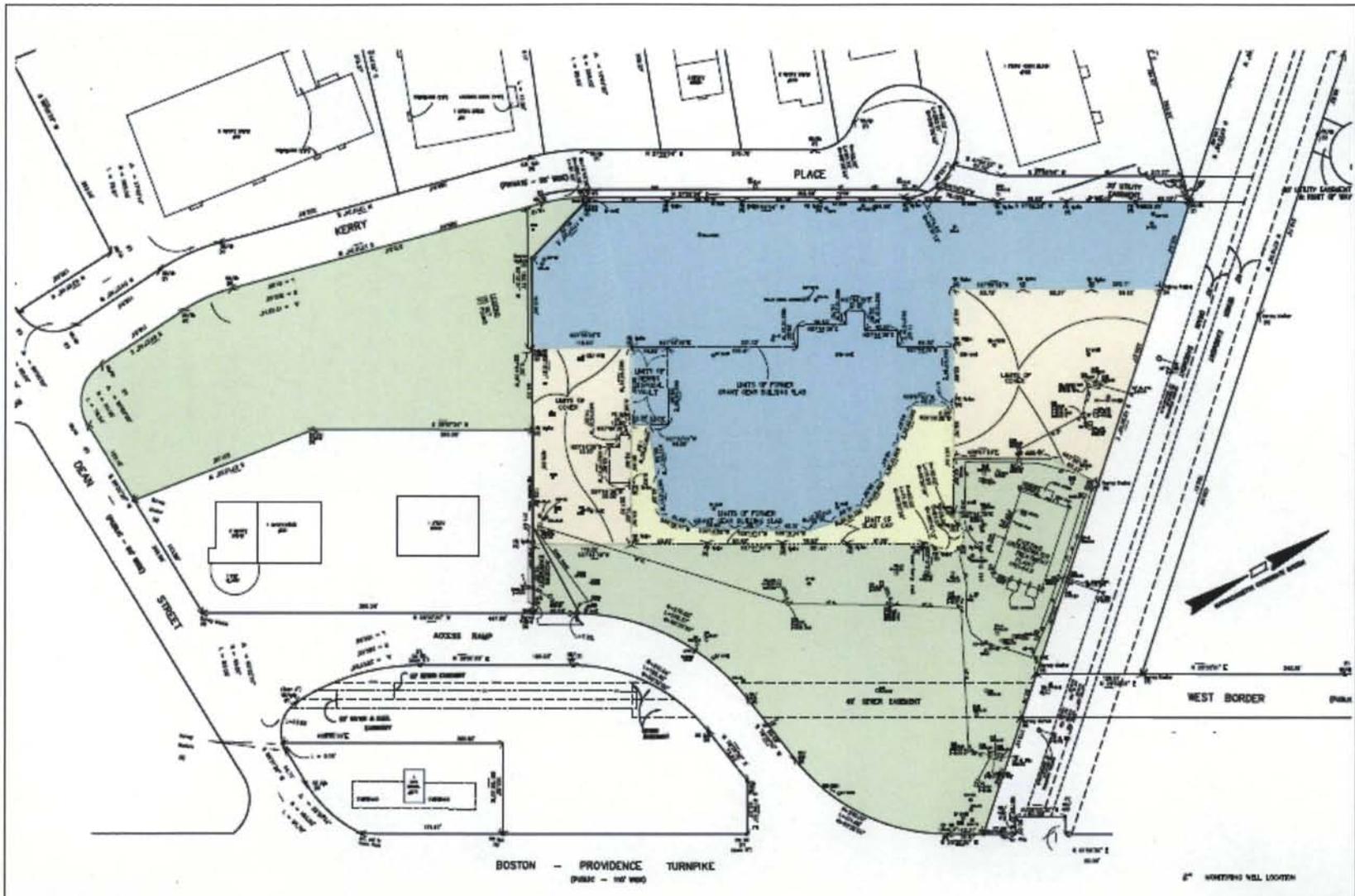


PROJ. MGR.: RBP  
 DESIGNED BY: DR  
 REVIEWED BY: AJR  
 OPERATOR: EMD  
 DATE: 12-14-2005

## LOCUS PLAN

### NORWOOD PCB SUPERFUND SITE NORWOOD, MASSACHUSETTS

JOB NO.  
 01.0018605.00  
 FIGURE NO.  
**1**



NO.	DATE	DESCRIPTION
1	10/20/80	ISSUED FOR PLAN

SCALE 1" = 50'

