

Analysis of Brownfields Cleanup Alternatives

DRAFT

**Former Borden Chemical Printing Facility
1625 Federal Street
Block 1184, Lot 5
City of Camden
Camden County, New Jersey**

**NJDEP Case No. 99-07-16-0034-09
NJDEP PI No. G000003602**

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CONTENTS

1	INTRODUCTION & BACKGROUND.....	1
1.1	Site Description and Previous Uses	2
1.2	Surrounding Land Use	3
1.3	Project Goal (Reuse Plan)	3
1.4	Summary of Environmental Conditions	3
1.5	Physical Setting.....	4
1.6	Exposure Pathways	5
2	APPLICABLE LAWS AND CLEANUP STANDARDS.....	5
3	EVALUATION OF CLEANUP ALTERNATIVES.....	6
3.1	Alternative No. 1 - Removal of Soil and Enactment of Engineering and Institutional Controls.....	7
3.1.1	Effectiveness.....	7
3.1.2	Sustainability and Resilience.....	8
3.1.3	Implementability.....	8
3.1.4	Operation and Maintenance.....	8
3.1.5	Institutional Controls	8
3.1.6	Cost.....	9
3.2	Alternative No. 2 - Removal of Historic Fill and PCB-contaminated Soil Sitewide.....	9
3.2.1	Effectiveness.....	10
3.2.2	Sustainability and Resilience.....	10
3.2.3	Implementability.....	10
3.2.4	Operation and Maintenance.....	10
3.2.5	Institutional Controls	10
3.2.6	Cost.....	10
3.3	Alternative No. 3 - No Action.....	10
3.3.1	Effectiveness.....	10
3.3.2	Sustainability and Resilience.....	11
3.3.3	Implementability.....	11
3.3.4	Operation and Maintenance.....	11
3.3.5	Institutional Controls	11
3.3.6	Cost.....	11
3.4	Preferred Alternative.....	11

ATTACHMENTS

- A. Site Location Map
- B. Summary of Public Comments and Responses



1 INTRODUCTION & BACKGROUND

The Site is comprised of Block 1184, Lot 5, and is located at 1625 Federal Street in the City of Camden, Camden County, New Jersey (Site). The Site encompasses an areal extent of 2.9 acres and is currently unoccupied. Two story structures in very poor condition are located along the Site's southern and eastern perimeters. The remaining areas of the Site consist of concrete slabs associated with former buildings.

The City of Camden has contracted Brownfield Redevelopment Solutions, Inc. (BRS), to prepare this Analysis of Brownfields Cleanup Alternatives (ABCA) in support of the EPA grant proposal. The purpose of the ABCA is to:

- Identify reasonable brownfields cleanup alternatives considered for addressing the contamination identified at the Site;
- Analyze the various factors influencing the selection of a preferred cleanup method, including effectiveness, implementability, costs, and sustainability;
- Select the preferred cleanup method, based on the analyses performed; and
- Provide community outreach and solicit public participation and comment on the remedial selection process prior to the final decision.

The City will promote and facilitate community involvement with the environmental cleanup and Site redevelopment project with the activities itemized below.

- The City will perform targeted outreach to notify communities of the availability of this Draft ABCA. This includes fulfillment of the New Jersey Department of Environmental Protection community notification requirements (N.J.A.C. 7:26E-1.4). The City will publish a notice of availability of this Draft ABCA in one or more major local newspapers or equivalent with general circulation in the target community.
- The City will provide an opportunity for members of the public to comment on the ABCA in a public meeting. Additional details regarding the public notification process will be presented in a *Community Relations Plan* to be prepared for the Site.
- The City will prepare written responses to the comments received and document any changes made to the cleanup plans and to the ABCA as a result of the comments.

A Brownfields Cleanup Decision Memo will be prepared at the end of the public comment process, which will describe the cleanup options selected by the City. The ABCA and the Decision Memo will be included with the Administrative Record. The Administrative Record repository is located at the offices of the City.

The expected outcome of the project includes a Response Action Outcome (RAO) letter to be issued by a New Jersey Licensed Site Remediation Professional (LSRP).

1.1 Site Description and Previous Uses

The Site has been used for industrial purposes since at least the early 1900s:

Begin	End	Operator	Operations
1906	1926	Warren Webster	Manufacture of steam heating supplies
1940	1974	Cities Service Co	Manufacture of printing inks
1974	1983	Borden Chemical	Manufacture of printing inks
1983	1990s	Lynkram	Manufacture of wire racks
1999	Present	None	None

As shown above, initially the Site manufactured steam heating supplies. More recently, the Site produced printing inks and wire racks. The Site has been vacant since the early 1990s. The City of Camden acquired the Site in 1999 through foreclosure and is attempting to remediate this Site for redevelopment.

