Analysis of Brownfields Cleanup Alternatives – Preliminary Evaluation
Long Falls Paperboard, 161 Wellington Road, Brattleboro, Vermont 05301
Vermont DEC Site Number 2010-4028
Prepared by Brattleboro Development Credit Corporation

I. Introduction & Background

a. Site Location (*address*)

The site is located at 161 Wellington Road in Brattleboro, Vermont, 05301 (herein referred to as "the Site").

a. Forecasted Climate Conditions

According to the US Global Change Research Program (USGCRP), heat waves, coastal flooding, and river flooding will pose a growing challenge to the region's environmental, social, and economic systems. This will increase the vulnerability of the region's residents, especially its most disadvantaged populations. Infrastructure will be increasingly compromised by climate-related hazards, including sea level rise, coastal flooding, and intense precipitation events. Some of these factors, most specifically intense precipitation events leading to increased river flooding and stormwater runoff, are most applicable to the cleanup of the Site.

According to FEMA, a small portion of the Site is within the Connecticut River 100-year flood plain. This means that portion of the property has a 1% annual chance of flooding. Although the majority of Site development and operations are outside the flood plain, forecasted greater storm frequency and intensity in a changing climate may result in more frequent and more powerful flooding of the Connecticut River, which may result in expansion of the flood zone and a greater increased risk of flooding of the Site.

b. Previous Site Use(s) and any previous cleanup/remediation

The Long Falls Paper Site consists of a 200,000 square foot paper manufacturing plant on a 40-acre riverfront parcel. No previous environmental cleanup / remediation work has taken place. The Site is an inactive Vermont hazardous Site due to a fuel oil release discovered in 1990. The release was investigated, no cleanup was performed, and the Vermont Department of Environmental Conservation (DEC) conferred Sites Management Activity Complete (SMAC) status.

c. Site Assessment Findings (*briefly summarize the environmental investigations that have occurred at the site, including what the Phase I and Phase II assessment reports revealed in terms of contamination present, if applicable*)

1. The Phase I ESA was completed on December 12, 2018. It included 12 Recognized Environmental Conditions (RECs), summarized as follows.
    a. Documented #6 fuel oil release (historical REC and REC) due to leaking USTs.
    b. Potential petroleum contamination due to diesel and gasoline underground storage tanks removed in 1988.

c. Use of the property for paper manufacturing for 58 years, which may have resulted in soil, groundwater and/or soil vapor contamination. Potential contaminants of concern include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, dioxin, and polyfluorinated compounds (PFCs).
d. Potential chemical and petroleum discharge to basement floor sumps and underground piping of unknown integrity possibly resulting in releases via piping breaches.
e. Visible and potential releases from equipment in the storage yard.
f. Potential for subsurface contamination due to an abandoned drum.
g. Filled area at the north end of the property with undocumented fill materials.
h. Windham Solid Waste Management District (WSWMD) landfill documented and potential influence on the property's groundwater quality (Controlled REC).
i. Potential soil and groundwater contamination from the active septic system north of the mill.
j. Potential soil and groundwater contamination from the unused septic system east of the mill.
k. Potential contamination in connection with the active rail line adjoining the west side of the facility.
l. Potential releases of hazardous substances and/or petroleum products from the historical printing press adjoining the property to the west.

2. A Site Investigation was previously performed on a portion of the Site near the paper plant (prior to the Phase I ESA), which consisted of installation of 17 groundwater monitoring wells and soil borings. The Site investigation findings included:
    a. Four soil borings were advanced at and near the location of the removed fuel oil USTs. Heavy petroleum contamination was detected from 8-47' below grade.
    b. Groundwater monitoring wells were installed, and groundwater was found approximately 70' below grade.
    c. Groundwater contamination was found including petroleum-related VOCs, total petroleum hydrocarbons, and chlorinated VOCs (cVOCs).
    d. The petroleum-related VOCs included benzene, ethylbenzene, toluene, xylenes, and Methyl-t-butyl ether (MTBE), a gasoline additive. The reported benzene concentration exceeded the drinking water standard in effect at the time.
    e. The cVOCs included tetrachloroethene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane, trichlorofluromethane, vinyl chloride, 1,1-dichloroethane, 1,2-dichoroethane, and trans-1,2-dichloroethene. The reported PCE and TCE and vinyl chloride concentrations exceeded the drinking water MCLs in effect at the time.
    f. Groundwater was estimated to be flowing northwesterly, away from the Connecticut River, and toward the river at other times, depending on river stage.

g. Follow up monitoring indicated that free product (floating oil) was detected in three wells in the vicinity of the removed USTs. It was described as extremely viscous to nearly solidified.
h. MTBE was the only petroleum VOC detected in the groundwater samples, in one well (MW-11) at a concentration below the health advisory standard in effect at the time.
i. Chlorinated VOCs were detected in groundwater. This contamination was attributed to past storage and handling of chlorinated solvents in the maintenance shop vicinity. The detected cVOCs included PCE, 1,1,1-trichloroethane, and trichlorofluromethane, concentrations of which were reportedly less than health advisory and drinking water standards in effect at the time. All of the reported concentrations were below current Vermont Groundwater Enforcement Standards.