AREA AND MAP  
 PREPARED BY  
 CONSULTING ENGINEER  
 CONTRACT NO.  
 DATE: 04/18/80

PROPOSED RETAIL STORES  
 NORWOOD, MASSACHUSETTS

EXISTING CONDITIONS PLAN

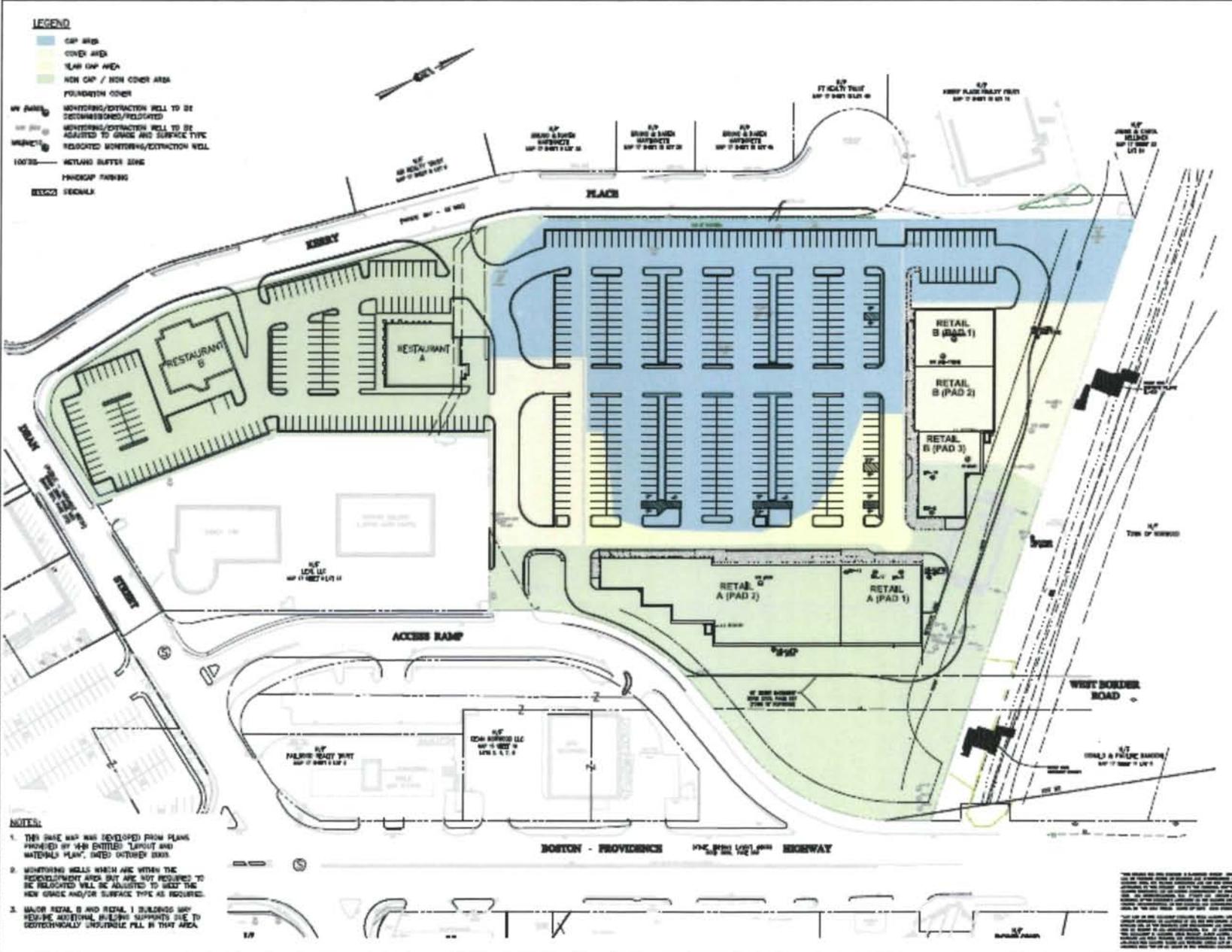
PROJECT NO.  
**18356.80**

FIGURE NO.  
**2**

**NOTES**

1. THE SITE MAP WAS DERIVED FROM PLANS PROVIDED BY NORWOOD ENGINEERING, DATED 1/15/80. SCALE 1/4" = 10'. UNDER LICENSE PLAN NO. 14477 DATED MARCH 20, 1979.
2. ALL DIMENSIONS CONTROLLED BY THESE RECORDS UNLESS OTHERWISE SPECIFIED.





- LEGEND**
- CAP AREA
  - COVER AREA
  - NON CAP / NON COVER AREA
  - FOUNDATION OTHER
  - MONITORING/EXTRACTION WELL TO BE DETERMINED/LOCATED
  - MONITORING/EXTRACTION WELL TO BE ADJUSTED TO GROUND AND SURFACE TYPE
  - RELOCATED MONITORING/EXTRACTION WELL
  - WETLAND BUFFER ZONE
  - PAVED/PAVING
  - EXISTING STRUCTURE

- NOTES:**
1. THIS SHRE MAP WAS DEVELOPED FROM PLANS PROVIDED BY THE ENTITLED LAYOUT AND MATERIALS PLAN, DATED OCTOBER 2009.
  2. MONITORING WELLS WHICH ARE WITHIN THE REDEVELOPMENT AREA BUT ARE NOT REQUIRED TO BE RELOCATED WILL BE ADJUSTED TO MEET THE NEW USAGE AND/OR SURFACE TYPE AS REQUIRED.
  3. MAJOR RETAIL B AND RETAIL 1 BUILDINGS MAY REQUIRE ADDITIONAL ANCHOR SUPPORTS DUE TO GEOTECHNICALLY UNSTABLE FILL IN THAT AREA.

PROJECT NO.	16556.80
FIGURE NO.	3
PROPOSED RETAIL STORES	PROPOSED CONDITIONS PLAN
INTERSECTION OF WHITE BULLER ROAD AND BOSTON-PROVIDENCE HIGHWAY	
DATE: 11-11-2009	
SCALE: 1" = 40'	
DESIGNED BY: [Signature]	CHECKED BY: [Signature]
DRAWN BY: [Signature]	DATE: 11-11-2009
PROJECT NO. 16556.80	FIGURE NO. 3

**APPENDIX B**  
**TABLES DOCUMENTING ARARs**

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTION TAKEN TO ATTAIN ARARs
<b>CHEMICAL SPECIFIC ARARs:</b>				
Federal Criteria, Advisories, and Guidance	Technical Basis for Deriving Sediment Quality Criteria for Non-ionic Organic Contaminants for the Protection of Benthic Organisms Using Equilibrium Partitioning (EPA-822-R-93-011)	To be Considered	This guidance is used to establish criteria to protect the aquatic organisms in streams and to determine environmental risk within the sediment and to set sediment cleanup levels.	The criteria established were used to evaluate risks to aquatic organisms exposed to contaminated water entrained
	Clean Water Act – Sec. 304 Federal Ambient Water Quality Criteria 33 USC 1314; 40 CFR 122.44	Relevant and Appropriate	Federal AWQC are criteria for protection of human health and aquatic organisms which have been developed for carcinogenic and Brook noncarcinogenic compounds.  AWQC are developed under the Clean Water Act (CWA) as guidelines from which states develop water quality standards.	AWQC were used to characterize risks to fresh water aquatic life in Meadow Brook
	EPA Carcinogenic Assessment Group Potency Factors	To be Considered	Potency factors are developed by the EPA from Health Effects Assessments or Evaluation by the Carcinogenic Assessment Group.	EPA Carcinogenic Potency Factors were used to complete the individual incremental cancer risk resulting from exposure to site contaminants.
	EPA Risk Reference Doses (RfDs)	To be Considered	RfDs are does levels developed by the EPA for non-carcinogenic effects.	EPA RfDs were used to characterize risks due to exposure to contaminants on site.
<b>LOCATION SPECIFIC ARARs</b>				
Federal Regulatory	Wetlands Executive Order (EO 11990) 40 CFR Part 6, Appendix A	Applicable	Under this regulation, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	Any redevelopment or O &M will include all all practicable means of minimizing harm to wetlands.
	Floodplains Executive Order (EO 11988) 40 CFR Part 6, Appendix A	Applicable	Federal agencies are required to reduce the risk of flood loss, to minimize the impact of floods, and to restore and preserve the natural and beneficial values of floodplains.	The remedial action was designed to keep all activities out of the floodplain to the greatest extent practicable.
	Clean Water Act (CWA) – Section 404 Dredge and Fill Requirements (33 U.S.C. 1344; 40 CFR Part 230)	Applicable	No activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	Ongoing monitoring and O&M activities in and adjacent to Meadow Brook or any other Site wetlands will meet these standards.
	Fish and Wildlife Coordination Act 16 U.S.C. 661	Applicable	Before undertaking any Federal action that causes the modification of any body of water or affects fish and wildlife.	Federal and State fish and wildlife agencies will be consulted concerning any monitoring and O&M activities in and adjacent to Meadow Brook.