The Site currently contains a multi-story abandoned industrial building, a portion of which was destroyed by fire in the late 1990s which was later demolished. The remaining portions of the buildings were also damaged by fire and scrap metal scavenging. The photo below depicts the conditions at the Site. The approximate Site boundary is outlined in yellow.



1.2 Surrounding Land Use

Railroad tracks associated with NJ Transit's Light Rail border the northern portion of the Site. An abandoned industrial building and residential properties are located to the west, and a vacant lot is present to the east. To the south is Federal Street, across which lies additional vacant lots.

1.3 Project Goal (Reuse Plan)

The goal of the project is to address contamination in order to facilitate redevelopment for light manufacturing / commercial reuse.

Remediation will address contaminated soil hot spots and site-wide contaminated historic fill.

Since significant groundwater impacts are not present, and since no significant source material is likely to remain at the Site, groundwater will be monitored (i.e. Monitored Natural Attenuation) until such time as the Ground Water Quality Standards (GWQS) are met. In the interim, a Classification Exception Area (CEA) will be instituted for contaminated groundwater associated with the Site.

Engineered cap components will include asphalt paved areas, concrete areas, building slabs, landscaped areas and other surface features. The remedial excavation will be backfilled with a combination of crushed concrete from on-Site buildings (following appropriate permitting), crushed stone from a licensed quarry, and certified clean fill.

1.4 Summary of Environmental Conditions

Many environmental assessment and investigation activities have been undertaken at the Site and surrounding area since 1981. Additional limited, targeted investigation activities will be conducted prior to implementing the remediation in order to refine the extent of contamination.

Following completion of a Preliminary Assessment (PA) and Site Investigation (SI), contamination was confirmed at the following AOCs. Both soil and groundwater have been impacted by former use. The most recent Remedial Investigation Report / Remedial Action Workplan (RIR/RAW) (Environmental Resolutions, Inc., November 2011) identified 22 Areas of Concern (AOCs) at the Site. A summary of contamination at each impacted AOC is provided as follows:

- *AOC A2 – Existing 550-gallon UST* – PID readings above background (95 ppm) were observed in the soil around this tank during closure. These PID readings were determined not to be attributed to the UST, but to another unknown source. A temporary well point installed in this location reported volatile organic tentatively identified compounds (TICs) with a total concentration of 1,428 ug/L, above the GWQS of 500 ug/L. Limited excavation in the area near the tank was recommended to reduce the concentration of TICs in the local groundwater.

- *AOC K2 – Concrete Holding Tank* – A vault was discovered in the south-central portion of the Site measuring four by eight feet, with a depth of approximately four feet bgs. PAHs, lead, mercury, and 1,1,1-trichloroethane were detected above NJDEP Impact to Groundwater Soil Screening Levels (IGWSSLs), but below Site-specific Impact to Groundwater Soil Remediation Standards (IGWSRS). Trichloroethene (TCE), 1,1-dichloroethene, and 1,1,1-trichloroethane were detected above GWQS in groundwater samples collected from MW-2 and K2-4GW, located within this AOC. Removal of the concrete vault with additional soil sampling to determine if a source of these contaminants is present beneath or around the vault was proposed in the 2011 RIR / RAWP. Removal of the vault will facilitate this additional investigation.
- *AOC K3 – Concrete Filled Former Structure* – An “T” shaped concrete trench was observed in the central portion of the Site measuring approximately 25 feet in length. Pesticides, PAHs, benzene, cis,1-2-dichloroethene, TCE, and PCBs were detected above applicable criteria. Only TCE and PCBs were observed above direct contact standards in soil. The remainder exceeded default IGWSSLs only. Groundwater sampling confirmed similar contaminants with the groundwater. Soil remediation was recommended in this area to address the ongoing source of groundwater impacts.
- *AOC L1 – Debris Filled Pit* – TCE was detected in soil above both direct contact standards and IGWSSLs. 1,1,1-trichloroethane, tetrachloroethene (PCE), benzene, cis-1,2-dichloroethene, 1,1-dichloroethane, and 1,1-dichloroethene were detected above their respective IGWSSLs. TCE was reported above its GWQS at nearby monitoring well MW-1. As such, additional remediation is planned at AOC L1.
- *AOC O – Floor Drains* – Three floor drains were observed at the Site. Of these drains, impacts were only observed near drain O1. Additional groundwater sampling was proposed to determine if TCE detected above the IGWSSL at this drain has impacted groundwater.
- *AOC P – Historic Fill* – Historic fill was found to be present across the property, but was determined not to have impacted groundwater. As such, a deed notice and cap was proposed, but no CEA was determined to be required for the historic fill.
- *AOC Groundwater* – VOCs were detected above the GWQS in all temporary well point and monitoring well samples with the exception of MW-5. Additional, off-Site groundwater sampling was proposed to delineate groundwater impacts.

