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March 11, 2014

Ms. Elinor Carbone
Mayor
City of Torrington
140 Main Street
Torrington, Connecticut 06790

RE: ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES,
FORMER TORIN MANUFACTURING SITE, 100 FRANKLIN STREET, TORRINGTON,
CONNECTICUT (HRP #TOR6035.RA)

Dear Ms. Carbone:

HRP Associates, Inc. (HRP) is pleased to submit the following Analysis of Brownfields Cleanup Alternatives (ABCA) for the above-referenced site. This ABCA was prepared for submittal to the United States Environmental Protection Agency (EPA) pursuant to the EPA Brownfields Revolving Loan Fund program.

If you have any questions or require any additional information, please do not hesitate to contact the undersigned at (860) 674-9570.

Sincerely yours,

HRP ASSOCIATES, INC.

David J. Feinson, PG
Project Geologist

Michael M. Gaughan
Senior Project Geologist

Zoé A. Belcher, LG, LEP
Project Manager

Attachments
cc: Jessica Dominguez, EPA
Art Bogan, VCOG

ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES

FORMER TORIN MANUFACTURING SITE
100 FRANKLIN STREET
TORRINGTON, CONNECTICUT

HRP #TOR6035.RA

March 11, 2014

Prepared For: **MS. ELINOR CARBONE**
CITY OF TORRINGTON
140 MAIN STREET
TORRINGTON, CONNECTICUT 06790

Prepared By: **HRP** *Associates, Inc.*
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1.0 INTRODUCTION

In February of 2014, HRP Associates, Inc. (HRP) was authorized by the City of Torrington to complete an Analysis of Brownfields Cleanup Alternatives (ABCA) for 100 Franklin Street in Torrington, Connecticut. A site location map is provided as Figure 1. This ABCA was prepared for submittal to the United States Environmental Protection Agency (EPA) pursuant to the EPA Brownfields Revolving Loan Fund (BRLF) program. This ABCA has been prepared in general conformance with the EPA guidance for cleanups with Federal loan funds.

The purpose of the ABCA includes identifying, evaluating, and selecting appropriate cleanup and management measures to address known and suspected environmental concerns at the subject site. It also provides a summary of the environmental conditions at the site to allow for the public to comment on the proposed remediation alternatives and strategies necessary to remediate or mitigate contamination in order to achieve regulatory compliance.

1.1 Site Description and History

The site is currently listed at the address of 100 Franklin Street in Torrington, Connecticut. The approximately 2-acre site consists of two adjoining parcels that are identified on City of Torrington Assessor's property cards as Map #117, Block #25, Lots 1 and 2. The property is currently vacant land and the onsite buildings were demolished in 2010. The property is accessible from Franklin Street and Franklin Drive. Historical site features and surrounding properties are depicted on Figure 2.

The site was originally developed in 1885 by the Torrington Manufacturing Company and consisted of a complex of manufacturing buildings centered on the northwestern portion of the property along the West Branch of the Naugatuck River. In the early 1900s, many of the original site buildings were razed and replaced with larger, connected, manufacturing buildings that extended from northwest to southeast, parallel to the abutting river.

The Torrington Manufacturing Company, which later changed its name to Torin Corporation in 1969, utilized the site to manufacture metal products including brass plated upholstery tacks/nails, fan blades, battery connectors, zinc electrodes, nuts and bolts, gas heaters, springs, coils, fans, blower wheels, and air rotors. Metal machining was the primary operation completed in the main plant building, with ancillary operations including plating, pattern and tool storage, carpentry, and packaging. In addition to the main plant buildings, outbuildings included: a shed for coal, oil waste and excelsior (wood shavings), lacquer, and thinner storage; water pump house; lumber shed; chip house; and a product testing laboratory.

Kembric Manufacturing Corporation (also known as the Bricmar Manufacturing Corp.) purchased the site in 1976 and performed plastic injection molding in the main plant building. Kembric ceased injection molding circa 2000 and began using the site for the assembly, storage, and packaging of finished plastic goods. Beginning in the 1990s, Kembric had leased the coal house portion of Building H to an individual for automobile and boat storage, and as an independent metal machine shop. Torrington Bottle Redemption Center occupied the main floor of the southeastern end of Building F between 2000 and 2005.

1.2 Surrounding Properties Use and History

The current and historical use of the area surrounding the site is as follows:

North: Land use adjacent to the north of the site has been used for commercial and residential purposes since at least 1885. An auto repair/service facility has been located to the north of Franklin Street since circa 1949.

Northwest: The property located adjacent to the northwest of the site was historically developed with an office building that was used by Torin from circa 1909 until circa 2007. The property is currently residential.

Southwest: The West Branch of the Naugatuck River currently and historically abuts the southwestern boundary of the site.

Northeast: Land use adjacent to the northeast of the site has been used for commercial (boat cover manufacturing and sales), and residential uses since at least 1885. The Excelsior Laundry Facility was

historically located on the northeast side of Franklin Drive from circa 1901 until the mid 1960s. The Connecticut Light & Power (CL&P) transformer yard has been located to the north of the Franklin Drive since the late 1960s.

Southeast: The property adjacent to the southeast of the site was initially developed with industrial buildings associated with the Torin facility in the early 1900s. Some of these buildings have been razed. The property is currently used for industrial operations.