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTION TAKEN TO ATTAIN ARARs
	Resource Conservation and Recovery Act (RCRA) Location Standards (40 C.F.R. 264.18)	Relevant and Appropriate	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	Hazardous waste disposed of or generated within the floodplain of Meadow Brook will be managed to prevent a release of hazardous waste in the event of a flood event.
State Regulatory	Massachusetts Wetlands Protection Act (M.G.L. c.131 Section 40 : 310 CMR 10.00)	Applicable	These regulations outline the requirements necessary to work within 100 feet of a wetland.	All redevelopment, monitoring, or O&M work within areas regulated under this standard will be conducted in compliance with these regulations.
	Massachusetts Waterways Regulations (M.G.L. c.21, Sections 26-53; 314 CMR 9.00)	Applicable	Regulates work within waterways, including water quality protection.	All redevelopment, monitoring, or O&M work within or adjacent to Meadow Brook will comply with these standards.

#### ACTION SPECIFIC ARARs

Federal Regulatory Requirements	Resource Conservation and Recovery Act (RCRA) Subtitle C (40 C.F.R. 260-262)	Applicable (for generated wastes); Relevant and Appropriate (for closure/post closure)	RCRA regulates the generation, transport, storage, treatment, and disposal of hazardous Waste. CERCLA specifically requires (in Section 121(d)(3) that hazardous substances from response actions be disposed of at facilities in compliance with Subtitle C of RCRA	Wastes generated during monitoring or O & M activities will be characterized and handled in accordance with applicable RCRA regulations. Wastes left in place under the cap will be managed in compliance with closure and post-closure standards.
	Toxic Substances Control Act (TSCA), 15 U.S.C. §§ 2601, <i>et seq.</i> , 40 C.F.R. 761.75	Applicable	Establishes standards for PCB landfills, including permitting waivers for clay soils, synthetic liner, 50 feet to water table, and leachate collection requirements upon a finding by the Regional Administrator.	Closure/post closures standards (incorporating waivers invoked under the ROD amendment) for the capped PCB wastes will be followed.
	Toxic Substances Control Act (TSCA), (40 C.F.R. 760.60)		Establishes treatment and disposal standards for PCB wastes generated as part of redevelopment, monitoring or O&M activities.	Treatment and disposal standards for PCB generated wastes will be satisfied.
	Clean Water Act - Sec. 304 Federal Ambient Water Quality Criteria 33 USC 1314; 40 CFR 122.44	Relevant and Appropriate	AWQC are developed under the Clean Water Act (CWA) as guidelines from which states develop water quality standards.	AWQC are used to monitor water quality in Meadow Brook to assess the protectiveness of the remedy.
	Guide on Remedial Actions at Superfund Sites with PCB Contamination (OSWER Directive 9355.4-01, August 1990)	To be considered	Sets forth guidelines for implementing remedial actions for PCBs	Ongoing monitoring and O&M activities will be conducted consistent with the goals of this guidance.
State Regulatory Requirements	Massachusetts Groundwater Protection Regulations 314 CMR 6.00	Relevant and Appropriate	These regulations establish the criteria for classifying ground water and for establishing monitoring standards.	Groundwater has been reclassified as Class III, designated for uses other than as a source of potable water supply. The regulations also set standards that will be used for monitoring.

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTION TAKEN TO ATTAIN ARARs
	Massachusetts Ambient Air Quality Standards	Applicable	These regulations specify emissions standards for particulates and lead.	All redevelopment, monitoring and O&M activities will be conducted in a manner to minimize the generation of dust or other hazardous wastes.
	Massachusetts Air Pollution Control Regulations 310 C.M.R. 7.00	Applicable	Regulations specific to control of odor and requirements for handling asbestos wastes and fugitive dust emissions.	Any odors and fugitive dust generated by O&M, redevelopment, and monitoring will be controlled under these standards.
	Massachusetts Hazardous Waste Regulations 310 C.M.R. 30.00	Applicable	Regulations governing the generation, treatment, storage, and disposal of hazardous waste.	These regulations will be followed in conducting O&M, monitoring, and redevelopment activities. Portions of these regulations, which are specific to on-site PCBs are not applicable since PCB are adequately regulated under TSCA.
	Massachusetts Hazardous Waste Regulations 310 C.M.R. 30.125(b)	Applicable	Requirements for Toxic Characteristic Leaching Procedure (TCLP).	Wastes generated for off-site disposal in conducting O&M, monitoring, and redevelopment activities will be characterized and handled in accordance with these standards.
	Massachusetts Hazardous Waste Regulations 310 C.M.R. 30.302	Applicable	Requirements for any generator of a waste to determine if the waste is hazardous.	Wastes generated for off-site disposal in conducting O&M, monitoring, and redevelopment activities will be characterized and handled in accordance with these standards.