1.5 Physical Setting

The Site is located between 10 and 20 feet above sea level within a mapped outcrop of the Potomac Formation (Kp), which is composed of fine- to coarse-grained sand, interbedded with white, red, or yellow clay. The underlying bedrock aquifer is the Potomac-Raritan-Magothy (PRM) aquifer system.



Surficial geology is mapped as Unit 2 of the Cape May Formation, which is comprised of sand, pebble gravel, silt, clay, peat, and cobbles.

Groundwater is found at approximately seven feet bgs and flows in an east-southeast direction.

1.6 Exposure Pathways

In order for contaminants from a site to pose a human health or environmental risk, one or more completed exposure pathways must link the contaminant to a receptor (human or ecological). A completed exposure pathway consists of four elements:

- A source and mechanism of substance release;
- A transport medium;
- A point of potential human or ecological contact with the substance (“exposure point”); and
- An “exposure route”, such as dermal contact, ingestion, etc.

Preliminary evaluation indicates the following potentially completed exposure pathways related to the Site in its current condition (i.e., pre-remediation):

1. **Direct contact with Soil.** Soil might be handled, inhaled or ingested by occasional on-Site construction workers or trespassers. This exposure pathway will be mitigated immediately by implementation of the proposed cleanup activities, which includes excavation and off-Site disposal of certain contaminated soils. Residual risk related to this pathway will be eliminated with engineering and institutional controls.
2. **Direct Contact with, or Ingestion of, Groundwater.** Although there are no current or anticipated future uses of on-Site groundwater, an institutional control will be implemented to prevent future groundwater use.
3. **Inhalation of Volatile Organic Compounds due to Vapor Intrusion.** The groundwater beneath the Site is impacted with volatile organic compounds. Groundwater is relatively shallow (approximately 7 feet bgs). The potential exists for compounds to volatilize from the groundwater, travel through the soil column, and enter structures on Site. While there are no occupied structures present on the Site, the potential exists for future development. As such, the vapor intrusion pathway is a concern.

2 APPLICABLE LAWS AND CLEANUP STANDARDS

All Site remediation to be performed under this grant would be conducted in accordance with the New Jersey Site Remediation Reform Act, N.J.S.A. 58:10C-1 et seq.; the Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10B-12 and implementing regulations in the Administrative Requirements for the Remediation of Contaminated Sites,

N.J.A.C. 7:26C; and the Technical Requirements for Site Remediation, N.J.A.C. 7:26E. The most current versions of the NJDEP Technical Guidance documents will be referenced, including:

- *Historic Fill Guidance Document,*
- *Capping of Sites Undergoing Remediation,*
- *Presumptive and Alternate Remedy Guidance Technical Guidance Document,* and
- various other NJDEP guidance documents applicable to the project.

The reference remediation standards for soil will be NJDEP's published numeric values for Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS), NJDEP's Residential Direct Contact Soil Remediation Standards (RDCSRS), and default Impact to Groundwater Soil Screening Levels (IGWSSLs).

The reference remediation standards for groundwater will be the current version of Class II-A Specific Groundwater Quality Criteria (GWQC) published in *Groundwater Quality Standards* (N.J.A.C 7:9C).

The effective implementation of the applicable laws and guidance will be managed and overseen by a Licensed Site Remediation Professional (LSRP), to be retained for the Site by the City. Any Response Action Outcome (RAO, i.e., NFA-equivalent) for the Site will be issued by the LSRP. Project reports, RAOs, etc. will be submitted on behalf of the City to the NJDEP, which retains the authority to audit the project and/or review and potentially reject any documents submitted.

3 EVALUATION OF CLEANUP ALTERNATIVES

This section identifies various reasonable remediation alternatives that were considered in response to the environmental contamination issues at the Site. The following potential remedial alternatives were considered:

- Alternative No. 1) A combination of excavation and offsite disposal and use of engineering and institutional controls are proposed for soils. Monitored natural attenuation along with establishment of a CEA is proposed for groundwater.
- Alternative No. 2) Removal of all impacted medial, including historic fill, and
- Alternative No. 3) No action.