1.3 Site and Surrounding Resource Areas

As discussed above, the property is located in a mixed-use industrial/commercial and residential use area. According to the Assessor's property card, the site is zoned DD (Downtown District). Municipal water and sewer systems are available to the surrounding parcels. Groundwater beneath the subject site and surrounding area is not known to be utilized as a source of potable water. However, two industrial water supply wells are located approximately 0.25 mile south/southeast of the site;

- one air conditioning water supply well is located approximately 0.75 mile north/northwest of the site;
- two emergency public water supply wells are located approximately 1.0 mile east/northeast of the site; and one public water supply well is located approximately 1.0 mile east of the site.

According to the 2007 and 2013 Phase 1 Environmental Site Assessments (ESA), no wetlands were identified on-site. According to the "Wetland Soils Map of Torrington" adopted by the City of Torrington, dated October 1, 1999, no wetlands are located on the property. Additionally, according to the map titled "Connecticut Inland Wetland Soils of Torrington Connecticut" (Connecticut Department of Energy and Environmental Protection [CT DEEP], 2009) the closest wetland soils are mapped approximately 0.23 mile north of the site.

According to the map of "Natural Diversity Data Base Areas for Torrington, Connecticut" (CT DEEP, December 2013) there are no State and Federal listed species or significant natural communities located within or in the immediate vicinity of the site.

1.4 Proposed Site Redevelopment

Redevelopment is proposed for the entire site. The existing building slabs and demolition debris will be removed from the site then the property will be graded and capped with asphalt and landscaped areas for use as a parking lot. Remediation and management of shallow contaminated soils will be necessary as part of the site redevelopment.

Soil remediation is being financed through the EPA BRLF Program and is being overseen by Valley Council of Governments (VCOG). The project now stands on the verge of taking a blighted vacant lot and turning it into a functional parking lot with landscaped areas and green space.

1.5 Review of Connecticut Cleanup Standards

The analytical data obtained during remediation will be compared to specific contaminant concentrations listed in the CT DEEP Remediation Standard Regulations (RSR), dated June 27, 2013. The promulgated RSR specify standards for the clean-up of sites where hazardous wastes or other pollutants have been disposed or released to the environment. Contaminated soils and their remediation goals are evaluated by two methods:

1. Direct Exposure Criteria (DEC) - intended to protect human health from risks associated with direct exposure to pollutants in contaminated soils.
2. Pollutant Mobility Criteria (PMC) - intended to protect groundwater quality from pollutants, which may migrate from vadose zone soils.

Groundwater remediation goals are outlined in the RSR and are, in part, dependent upon water quality classifications. The site is located in a GB-classified groundwater area that is defined by CT DEEP as an area where groundwater is

presumed to be unsuitable for human consumption without prior treatment. There are two standards that typically apply to groundwater in a GB classification setting:

1. Surface Water Protection Criteria (SWPC) – intended to protect the existing use of surface water bodies, wetland areas, and intermittent streams to which a groundwater plume discharges.
2. Volatilization Criteria (VC) – intended to protect the occupants of buildings from the migration of volatile organic compounds (VOCs) from a groundwater plume into the interior of a given structure.

In addition to groundwater standards, volatilization criteria (VC) standards for soil vapor are used to evaluate the results of soil gas investigations. Although VOCs are constituents of concern (COC) for the site, no VOCs have been detected in site soils or groundwater at concentrations greater than RSR criteria.

2.0 ENVIRONMENTAL CONDITIONS AT THE SITE

2.1 Previous Environmental Investigations

Information from previous environmental site assessments and subsurface investigations conducted at 100 Franklin Street is included in the applicable sections of this document. Previous environmental reports are summarized as follows:

- A report entitled "Phase I Environmental Site Assessment, Torrington Manufacturing Company (Torin), 100 Franklin Street, Torrington, CT", dated January 2007, was issued by HRP to the City of Torrington. The report noted that the site meets the definition of an "establishment" pursuant the Connecticut Transfer Act (Section 22a-134(3)) based on the generation of hazardous waste. The report identified the following recognized environmental conditions (RECs):

    - Building B (machine shop) – Three machine pits were observed in the building. A loading ramp with an associated in-ground hydraulic lift and above-ground hydraulic oil tank were observed at the west end of the building. A floor drain was observed near oily staining in an area of the building that was formerly for storage of drums containing waste oil, solvents, potassium hydroxide, roof preserver, paint related wastes, and other materials. The discharge point of the floor drain could not be identified.
    - Building C (boiler house) – Boiler blow down, oils, and other chemicals/wastes were likely stored/handled in the building.
    - Building D (plating factory) – Metals, caustic chemicals, petroleum products, and solvents were likely stored/handled in the building.
    - Building E (former machine shop) – Petroleum products and solvents were likely stored/handled in the building. A machine pit was observed in the basement of the building.
    - Building F (former machine shop) – Petroleum products and solvents were likely stored/handled in the building. Historical records

indicated the presence of a basement opening in the center of the building. A sump was located in the far southern corner of the building.