**APPENDIX C  
INTERVIEW NOTES**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
Region 1  
1 Congress Street, Suite 1100  
BOSTON, MA 02114-2023

**Norwood PCB's Site Interviews**

Name: David Buckley

Title: Project Manager

Organization: MassDEP

What is your relationship to the Norwood PCBs Site?

Project Manager for the Commonwealth of Massachusetts (acting through MassDEP).

Are there any issues regarding the site that you would like to bring to EPA's attention?

Site remediation has been completed to MassDEP's satisfaction. Also, redevelopment activities have been substantially completed to MassDEP's satisfaction. Redevelopment activities have had to necessarily interact with the site remedy components and EPA, MassDEP, the site owner, and developer have worked closely to see the two complemented each other. Redevelopment to a shopping center was a beneficial use that MassDEP believes is an overall improvement.

There are a number of minor punch list items which the developer has committed to completing in short order. Some of these items are critical to the long term protection and monitoring of the remedy including the Grant of Environmental Restriction and Easement. Of critical importance are installing bench marks to identify the critical cap components and updating the as-built plans to reflect actual field conditions.

Do you believe that the completed Remedial Actions are protective of human health and the environment?

Yes, upon completion of the punch list items referenced in the answer to question 1 above.

Do you foresee any issues becoming a problem affecting the protectiveness of the remedy in the future?

No, as long as the various responsible parties continue to maintain the remedy components they are responsible for. To date this has not been a problem.

Do you have any other questions, comments or concerns?

No



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
Region 1  
1 Congress Street, Suite 1100  
BOSTON, MA 02114-2023

Norwood PCB's Site Interviews

Name: Albert Ricciardelli

Title: Senior Principal

Organization: GZA GeoEnvironmental, Inc.

What is your relationship to the Norwood PCBs Site?

Project Coordinator for Settling Defendants Remedial Action

Are there any issues regarding the site that you would like to bring to EPA's attention?

No

Do you believe that the completed Remedial Actions are protective of human health and the environment?

Yes

Do you foresee any issues becoming a problem affecting the protectiveness of the remedy in the future?

No

Do you have any other questions, comments or concerns?

None



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 1  
1 Congress Street, Suite 1100  
BOSTON, MA 02114-2023

Norwood PCB's Site Interviews

Name: Steve Costello

Title: Director of Community Planning and  
Economic Development

Organization: Town of Norwood

What is your relationship to the Norwood PCBs Site?

The Norwood Planning Board issued the Special Permit allowing the redevelopment of this site. I am the primary contact for the Board.

Are there any issues regarding the site that you would like to bring to EPA's attention?

None at this time

Do you believe that the completed Remedial Actions are protective of human health and the environment?

I think the EPA and DEP have done an outstanding job in assisting the Town with the rehabilitation of this site. There were absolutely no issues with the town or abutting neighbors because the EPA and the developer agreed to a Work Plan with Remedial Actions prior to construction. This Work Plan addressed the town's primary concern (i.e. do not disturb the capped area) and, in my opinion, the final development is very protective of human health and the environment.

Do you foresee any issues becoming a problem affecting the protectiveness of the remedy in the future?

None at this time

Do you have any other questions, comments or concerns?

None at this time



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 1

1 Congress Street, Suite 1100  
BOSTON, MA 02114-2023

Norwood PCB's Site Interviews

Name: Jim Grafmeyer

Title: V.P. Development

Organization: Developers Diversified Realty (DDR)

What is your relationship to the Norwood PCBs Site?

Lessee/Developer

Are you aware of the past remedial activities (capping, groundwater treatment) at the Norwood PCBs site?

Yes

Are you aware of the most recent redevelopment activities at the Norwood PCBs site?

Yes

Do you have any questions or concerns regarding either the remedial (i.e., clean-up) activities or redevelopment activities at the Norwood PCBs?

No

Do you have any recommendations for the USEPA regarding this site?

No

**APPENDIX D  
PHOTODOCUMENTATION**



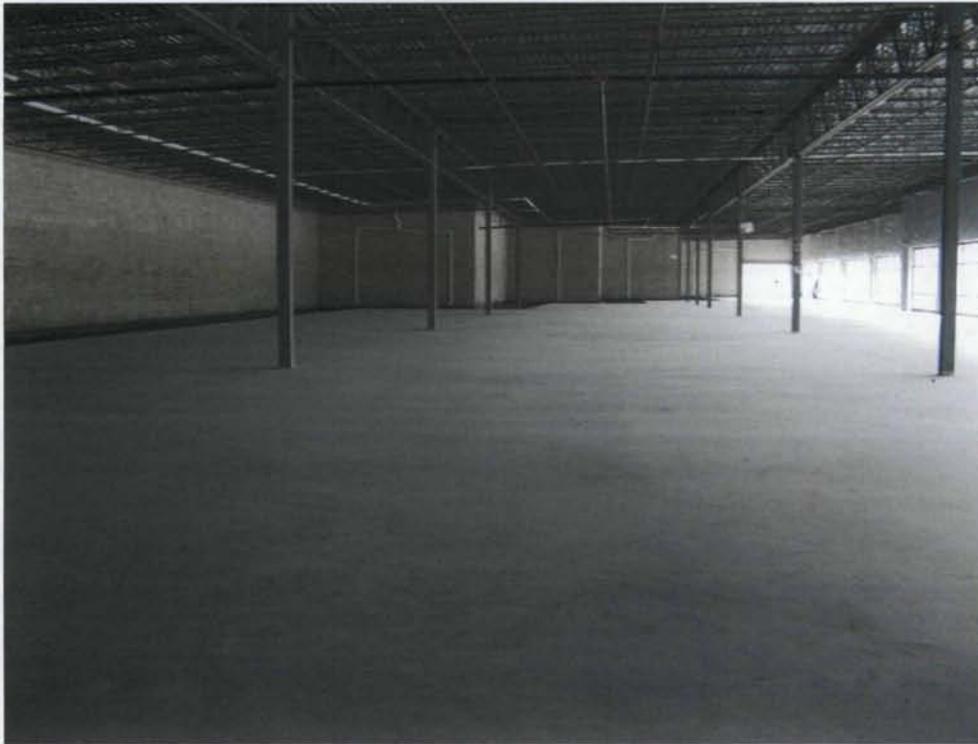
Photograph 1: The Redeveloped Site (cap/parking lot foreground/retail buildings background).