The following evaluation criteria were considered in comparing the remedial alternatives.

- A. Effectiveness in providing compliance with NJDEP regulations and increased protectiveness to public health and the environment;
- B. Implementability of the considered alternative;
- C. Cost of the considered alternative; and

D. Sustainability and Resilience considerations.

3.1 Alternative No. 1 - Removal of Soil and Enactment of Engineering and Institutional Controls

Under this alternative, the remedial action will include removal of contaminated soil hot-spots, followed by installation of permeable and impermeable caps as Engineering Controls, and recording of a deed notice and a classification exemption area (CEA) as Institutional Controls. This combination of remedies will prevent exposure to residual Site contaminants. Further details of the remediation plan would include:

- Excavation and disposal of approximately 4,850 tons of impacted soil.
- Post-excavation sampling to document compliance with remediation standards.
- Backfill with a combination of stone, certified clean fill, and recycled concrete from on-Site buildings (see below).
- Following characterization of soil waste, transportation and disposal of soils at a licensed/permitted disposal facility.
- Installation of asphalt (2,808 square yards), concrete (including building slabs) (9,826 square yards), and clean soil (936 cubic yards) capping of impacted areas.
- Re-use building concrete for backfill/grading under a NJDEP approved Beneficial Use Determination (BUD).
- All fill material will be compliant with the NJDEP Fill Material Guidance for SRP Sites, dated April 2015 (Version 3.0), and documentation of compliance will be provided in the final Remedial Action Report. Ultimately, the final remedial action including the engineered cap will be completed upon development of the Site.
- The ongoing protectiveness of the engineering controls will be ensured by development of, and adherence to, an Operation and Maintenance Plan. Ongoing operation and maintenance of the cap will be performed.
- The Institutional Controls will consist of a deed notice attached to the deed in perpetuity. The deed notice will provide notice of the contaminants and the concentrations that were left in place, and controlled by the Cap. In addition, a CEA will be established to prohibit groundwater use on the Site.

Selection of this alternative will result, upon completion, in restricted future use of the Site.

3.1.1 Effectiveness

Although some residual contamination may still exist, institutional and engineering controls would effectively achieve project remediation goals by:

- Removing the most highly contaminated soil from the Site;



- Achieving technical and administrative compliance with the NJDEP site remediation regulations;
- Disruption of the pathway of contaminated material to the outside environment. Although the contamination still exists, the engineered cap and CEA will significantly reduce the potential for human exposure.
- Provide notice of Site environmental conditions to future Site owners, occupants, and the general public by means of the Deed Notice.

3.1.2 Sustainability and Resilience

This criterion evaluates the degree to which the remedial alternative may reduce greenhouse gas discharges, reduce energy use, employ alternative energy sources, reduce volume of wastewater to be disposed, reduce volume of materials to be taken to a landfill, and/or allow for the reuse or recycling of materials during cleanup is considered, where applicable.

When compared with alternative 2, this alternative limits excavation and truck transportation of contaminated media to areas with the highest contamination, thereby reducing the fossil fuel energy use, and associated greenhouse gas discharges associated with that task.

3.1.3 Implementability

Soil excavation and cap placement is easily and rapidly implementable because it involves relatively simple technology and equipment. This type of remedy is a widely used and readily accepted approach for remediating and encapsulating contaminated soils. The City and/or its consultant will retain a contractor that is licensed, qualified, and OSHA-certified to perform work on hazardous materials sites. The deed notice and CEA, prepared in accordance with NJDEP guidance, are relatively routine administrative submissions.

3.1.4 Operation and Maintenance

Operation and Maintenance on the installed soil cap should include the following:

- Routine inspections
- Vegetation maintenance (grass mowing and weed control)
- Written O&M Plan that includes a discussion including but, not limited to; soil cover maintenance, reporting, maintenance agreement, a utility plan should future utilities or building be proposed at the Site, and fence maintenance (if applicable).

3.1.5 Institutional Controls

This alternative will require the following Institutional Controls:

- A Deed Notice is required because contaminant concentrations above the RDCSRS and NRDCSRS are expected to remain below the engineered cap. A Deed Notice is

required to document the extent of contamination and the engineering controls and will be issued pursuant to N.J.A.C 7:26C-7.

- All required NJDEP permits, reporting, and inspection requirements.
- A CEA for groundwater.