- Building H (coalhouse and storage) – Oily staining was observed along the northwestern wall of the building beneath drums containing oil waste, lacquer, and/or thinner.
- Former Buildings – Historical buildings were previously razed within the footprint of the main plant building. These buildings included a lumber shed, chip house, and a pattern storage/laboratory building. Petroleum and/or hazardous materials may have been stored and handled in these areas, and contaminated backfill may have been placed when the buildings were razed.
- Electrical Transformers – Electrical transformers were observed on an elevated platform and on a utility pole located in the alleyway between the main plant building and the coalhouse. Oily staining was observed on two of the platform transformers. Additionally, capacitors were located in the electrical room inside Building E.
- Former Underground Storage Tanks (USTs) – Two USTs (FUST-1 and FUST-2) containing fuel oil and gasoline were removed from the ground in 1994. A spill was identified during removal and remediation was completed in 1995. Remedial efforts included limited soil removal, groundwater recovery and treatment to remove free-phase product, and temporary operation of a soil vapor extraction (SVE) system. A “closure” groundwater sample collected from the on-site recovery well indicated the presence of various VOCs, including trichloroethylene (TCE). However, the presence of TCE is expected to be associated with another on-site release and not from the USTs.
- Exterior Drainage Features – a masonry swale adjacent to Building F, a drainage grate and outfall near Building B, and two catch basins in the southeastern portion of the site were observed, which received industrial storm waste runoff from the site.

- Solid waste deposits were observed on various portions of the site including a pile of road sweepings, a pile of wooden pallets, a discarded empty drum, metal and furniture debris, and scattered deposits of asphalt roofing and thermal system insulation.
- A rusty stain from an unknown source was observed on the ground in the alleyway between Building C and Building G.
- Former transformer yard at the far southern corner of the site
- Former coal pile located near the former laboratory
- Former scale located on the western end of the site
- Loading dock areas where liquid chemicals and oils were likely handled, transported, and stored.

- A report entitled "Phase II Subsurface Investigation Report, Torrington Manufacturing Company (Torin) Site, 100 Franklin Street, Torrington, Connecticut", dated May 2007, was issued by HRP to the City of Torrington. The report details the following scope of work:

  - advancement of twenty-five soil borings (TB-1 through TB-25) including collection and laboratory analysis of soil samples,
  - collection of three hand samples from debris piles for laboratory analysis, and
  - installation of seven monitor wells (MW-2 through MW-8), and sampling and analysis of groundwater samples from eight wells including a previously installed recovery well (RW-1).

  Soil and groundwater samples were collected from fifteen potential release areas (PRAs) and one release area (RA) and analyzed for:

  - extractable total petroleum hydrocarbons (ETPH),
  - VOCs, polychlorinated biphenyls (PCBs),
  - polycyclic aromatic hydrocarbons (PAHs),

- cyanide, and
- Resource Conservation and Recovery Act (RCRA) 8 metals.

Releases were detected at fourteen PRAs and confirmed at one RA. The following table describes each PRA/RA and associated releases.

PRA/RA#	Description	Analyses	Release Detected
RA #1	Loading Dock Areas	ETPH, VOCs, PAHs, Metals	ETPH, VOCs, PAHs, Metals
RA #2	Building B	ETPH, VOCs, Metals	ETPH, VOCs, Metals
RA #3	Building C	ETPH, VOCs, PAHs, PCBs, Metals	ETPH, VOCs, PAHs, Metals
RA #4	Building D	ETPH, VOCs, PCBs, Metals	ETPH, VOCs, Metals
RA #5	Building E	ETPH, VOCS, PAHs, PCBs, Metals	ETPH, PAHs, Metals
RA #6	Building F	ETPH, VOCs, PAHs, Metals	ETPH, VOCs, PAHs, Metals
RA #7	Building H	ETPH, VOCs, PAHs, Metals	ETPH, PAHs, Metals
RA #8	Historical Buildings and Features	ETPH, Metals	ETPH, Metals
RA #9	Electrical Transformers	ETPH, PCBs, Metals	ETPH, Metals
RA #10	1994 UST Petroleum Spill	ETPH, VOCs, Metals	ETPH, VOCs, Metals
RA #11	Exterior Drainage Features	ETPH, VOCs, PAHs, Metals	ETPH, VOCs, PAHs, Metals
RA #12	Solid Waste Deposits	ETPH, VOCs, PAHs, PCBs, Metals	ETPH, PAHs, Metals
RA #13	Rusty Stain	ETPH, VOCs, PAHs, PCBs, Metals	ETPH, VOCs, PAHs, Metals
RA #14	Former Transformer Yard	ETPH, VOCs, PCBs, Metals	ETPH, Metals
RA #15	Coal Pile	ETPH, VOCs, PCBs, Metals	ETPH, Metals
PRA #16	Former Scale	Field screening VOCs	None

ETPH, VOCs (specifically TCE), PAHs, and metals were detected above the laboratory reporting limits in soil. Several metals and VOCs were detected in groundwater samples. ETPH and/or metals were detected in soil

samples at concentrations greater than the RSR criteria at RA #2, RA #3, RA #5, and RA #8 through RA #15. Groundwater samples contained metals at concentrations greater than the SWPC, and VOCs at concentrations below RSR criteria.

2.2 Site Environmental Regulatory History

Based on the information obtained during the Phase I ESAs, the site appears to meet the definition of an "establishment" as defined in Section 22a-134(3) of the Connecticut General Statutes, also known as the Connecticut Transfer Act. Specifically, at least 100 kilograms of hazardous waste was generated in a one month period. However, the site may be exempt from the Transfer Act as it is owned by a municipality.