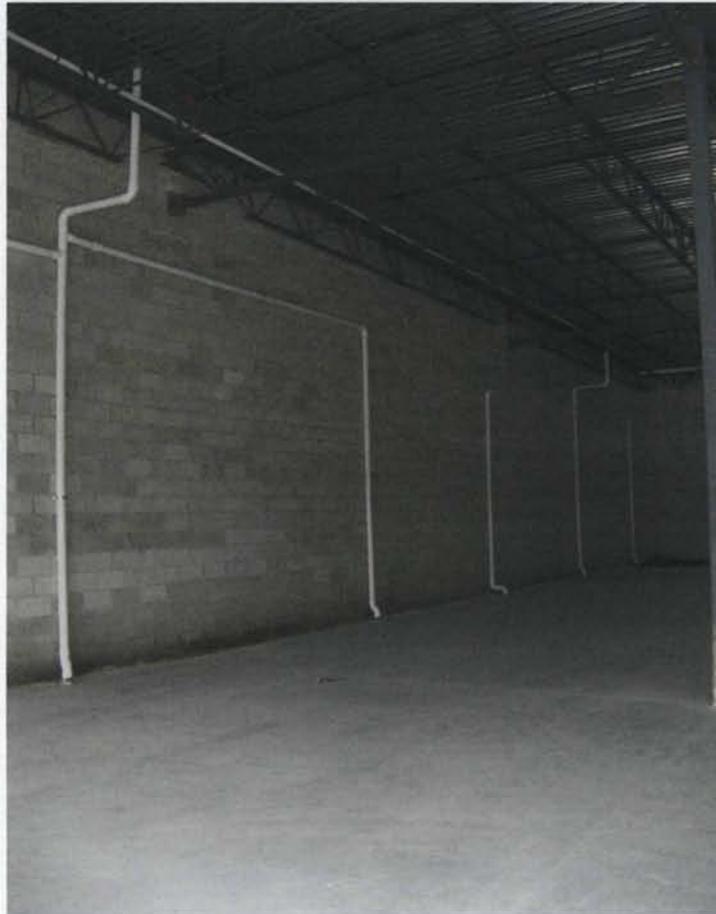
Photograph 2: Retail Building A (looking towards Route 1).



Photograph 3: Retail Building B (looking towards Meadow Brook).



Photograph 4: The interior of Retail Building A.



Photograph 5: Elements of the Passive Vapor Mitigation System in Building A.



Photograph 6: The Liquid Boot™ Vapor Barrier layer which underlies concrete slab.



Photograph 7: Roof penetration and exhaust vent to passive Vapor Mitigation System (Retail Building A).



Photograph 8: The interior of Retail Building B.



Photograph 9: Elements of the Passive Vapor Mitigation System in Retail Building B.



Photograph 10: The Liquid Boot™ Vapor Barrier layer which underlies concrete slab.



Photograph 11: The newly-constructed parking lot that overlies the Remedial Cap.



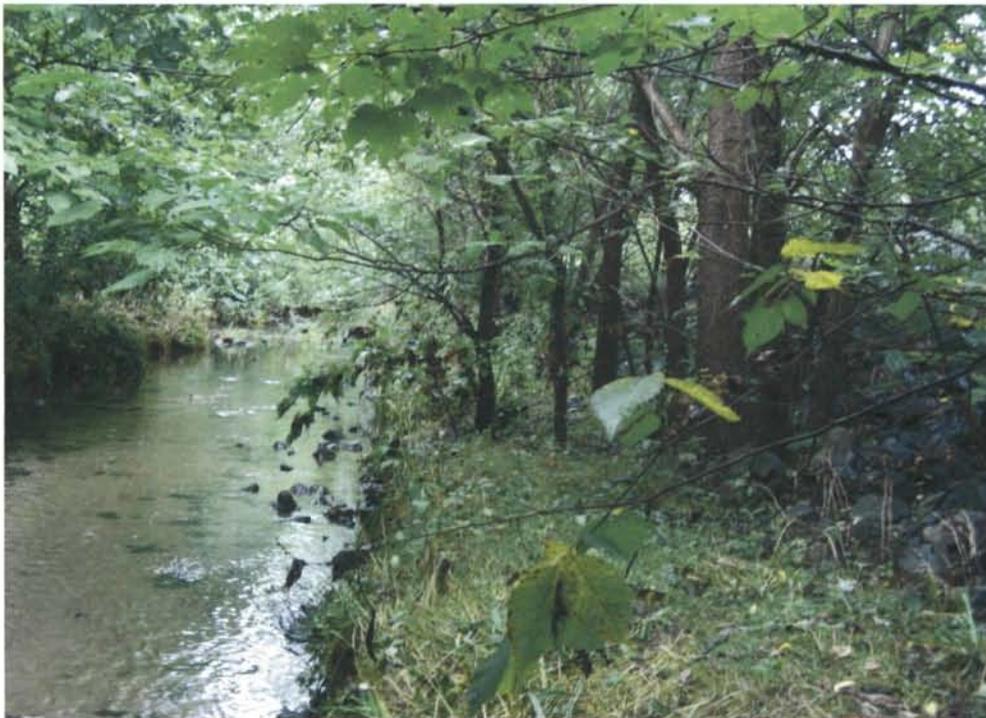
Photograph 12: The northwest edge of the parking lot and property boundary with Kerry Place.



Photograph 13: Detention basin facing Southeast with maintenance crews visible.



Photograph 14: Grounds crew maintaining detention basin.



Photograph 15: Meadow Brook, looking facing down stream (Southeast).