3.1.6 Cost

The costs for completing remediation under this approach were estimated using the following elements and assumptions:

- 1) Site preparation including
 - a) bid document generation,
 - b) a survey of areas to be excavated, and
 - c) removal of the structures at AOCs K2/K3.
- 2) Project and Grant Management tasks, including public notification;
- 3) Conduct procurement process;
- 4) Excavation and disposal of contaminated soil;
- 7) Procurement and testing of clean fill cap materials;
- 8) Emplacement of a cap over the Site;
- 9) Site restoration, including vegetative cover;
- 10) Prepare Deed Notice and CEA;
- 11) Prepare Soil and Groundwater Remedial Action Permits;
- 12) Prepare Remedial Workplan (RAW);
- 13) Prepare Quality Assurance, and Health and Safety deliverables

The estimated cost for this cleanup alternative is approximately \$657,000. The USEPA cleanup grant contribution would be \$600,000. The City cost share would provide the remaining moneys from other funding sources.

3.2 Alternative No. 2 - Removal of Historic Fill and PCB-contaminated Soil Sitewide

Under this alternative, the remedial action will consist of removal of all contaminated historic fill down to native materials, estimated to be at a depth of four feet Site-wide, and replacement with clean soil fill. Selection of this alternative is expected to result, upon completion, in unrestricted future use of the Site. No engineered cap would be installed, as no contaminated materials would remain on Site. No Institutional Controls would be needed as removal of impacted soil is expected to remediate groundwater.

3.2.1 Effectiveness

This alternative would be immediately effective by removal of the potential continuing contaminant sources associated with the presence of historic fill from the Site. The remedial action should result in unrestricted use of all areas of the Site.

3.2.2 Sustainability and Resilience

This alternative compares unfavorably to Alternative 1 (described in Section 3.1) with regard to sustainability metrics. The approach would result in increased energy use, greenhouse gas emissions, and landfill disposal volume. It is expected to compare favorably to Alternatives 1 and 3 in resilience metrics, such as the continuing protectiveness of the remedy in light of reasonably foreseeable changing climate conditions.

3.2.3 Implementability

This alternative is feasible and implementable. This approach will involve the work elements described in Section 3.1, with the exception of the emplacement of a clean soil cap and deed notice, plus additional volumes of excavated soil and clean backfill.

3.2.4 Operation and Maintenance

This approach, upon successful implementation, would allow for unrestricted use of the Site. No ongoing operation and maintenance of remedial systems would be required.

3.2.5 Institutional Controls

This approach, upon successful implementation, would provide for the removal of all contaminated soil from the Site. No Deed Notice is required. As the current presence of historic fill materials is the reason that a groundwater CEA is required under other scenarios, a CEA would not be required if the historic fill is removed from the Site.

3.2.6 Cost

To implement this strategy, all contaminated soil would be excavated, disposed, and replaced with clean fill. Total project costs for this alternative are estimated at \$3,057,285.

3.3 Alternative No. 3 - No Action

If no environmental cleanup remedy were performed at this Site:

- The Site would remain out of compliance with NJDEP's regulations; and
- The potential for exposure to contaminated soil and water by human and ecological receptors would remain.

3.3.1 Effectiveness

The "no action" alternative is not effective in that it does not provide for compliance with NJDEP regulations and it fails to provide for the beneficial reuse of the Site.

3.3.2 Sustainability and Resilience

The “no action” approach would not meet project remediation goals because the contamination would remain in place, untreated, and without a barrier. As such, the “no action” approach would present a continuing risk to the public. Based on this, evaluation of the approach with regards to other sustainability criteria is not relevant.

3.3.3 Implementability

The “no action” alternative is technically feasible, although the presence of untreated soil and groundwater contaminants would not be in compliance with NJDEP regulations.

3.3.4 Operation and Maintenance

Because there is no remedy implemented, there would also be no operation and maintenance requirements at the Site.

3.3.5 Institutional Controls

Because there is no remedy implemented, there would be not institutional controls at the Site.

3.3.6 Cost

There are no costs associated with this remedial alternative.

3.4 Preferred Alternative

The preferred alternative is Alternative No. 1 – “Removal of Soil and Enactment of Engineering and Institutional Controls”. Soil excavation is a proven method, easily and quickly implementable, environmentally effective, and cost-effective. Excavation equipment is readily available. Soil excavation and emplacement of a cap, along with implementation of a groundwater CEA, is accepted by the NJDEP as a remedy for historic fill contamination. This remedy can be readily completed within the timeframe of the USEPA Brownfields Grant.

Attachment A
Site Location Map



Attachment B
Summary of Public Comments and Responses