HRP understands that the City of Torrington desires to remediate the site in accordance with prevailing standards and CT DEEP regulations. In order for CT DEEP to recognize the cleanup activities, it is proposed that the site enter CT DEEP's Voluntary Remediation Program (VRP) pursuant to Section 22a-133x of the Connecticut General Statues. This program will allow for a Licensed Environmental Professional (LEP) to verify that the site has been investigated and remediated in accordance with the RSR. The site may be entered into the VRP through the filing of an Environmental Condition Assessment Form (ECAF).

2.3 Potential Threats to the Public Health and the Environment

Various potential pathways are evaluated to determine if any possible risk to public health or the environment exists from the on-site contamination. The evaluation is based on the identified contamination at the subject site.

2.3.1 Soil Migration Pathway

Soils impacted with ETPH and metals at concentrations greater than the GB PMC and/or DEC were identified between 0 and 4 feet below grade (fbg). The ground surface is currently a mix of concrete slab, soil, and building debris, and therefore, the underlying soils are generally accessible to direct

contact and exposed to precipitation. The following soil exposure pathways may exist based on the current conditions:

- direct human contact with or ingestion of impacted soil
- migration of soil contaminants to groundwater through leaching

Proposed site redevelopment activities, including significant site excavation and re-grading, will disturb impacted soils but will not substantially increase the direct exposure potential because these soils are already accessible. Contaminated soils will require remediation and appropriate management to eliminate and/or minimize continued direct exposure risks. Implementation of erosion and dust control measures will be required during the proposed site construction activities to prevent migration of contaminated soils from the site.

Based on flood zone mapping published by the Federal Emergency Management Agency, portions of the site are located between the 100 and 500 year flood zones. A flood event could conceivably damage protective remedial measures (discussed below) and create a direct exposure pathway. However, this risk is mitigated by the presence of a United States Army Corps of Engineers flood control levee that lines the banks of the West Branch of the Naugatuck River throughout downtown Torrington, including the stretch of the river that abuts the site. The integrity of the onsite portion of the levee will be maintained during site remediation activities.

2.3.2 Groundwater Migration Pathway

Groundwater impacted with lead, mercury, and zinc at concentrations greater than the SWPC was identified in the shallow overburden aquifer at the site. Other metals and chlorinated VOCs were detected at low concentrations below RSR criteria. Groundwater depths ranged from approximately 8 to 15 fbg, with overburden groundwater flow inferred to be south-southeasterly toward the West Branch of the Naugatuck River.

The site is located in an area where groundwater has been classified as GB. CT DEEP defines the GB classification as groundwater within a historically highly urbanized area or an area of intense industrial activity and where public water service is available. Such groundwater may not be suitable for human consumption without treatment due to waste discharges, spills, or leaks of chemical or land use impacts. According to CT DEEP Aquifer Protection Area mapping, there are no aquifer protection areas in close proximity to the site.

Based on the current conditions, the potential for exposure to groundwater at the site or surrounding area through direct contact or ingestion is improbable. Exposure to groundwater is not expected during and after the proposed site redevelopment activities.

2.3.3 Surface Water Migration Pathway

The closest designated surface water body to the site is the West Branch of the Naugatuck River, which abuts the site to the southwest. The surface water classification of the river is B. The CT DEEP defines this designation as surface water known or presumed to meet Water Quality Criteria which support designated uses that may include recreational use; fish and wildlife habitat; agricultural and industrial supply and other legitimate uses including navigation.

Based on the current conditions, groundwater plumes of lead, nickel, and mercury may be impacting the West Branch of the Naugatuck River. The proposed remedial strategy will address the plume source areas and mitigate future groundwater impacts to surface water. Contaminated soils will be exposed during proposed site redevelopment activities, thus increasing the potential for impact to surface runoff. Therefore, erosion and sediment control measures will need to be implemented during the proposed construction activities to prevent contaminated soil runoff from entering the West Branch of the Naugatuck River.

2.3.4 Air Migration Pathway

Given the current undeveloped nature of the site, there is a potential for the airborne migration of contaminated dusts. Dust control measures will be instituted during soil remediation to minimize the potential for off-site migration of contaminants via air transport. Since compounds exceeding regulatory standards (ETPH and metals) have low volatility, vapor migration risk is unlikely.

3.0 REMEDIATION ALTERNATIVES ANALYSIS

3.1 Purpose of EPA Brownfields Revolving Loan Funding

The City of Torrington has secured EPA Brownfields funding for eligible cleanup activities at the site through the VCOG BRLF. This document fulfills the requirement for an ABCA as stipulated by this funding mechanism. EPA Brownfields funding will be used for remediation permits, design, construction, construction contract administration, removal of contaminated materials, placement of clean fill, and 1 year of post-remediation monitoring activities in order to bring the site into compliance with RSR standards. Soil remediation is necessary as part of the proposed site redevelopment. The remediation will facilitate the redevelopment of the currently unused, blighted site into a parking lot that will serve the bustling downtown district and will therefore improve the community.

3.2 Remedial Alternatives Evaluation

Soil remediation is proposed as part of site redevelopment based on the results of environmental site investigations. The following section provides an evaluation of the remedial alternatives generally based on the proposed site redevelopment and the anticipated effectiveness, feasibility, and cost.

3.2.1 No Action

No action is necessary if the site does not enter a State program and no development is conducted. However, the city proposes to enroll the site in the CT DEEP VRP as part of the BRLF requirement. Under this program, the site owner has the legal obligation to bring the site into compliance with the RSRs. As such, some amount of remediation is necessary. No costs have been generated for this option.