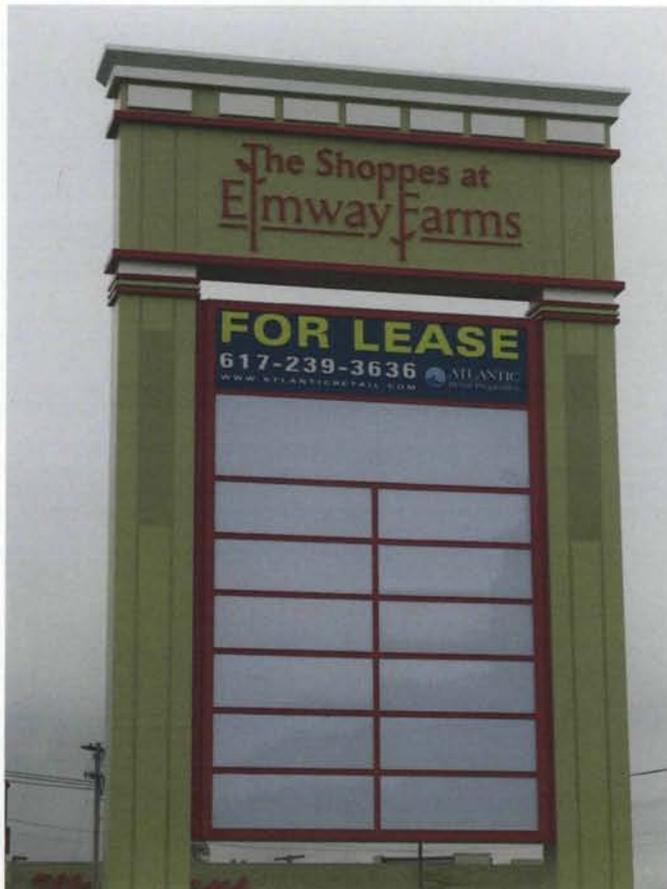
Photograph 16: Storm drain point of discharge into the detention basin.



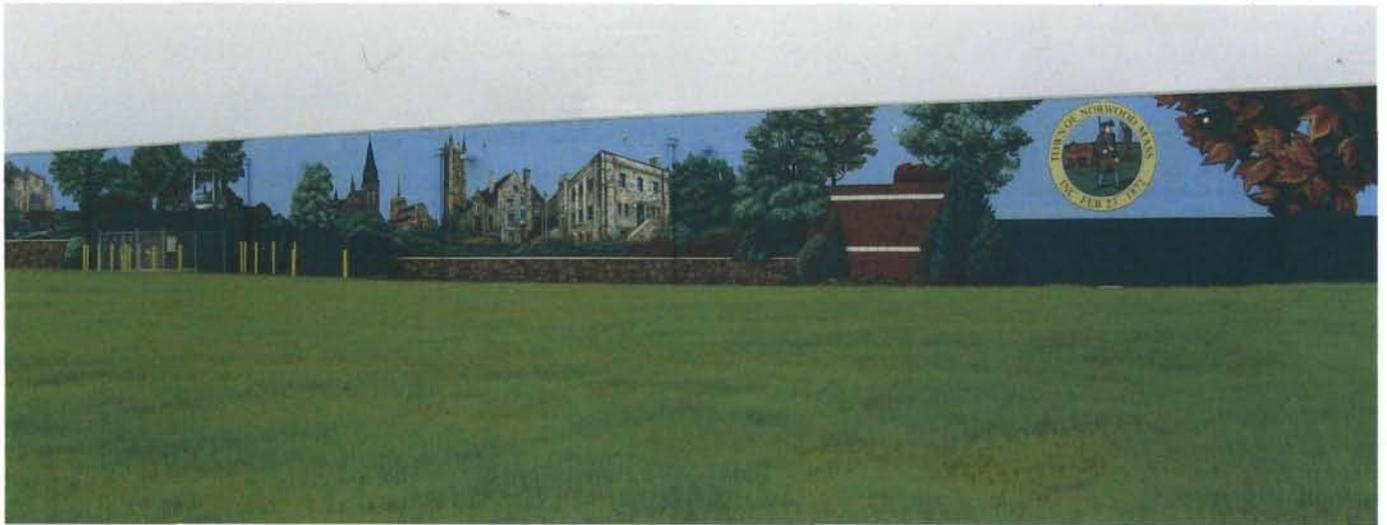
Photograph 17: Overgrowth on slope of the detention basin along Meadow Brook.



Photograph 18: Shopping cart discarded in Meadow Brook.



Photograph 19: Sign fronting Rt. 1.



Photograph 20: The mural on the rear of Retail Building A, as viewed from Route 1 (required by the Town of Norwood).



Photograph 21: Sub-slab sampling ports located along the rear of Retail Building A



Photograph 22: Sub-slab sampling ports located along the rear of Retail Building B.



Photograph 23: Sub-slab sampling ports located along the rear of Retail Building B.

**APPENDIX E**  
**SITE INSPECTION CHECKLISTS**

## Five-Year Review Site Inspection Checklist Norwood PCBs Superfund Site, Norwood, Massachusetts

I. SITE INFORMATION			
<b>Site name:</b> Norwood PCBs	<b>Date of Inspection:</b> July 8, 2009		
<b>Location and Region:</b> Rt. 1 and Dean St, Norwood, Massachusetts, USEPA Region I	<b>EPA ID:</b> MAD980670566		
<b>Agency, office, or company leading the five-year review:</b> USEPA Region I	<b>Weather/temperature:</b> Partly Cloudy ~ 70°F		
<b>Remedy Includes:</b> (Check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Landfill cover/containment  <input type="checkbox"/> Access controls  <input checked="" type="checkbox"/> Institutional controls  <input type="checkbox"/> Groundwater pump and treatment  <input type="checkbox"/> Surface water collection and treatment  <input type="checkbox"/> Other _____             </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Monitored natural attenuation  <input type="checkbox"/> Groundwater containment  <input type="checkbox"/> Vertical barrier walls             </td> </tr> </table>		<input checked="" type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	<input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls
<input checked="" type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	<input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls		
<b>Attachments:</b> <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached			
II. INTERVIEWS (Check all that apply)			
1. <b>O&amp;M site manager</b> <u>Albert Ricciardelli</u> <u>Senior Principal, GZA</u> _____ <div style="display: flex; justify-content: space-around; font-size: small;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone    Phone no. _____ Problems, suggestions; Report attached <u>Interview record attached</u> _____			
2. <b>O&amp;M staff</b> _____                      _____                      _____ <div style="display: flex; justify-content: space-around; font-size: small;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone    Phone no. _____ Problems, suggestions; Report attached _____ _____			



III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1.	<b>O&amp;M Documents</b> <input checked="" type="checkbox"/> O&M manual <input checked="" type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs Remarks _____	<input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
2.	<b>Site-Specific Health and Safety Plan</b> <input type="checkbox"/> Contingency plan/emergency response plan Remarks <u>This H&amp;S Plans exist for O&amp;M and Redevelopment activities.</u>	<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A
3.	<b>O&amp;M and OSHA Training Records</b> Remarks _____	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
4.	<b>Permits and Service Agreements</b> <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits Dumpster for the City Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
5.	<b>Gas Generation Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
6.	<b>Settlement Monument Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
7.	<b>Groundwater Monitoring Records</b> Remarks <u>These records are submitted annual in Groundwater Monitoring Reports</u>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
8.	<b>Leachate Extraction Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
9.	<b>Discharge Compliance Records</b> <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
10.	<b>Daily Access/Security Logs</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A



<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b>		
	Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Type of monitoring (e.g., self-reporting, drive by)	Site visits	
	Frequency	No less than quarterly	
	Responsible party/agency	MassDEP is responsible; however, site visits routinely conducted by PRP's consultants (GZA), EPA and MassDEP.	
	Contact	David Buckley	Project Manager
		Name	Title
			617-556-1156
			Phone no.
	Reporting is up-to-date	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Reports are verified by the lead agency	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Specific requirements in deed or decision documents have been met	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Violations have been reported	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Other problems or suggestions:	<input type="checkbox"/> Report attached	
	<u>Institutional Controls include following (general) use restrictions: no groundwater withdrawal, no interference with response actions, disruption of caps, or excavation of contaminated material. No formal reports required by MassDEP; however, property use is described (and updated) in Annual Monitoring reports prepared by GZA and reviewed by EPA and MassDEP</u>		
2.	<b>Adequacy</b>	<input checked="" type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A
	Remarks		
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No vandalism evident
	Remarks	Graffiti was noticed during one site inspection and has since been removed.	
2.	<b>Land use changes on site</b>	<input checked="" type="checkbox"/> Redevelopment	<input type="checkbox"/> N/A
	Remarks	The site has been redeveloped for commercial/retail use. Two buildings are on the site but are currently vacant.	
3.	<b>Land use changes off site</b>	<input checked="" type="checkbox"/> N/A	
	Remarks		
<b>VI. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	<b>Roads damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A
	Remarks		

<b>B. Other Site Conditions</b>		
Remarks _____ As a result of the completed redevelopment, site conditions are generally improved (for example there are new access road, additional asphalt over the cap, increased lighting, etc.). _____		
<b>VII. LANDFILL COVERS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		
<b>A. Landfill Surface</b>		
1.	<b>Settlement</b> (Low spots) Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Settlement not evident Depth _____
2.	<b>Cracks</b> Lengths _____    Widths _____    Depths _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident
3.	<b>Erosion</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident Depth _____
4.	<b>Holes</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Holes not evident Depth _____
5.	<b>Vegetative Cover</b> <input type="checkbox"/> Grass <input type="checkbox"/> Cover properly established <input type="checkbox"/> No signs of stress <input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram) Remarks _____	
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> <input checked="" type="checkbox"/> Additional Layer: Parking Lot Remarks _____ As a result of redevelopment, an asphalt parking lot was installed over the remedial cap.	
7.	<b>Bulges</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Bulges not evident Height _____
8.	<b>Wet Areas/Water Damage</b> <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____	<input checked="" type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map    Areal extent _____ <input type="checkbox"/> Location shown on site map    Areal extent _____ <input type="checkbox"/> Location shown on site map    Areal extent _____ <input type="checkbox"/> Location shown on site map    Areal extent _____
9.	<b>Slope Instability</b> <input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____	<input checked="" type="checkbox"/> No evidence of slope instability

<b>B. Benches</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	<b>Flows Bypass Bench</b> Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A or okay
2.	<b>Bench Breached</b> Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A or okay
3.	<b>Bench Overtopped</b> Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A or okay
<b>C. Letdown Channels</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	<b>Settlement</b> Areal extent _____      Depth _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of settlement
2.	<b>Material Degradation</b> Material type _____      Areal extent _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of degradation
3.	<b>Erosion</b> Areal extent _____      Depth _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion
4.	<b>Undercutting</b> Areal extent _____      Depth _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting
5.	<b>Obstructions</b> Type _____ <input type="checkbox"/> Location shown on site map      Areal extent _____ Size _____ Remarks _____ _____	<input type="checkbox"/> No obstructions
6.	<b>Excessive Vegetative Growth</b> Type _____ <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map      Areal extent _____ Remarks _____ _____	
<b>D. Cover Penetrations</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		

1.	<b>Gas Vents</b>	<input type="checkbox"/> Active	<input type="checkbox"/> Passive	
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	<input checked="" type="checkbox"/> N/A	
	Remarks _____			
<hr/>				
2.	<b>Gas Monitoring Probes</b>	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Good condition
	Remarks _____			
<hr/>				
3.	<b>Monitoring Wells (within surface area of Cap)</b>	<input type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning	<input checked="" type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration	<input checked="" type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Good condition
	Remarks <u>One groundwater monitoring well was noted to be missing a lock in the north cover area. This is a redevelopment punch list item.</u>			
<hr/>				
4.	<b>Leachate Extraction Wells</b>	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Good condition
	Remarks _____			
<hr/>				
5.	<b>Settlement Monuments</b>	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed	<input checked="" type="checkbox"/> N/A
	Remarks _____			
<hr/>				
<b>E. Gas Collection and Treatment</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
<hr/>				
1.	<b>Gas Treatment Facilities</b>	<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse
	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance		
	Remarks _____			
<hr/>				
2.	<b>Gas Collection Wells, Manifolds and Piping</b>	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance	
	Remarks _____			
<hr/>				
3.	<b>Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)</b>	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks _____			
<hr/>				
<b>F. Cover Drainage Layer</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
<hr/>				
1.	<b>Outlet Pipes Inspected</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
	Remarks _____			
<hr/>				
2.	<b>Outlet Rock Inspected</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
	Remarks _____			