3.2.2 Soil Excavation

Based on the anticipated redevelopment plans, excavation and off-site disposal of impacted soil and the installation of approved cover materials is proposed as the primary remedial option for the subject site.

Soil excavation and off-site disposal is a commonly used remedial method. Soils contaminated with ETPH and metals exceeding RSR standards are typically within 4 feet of the ground surface at various locations on the site. The benefit of soil excavation is that all the contamination can be removed, if feasible. The RSRs allow various strategies to reduce the amount of excavation needed by leaving certain contaminants in place provided they are made inaccessible by cover materials. These strategies are described below.

Effectiveness

Soil excavation is the most effective method of mitigating exposure risk and contamination because the source is removed from the site. The excavated soil should not pose a significant exposure risk to contractors or the general public if it is managed appropriately during excavation and staging. Based on the identified contaminants, the soils could be disposed at a landfill for use as cover material or recycled as asphalt batch materials, based on the petroleum content.

Ease of Implementation

Implementation of shallow soil remedial excavation is a relatively straightforward process. Heavy machinery is utilized to remove the impacted soil to a target depth. Confirmatory soil samples are collected to confirm removal of all impacted soils. Soils are then loaded onto trucks and transported for offsite disposal. The excavations are subsequently backfilled with clean material.

Cost

Several excavation cost scenarios were reviewed as part of the assessment and cost estimating process. The scenarios presented below include costs for managing contaminated soil, capital improvements such as pavement, and post-remediation monitoring and reporting.

1. Removal of all impacted soil. This option would entail the removal of approximately 19,000 tons of soil at an approximate total project cost of $2.1 million. This option would allow for unrestricted future site uses.

2. The RSRs allow for certain soils exceeding the applicable DEC to be left in place if the soils are rendered inaccessible by one or more of the following methods described below. Each of these methods would require an Environmental Land Use Restriction (ELUR) to restrict residential property uses and prohibit the disturbance of the protective materials and underlying impacted soil. The ELUR costs are presented in Section 3.2.4. Additionally, any soil exceeding the GB PMC at depths at or above the seasonally-high groundwater table would be excavated and disposed off-site.

    a. Impacted soil can be placed directly beneath a permanent building. This option was not considered because permanent buildings are not part of the redevelopment plan for the site.

    b. Impacted soil can be placed beneath 4 feet of clean material in landscaped areas. In this scenario, impacted soils are excavated to a depth of 4 feet, backfilled with 4 feet of clean fill, and finished with landscaping. This option was not considered as a stand-alone remedy because the site will be primarily developed as a paved lot, not as a landscaped area. This option was considered for select landscaped spaces on the site, including a potential greenway along the Naugatuck River. The costs for the landscaped greenway are presented as part of the final proposed remedy.

    c. Impacted soil can be placed beneath 2 feet of clean material and capped with bituminous pavement or concrete. In this scenario, impacted soils are excavated to a depth of 2 feet, backfilled with 2 feet of clean fill, and finished with pavement or concrete. This option was considered for paved areas and

sidewalks that may be included in the redevelopment plan. If the entire site were to be treated with this remedy (i.e. all pavement and no green space, 9,600 tons of soil would be removed for an approximate total project cost of $1.2 million.

d. Since most of the soil impacts are the result of widespread polluted fill, the impacts can be rendered inaccessible by capping with a minimum of 3 inches of bituminous pavement or concrete. This option was considered for paved areas and sidewalks that may be included in the site redevelopment plan. This option may only be exercised for certain pollutants (petroleum hydrocarbons, SVOCs, and metals) that exceed the applicable DEC. If the entire site were to be treated with this remedy (i.e. all pavement and no green space), approximately 222 tons of GB PMC "hotspot" soil would be removed for an approximate total project cost of $321,000.

e. The site may be remediated by a combination of the excavation strategies presented above. Under this scenario, select soils would be excavated and disposed off-site, including soils to a depth of 4 feet within the proposed greenway (assumed to be 20% of the site area) and GB PMC "hotspot" soils. The remainder of site soils would be rendered inaccessible directly beneath 3 inches of bituminous pavement. This option would entail the excavation of 3,800 tons of soil for an approximate total project cost of $655,000

3.2.3 Engineered Control

An engineered control is an impermeable barrier that mitigates human and environmental exposure to soils exceeding the RSR criteria. A typical engineered control consists of an impermeable high density polyethylene (HDPE) liner and a surface finish of landscaping, pavement, or sidewalks. Alternatively, impermeable hot mix asphalt pavement may be used in place of the HDPE liner. The engineered control differs from the capping strategies presented above in that the impermeable layer isolates the

impacted soil from precipitation and therefore may be used to address certain soils that exceed the PMC. An engineered control would require the implementation of an ELUR to prohibit disturbance of the cap and the underlying soils and a CT DEEP-approved operation and maintenance (O&M) plan.

Effectiveness

The primary advantage of the engineered control is that it minimizes the amount of soil that would need to be excavated and disposed offsite. The impermeable hot mix asphalt option is beneficial in that the cap material also serves as a durable pavement that is suitable for use as a parking lot. The primary disadvantages include the following:

- The use of an engineered control as a method to demonstrate compliance with the PMC requires a variance approval by the Commissioner of the CT DEEP.
- O&M and groundwater monitoring plans would need to be implemented for the lifespan of the control to ensure the continued effectiveness of the remedy.
- The site owner would need to demonstrate financial assurance to CT DEEP for future operation, maintenance, and monitoring costs.
- The strategies of spot soil excavation and soil/asphalt capping would accomplish the same goals as the engineered control without the long-term maintenance and monitoring obligations.

Ease of Implementation

An engineered control could be readily installed as part of the site development activities but is not as straightforward as the excavation and capping option. The impermeable liner and associated substrate materials, including storm water drainage, would be installed prior to paving. The impermeable liner or impermeable hot mix asphalt would have to be installed and warranted by a specialty contractor. Care must be taken

during the installation of the liner and buffering sand layers to prevent puncturing the liner.

Costs

The costs to implement a low-permeability liner to address impacted soils range from $1.3 to 2 million.

3.2.4 Environmental Land Use Restriction

The RSRs allow for contamination to remain in place provided that an ELUR is filed on the land records to restrict certain activities to mitigate human exposures. As described above, the various capping options would require an ELUR to prohibit the disturbance of the protective materials and the underlying impacted soil. In order to apply the less stringent industrial/commercial criteria, a site-wide ELUR would also be required to prohibit future residential uses of the site. Any ELUR would be prepared in accordance with the requirements set forth in C.G.S. Section 22a-133q-1.

Effectiveness

An ELUR is an effective method of meeting the state regulations while reducing overall remedial activities. The ELUR is meant to reduce risks to human health, and may not result in a reduction of source material. However, based on the proposed redevelopment plans and the nature and depth of contamination, an ELUR could not be used as the sole remedial strategy. An ELUR may be implemented in conjunction with soil excavation and confirmatory sampling as effective means of addressing the soils that exceed RSR standards. Implementation of these remedial controls is less costly and has lower energy consumption than other remedial options.

Ease of Implementation

While an ELUR is not a stand-alone remedial option for this site, the process is relatively straight forward and can be easily implemented in conjunction with the other remedial alternatives. Additional confirmatory sampling will be necessary to support an ELUR.

Costs

An ELUR typically ranges in cost from $10,000 to $15,000. The confirmatory sampling to support the ELUR is estimated at $3,350.

3.3 Selection and Implementation of Remedial Alternatives

Based on the completed evaluation, the proposed remedial alternatives will include a combination of soil excavation, soil isolation, and the implementation of ELURs. "Hotspot" soils (i.e. soil impacts from specific releases not attributable to widespread fill) and soils that exceed the GB PMC will be excavated and transported offsite for disposal or recycling.

Soil impacts attributed to widespread fill exceeding the DEC will be addressed through capping and administrative controls. Pending the results of confirmatory soil sampling, ETPH and metals associated with the widespread fill that impacts the majority of the site will be rendered inaccessible with a minimum 3-inch layer of bituminous pavement. Any impacted soils in landscaped areas or greenways will be rendered inaccessible by excavating the fill to a depth of 4 fbg and backfilling with clean fill. ELURs would be recorded to prohibit residential uses of the site and to prohibit the disturbance of the protective materials (i.e. asphalt and clean fill) and underlying impacted soils.

In accordance with Section 22a-133k-3(g), post-remediation groundwater monitoring will be conducted to evaluate the remedial activities. Post-remediation groundwater monitoring will be reported in the final verification document.

3.4 Evaluation of Conformity with Green Remediation Policy

The "Clean and Green Policy for Contaminated Sites" (February 18, 2010) was developed by EPA New England (Region 1) to promote strategies and practices that reduce the environmental footprint during cleanup and restoration activities. These goals generally include the following:

- minimize total energy use and maximize use of renewable energy
- minimize air emissions and greenhouse gas generation
- minimize water use and impacts to water resources

- reduce, reuse, and recycle materials and wastes
- support the environmentally-sustainable reuse of remediated land