<b>G. Detention/Sedimentation Ponds</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A <u>A detention basin is located along the northern edge of the property and is used to manage stormwater form the Roof drains and parking lot (i.e., Cap).</u>		
1.	<b>Siltation</b> Areal extent _____ Depth _____ <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Siltation not evident Remarks _____ _____	
2.	<b>Erosion</b> Areal extent _____ Depth _____ <input checked="" type="checkbox"/> Erosion not evident Remarks _____ _____	
3.	<b>Outlet Works</b> <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____	
4.	<b>Dam</b> <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____	
5.	<b>Vegetative Growth</b> <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Vegetation does not impede flow Areal extent _____ Type _____ Remarks <u>Vegetative growth in the detention basin is maintained by grounds crew 2 times per year.</u>	

<b>H. Retaining Walls</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Deformations</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Horizontal displacement _____	Vertical displacement _____	
	Rotational displacement _____		
	Remarks _____		
	_____		
2.	<b>Degradation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
	Remarks _____		
	_____		
<b>I. Perimeter Ditches/Off-Site Discharge</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
<u>Meadow Brook flows along the northern edge of the site and receives stormwater from the detention basins.</u>			
1.	<b>Siltation</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Siltation not evident
	Areal extent _____	Depth _____	
	Remarks _____		
	_____		
2.	<b>Vegetative Growth</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Vegetation does not impede flow		
	Areal extent _____	Type _____	
	Remarks <u>While the flow does not seem to be restricted, some debris has accumulated in the Brook and the vegetation on the side slopes is moderate. The Town has been made aware of their responsibility to perform the recommend O&amp;M as per the O&amp;M Manual for Meadow Brook.</u>		
	_____		
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident
	Areal extent _____	Depth _____	
	Remarks _____		
	_____		
4.	<b>Discharge Structure</b>	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
	_____		
<b>VIII. VERTICAL BARRIER WALLS</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
	Areal extent _____	Depth _____	
	Remarks _____		
	_____		
2.	<b>Performance Monitoring</b>	Type of monitoring _____	
	<input type="checkbox"/> Performance not monitored		
	Frequency _____	<input type="checkbox"/> Evidence of breaching	
	Head differential _____		
	Remarks _____		
	_____		

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	<b>Pumps, Wellhead Plumbing, and Electrical</b> <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____
2.	<b>Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
3.	<b>Spare Parts and Equipment</b> <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	<b>Collection Structures, Pumps, and Electrical</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
3.	<b>Spare Parts and Equipment</b> <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____

<b>C. Treatment System</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A (GWTP decommissioned and removed)
1.	<b>Treatment Train</b> (Check components that apply)		
	<input type="checkbox"/> Metals removal	<input type="checkbox"/> Oil/water separation: _____	<input type="checkbox"/> Bioremediation
	<input type="checkbox"/> Air stripping	<input type="checkbox"/> Carbon adsorbers: _____	
	<input type="checkbox"/> Filters _____		
	<input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____		
	<input type="checkbox"/> Others _____		
	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance	
	<input type="checkbox"/> Sampling ports properly marked and functional		
	<input type="checkbox"/> Sampling/maintenance log displayed and up to date		
	<input type="checkbox"/> Equipment properly identified		
	Quantity of groundwater treated annually _____		
	Quantity of surface water treated annually _____		
	Remarks _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional)		
	<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance
	Remarks _____		
3.	<b>Tanks, Vaults, Storage Vessels</b>		
	<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance
	Remarks _____		
4.	<b>Discharge Structure and Appurtenances</b>		
	<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance
	Remarks _____		
5.	<b>Treatment Building(s)</b>		
	<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs repair
	<input type="checkbox"/> Chemicals and equipment properly stored		
	Remarks _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy)		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition
	<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks _____		
<b>D. Monitoring Data</b>			
<u>The last comprehensive monitoring data was collected on July 2005 (31 monitoring wells and 9 extraction wells). Since that that time, bi-annual groundwater monitoring has continued as part of the PRPs Cap and Cover O&amp;M Plan. Annual reports are received.</u>			
1.	<b>Monitoring Data</b>		
	<input checked="" type="checkbox"/> Is routinely submitted on time	<input checked="" type="checkbox"/> Is of acceptable quality	
2.	<b>Monitoring data suggests:</b>		
	<input type="checkbox"/> Groundwater plume is effectively contained	<input type="checkbox"/> Contaminant concentrations are declining	

**D. Monitored Natural Attenuation**

1. **Monitoring Wells** (natural attenuation remedy)
- Properly secured/locked       Functioning       Routinely sampled       Good condition  
 All required wells located       Needs Maintenance       N/A
- Remarks \_\_\_\_\_

**X. OTHER REMEDIES**

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

**XI. OVERALL OBSERVATIONS**

**A. Implementation of the Remedy**

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The purpose of the remedy is isolated and prevent direct contact with PCB-contaminated soil and sediment. Based upon the site inspection, monitoring results, and observations during this review, the remedy appears to be functioning as intended. New groundwater cleanup goals established in the 2005 ESD have been met. The Site was approved for and subsequently redeveloped in 2008.

**B. Adequacy of O&M**

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

O&M plans exist for the Cap and Cover area of the site and the Meadow Brook parcel. However, the O&M plan needs to be updated so as to reflect minor changes as a result of the completed redevelopment.

**C. Early Indicators of Potential Remedy Problems**

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

No issues or observations which suggest the protectiveness of the remedy may be compromised.

**D. Opportunities for Optimization**

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Remedial Action is complete and the Final Close-out Report (FCOR) has been prepared. Remaining remedial activities consist predominantly of PRP-lead O&M activities, therefore, no real opportunity for optimization.