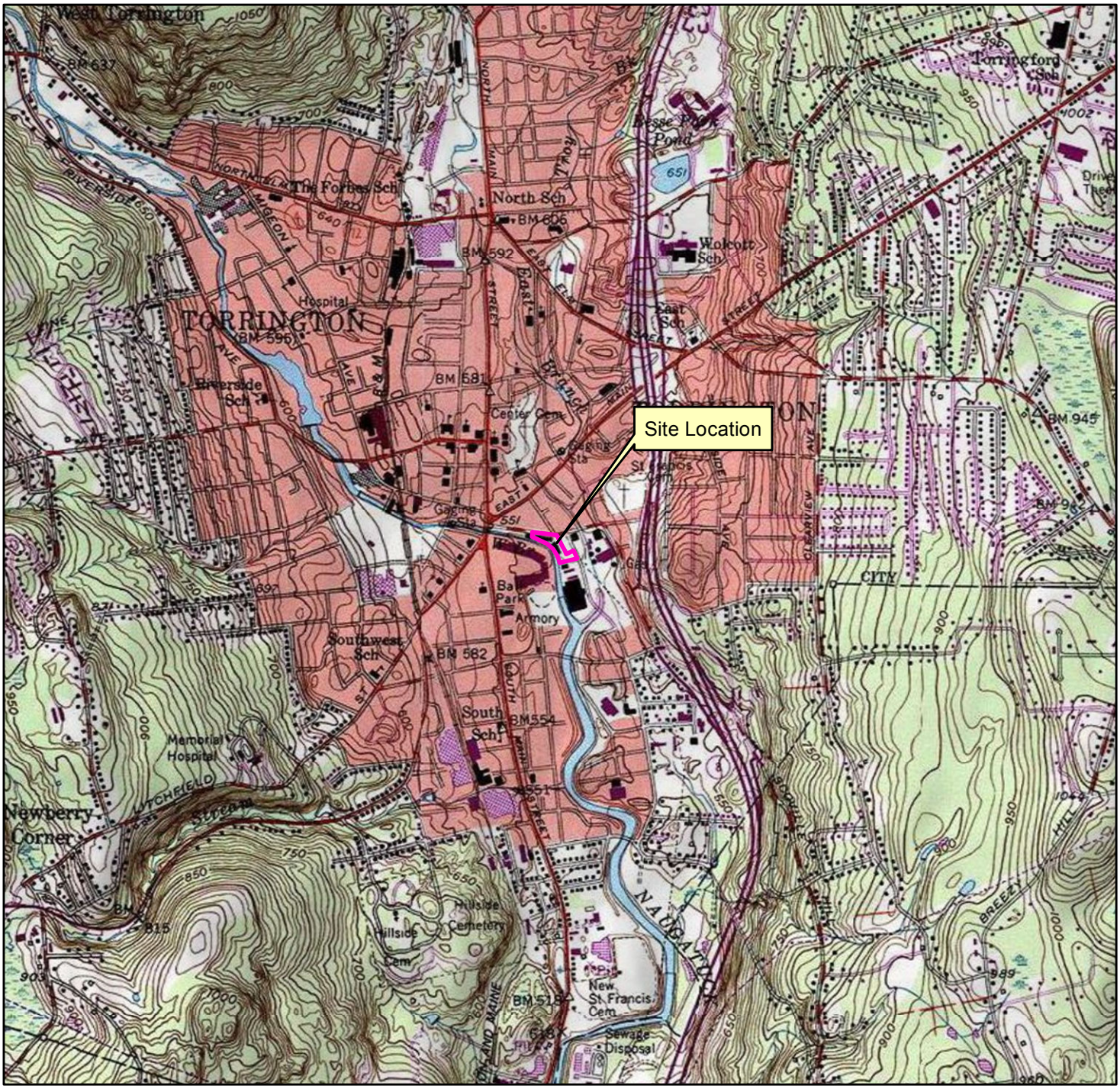
The proposed implementation of remedial controls to reduce the quantity of soils requiring excavation and off-site disposal will reduce energy consumption and air emissions. The use of protective caps and ELURs will minimize the need for excavation and off-site disposal, thus reducing carbon emissions from vehicle transport, decreasing the amount of waste being placed in landfills, and reducing air pollutant emissions from waste incineration. Soils that require off-site disposal will be either recycled for use in asphalt or reused at a landfill facility as daily cover material, as appropriate. A landscaped greenway along the Naugatuck River is proposed as part of the final site development to enhance the riparian environment in an urban setting. The selected remedial approach generally meets the EPA green remediation goals, to the extent practical and appropriate, for this project.

3.5 Estimated Remediation Costs

Remediation costs have been estimated based on the investigations completed to date for the subject site. The total estimated remediation cost is $670,000 which includes permits, Remedial Action Plan, soil removal, confirmatory sampling, capital improvements associated with site restoration, post-remediation monitoring, ELUR filing, and project closeout reporting. The schedule for this remediation is presented below:

ABCA Submittal	March 2014
QAPP Submittal	March 2014
Public Meeting	April 2014
Remediation Public Notice	April 2014
RAP Submittal	May 2014
Excavation	June-July 2014
RAR and ELUR submittal	July-Aug 2014
Groundwater Monitoring	August 2014 – May 2015
Verification	August 2015

FIGURES

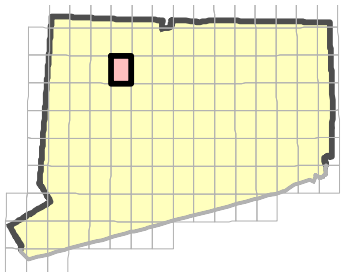


0 1,000 2,000 4,000 6,000 8,000

Feet

1 inch = 2,000 feet

N



USGS Quadrangle Information
Quad ID: 41073-G1
Name: Torrington, Connecticut
Date Rev: 1982
Date Pub: 1985

Figure 1
Site Location
Torrington Manufacturing Co. (Torin) Site
100 Franklin Street
Torrington, Connecticut
HRP # TOR6034.P1
Scale 1" = 2,000'

HRP Associates, Inc.
Environmental/Civil Engineering & Hydrogeology
Creating the Right Solutions Together
Offices in CT, SC, NY, FL, MA, TX and PA
197 Scott Swamp Road
Farmington, Connecticut 06032
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www.hrpassociates.com

Path: V:\Data\T\TORCI - CITY OF TORRINGTON\TORIN SITE, 100 FRANKLIN STREET, TORRINGTON, CT\TOR6034P1\GIS\Site Location.mxd

LIST OF FORMER BUILDINGS LOCATED AT THE SITE PRIOR TO 2010		
BUILDING	CONSTRUCTION	HISTORICAL USE
B	CIRCA 1907	MACHINE SHOP
C	CIRCA 1906	BOILER HOUSE
D	CIRCA 1900	PLATING FACTORY
E	CIRCA 1907	MACHINE SHOP, ENGINE/GENERATOR ROOM
F	CIRCA 1915	MACHINE SHOP
G	CIRCA 1902	WATER PUMP HOUSE
H	CIRCA 1907	COAL SHED, OIL WASTE AND EXCELSIOR, AND LACQUER & THINNER STORAGE
I	CIRCA 1906–1995	MATERIAL TESTING LABORATORY & PATTERN STORAGE
J	CIRCA 1915–1924	CHIP HOUSE
K	CIRCA 1915–1924	LUMBER SHED
BRICK CHIMNEY	CIRCA 1913	POWER GENERATION/COAL BURNING
FORMER HOUSE	CIRCA 1909–1934	FORMER 2–FAMILY RESIDENCE

VACANT LOT (FORMER EXELSIOR LAUNDRY FACILITY)

CL&P TRANSFORMER YARD

N

FRANKLIN DRIVE

GATE

FORMER HOUSE

WIRE FENCE (TYP.)

SOIL PILE COVERED WITH POLY PLASTIC

COMMERCIAL

RESIDENTIAL

SITE BOUNDARY (TYP.)

ROAD SWEEPINGS PILE

INERTIA DYNAMICS FACILITY (FORMER OFF–SITE TORIN MFG. CO. PLANT)

COMMERCIAL

CIRCA 1949 ADDITION

TB–22

TB–21

FORMER "CHIP" HOUSE (BUILDING J)

HS–4

FORMER LUMBER SHED (BUILDING K)

MW–7

TB–8

TB–24

FORMER PATTERN STORAGE AND LAB. (BUILDING I)

CENTER STREET

RESIDENTIAL CONDOS

BUILDING E

BUILDING F

BROKEN ASPHALT & GRAVEL

TB–20

MW–4

FORMER COAL PILE & MISCELLANEOUS STORAGE (PRE 1934–CIRCA 1980)

APPROX. LOCATION OF MACHINE PIT IN BASEMENT ENGINE ROOM

BUILDING D

BUILDING H

POLE MOUNTED TRANSFORMERS

REPORTED BASEMENT OPENING

MW–2

TB–1

SUMP

MW–3

TB–3

SUMP

INCLINED LOADING RAMP

TB–18

TB–4

DUMPSTER LOCATION

PILE OF WOOD PALLETS, METAL DEBRIS, FURNITURE, AND SIMILAR SOLID WASTES

FUST–2: APPROX. LOCATION OF 500–GAL. GASOLINE UST (REMOVED 1994)

MW–8

TB–9

RUSTY STAIN

AST–2: APPROX. 275 GAL. EMPTY WATER TANK

VENT

BUILDING C

TB–15

TB–14

COAL HOUSE

HS–2

TB–17

HS–1

TB–19

TB–23

HISTORICAL TRANSFORMER YARD

SCATTERED ASPHALT ROOFING AND STEAM PIPE INSULATION ON GROUND

MASONRY RIVER WALL (TYP.)

TB–2

TB–16

AUTO REPAIR FACILITY

FRANKLIN STREET

BUILDING B (NO BASEMENT)

TB–11

TB–10

RW–1

HS–3

THE NAUGATUCK RIVER

FORMER LACQUER & THINNER STORAGE AREA

MACHINE PITS

TB–12

FORMER OIL WASTE AND EXCELSIOR STORAGE AREA

FLOOR DRAIN

HS–6

TB–13

TRANSFORMERS ON ELEVATED PLATFORM

DRUM STORAGE AREA

GATE

TB–7

MW–6

FORMER SCALE

HS–5

TB–6

MW–5

BRICK CHIMNEY

SCATTERED ASPHALT ROOFING AND SCRAP METAL DEBRIS ON GROUND

BROKEN ASPHALT

TB–25

TB–5

WEST BRANCH

WATER PUMP HOUSE (BUILDING G)

PILE OF ASPHALT ROOFING DEBRIS

RESIDENTIAL (FORMER OFFICE BLDG. FOR TORR. CO.)

REPORTED FORMER DRUM STORAGE AREA

FUST–1: 18,000 GAL. #2 FUEL OIL UST (REMOVED 1994)

24" DIAMETER WELL

INCLINED LOADING RAMP WITH HYDRAULIC LIFT

AST–1: 275 GALLON HYDRAULIC OIL TANK

OUTFALL

DRAINAGE GRATE

60 0 30 60

APPROXIMATE SCALE (1" = 60')

LEGEND

- –CATCH BASIN
- –LOADING DOCK
- –FLOOR DRAIN
- –ELECTRICAL TRANSFORMER
- –SOLID WASTE AREA
- –MASONRY DRAINAGE SWALE
- –EXISTING GROUNDWATER MONITORING WELL
- –APPROXIMATE TEST BORING LOCATION
- –APPROXIMATE HAND SAMPLE LOCATION

NOTE: THE PROPERTY IS CURRENTLY EMPTY LAND. ALL FEATURES PRESENTED ON THIS SITE PLAN ARE BASED ON THE OBSERVATIONS MADE IN 2007.

FIGURE 2
SITE PLAN SHOWING FORMER FEATURES, SAMPLING LOCATIONS AND PRAs/RAs
TORRINGTON MANUFACTURING COMPANY (TORIN) SITE
100 FRANKLIN STREET
TORRINGTON, CONNECTICUT
HRP# TOR6034.P1
SCALE: 1" = 60'±

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