3. A separate Site investigation was performed on the northern part of the Site, in conjunction with the WSWMD landfill on the adjoining property to the west. Five monitoring wells were installed and sampled. Chlorinated solvents and metals were detected in the groundwater below the northern end of the property at concentrations above state groundwater standards. However, this portion of the property has had its groundwater re-classified to non-potable status so no cleanup is needed.

d. Project Goal (*site reuse plan*)

BDCC's redevelopment strategy is to continue to operate the facility (with Long Falls Paperboard) and expand as economic conditions permit. Once cleanup is complete, BDCC will turn the land over to Long Falls Paperboard to complete its economic development mission.

II. Applicable Regulations and Cleanup Standards

a. Cleanup Oversight Responsibility (*identify the entity, if any, that will oversee the cleanup, e.g., the state, Licensed Site Professional, other required certified professional*)

Brattleboro Development Credit Corporation (grantee) will follow federal procurement requirements to retain a qualified environmental professional to coordinate, oversee and certify the cleanup. The qualified environmental professional procurement will be advertised using open competitive procedures. The DEC will also oversee the cleanup and will issue the Certificate of Completion under Vermont's Brownfields Reuse and Environmental Liability Limitation Act (BRELLA) program.

b. Cleanup Standards for major contaminants (*briefly summarize the standard for cleanup e.g., state standards for residential or industrial reuse*)

The cleanup will be performed to standards published by the DEC in its Investigation and Remediation of Contaminated Properties Rule (I-Rule) and the USEPA. The following table summarizes the major contaminants on the Site, the media they are present in, the

applicable cleanup standards, and the planned means to achieve the cleanup.

Major Contaminant	Media	Applicable Cleanup Standard	Remedial Technique
Metals, Volatile Organic Compounds, co-mingled petroleum (on-Site presence confirmed via previous investigations)	Soil	Vermont I-Rule Soil Screening Levels	Shallow soil replacement (soil removal and disposal and clean soil cap installation)
Semivolatile Organic Compounds, PCBs, PFCs (on-Site presence likely but not confirmed, assessments are ongoing)			

c. Laws & Regulations Applicable to the Cleanup (*briefly summarize any federal, state, and local laws and regulations that apply to the cleanup*)

Laws and regulations that are applicable to this cleanup include the Federal Small Business Liability Relief and Brownfields Revitalization Act, the Federal Davis-Bacon Act, Federal EPA TSCA, State of Vermont I-Rule and Groundwater Protection Rule. Federal, state, and local laws regarding procurement of contractors to conduct the cleanup will be followed. In addition, all appropriate permits (*e.g.*, Dig-safe, hazardous waste manifests, and non hazardous waste transport/disposal bills of lading) will be obtained.

III. Evaluation of Cleanup Alternatives

a. Cleanup Alternatives Considered (*minimum two different alternatives plus No Action*)

The subsurface media to be addressed at the Site is shallow soil (0-18" deep). Groundwater is not targeted for cleanup. Groundwater is 70' deep and is not used. Part of the groundwater beneath the property has been re-classified to non-potable status, and legal restrictions on its use exist, therefore, no cleanup is needed. Options for soil cleanup were evaluated and the results are as follows.

b. Evaluation of Cleanup Alternatives (*brief discussion of the effectiveness, implementability and a preliminary cost estimate for each alternative)*

The proposed remedy for detected contamination on the Site must primarily isolate contaminated soils from direct human exposure. A second objective of the corrective action is to isolate residual contaminated soils from possible physical transport and dispersion. A third objective is to provide adequate protection to workers and

neighboring residents during construction. A fourth objective will be to minimize the corrective action's impact on climate change considerations.

Option A: Partial Contaminated Soil Removal

Option A specifies that the top 18" of soil be removed from a 1.2-acre area around the plant. The rest of the soils from 18" depth downward would remain on-Site. Other areas of land around the plant are paved and the pavement will prevent exposure to shallow soils. Therefore, those soils would not be disturbed. Excavated soils would be loaded and transported to a certified disposal facility. Stabilization of the excavation would not likely be necessary due to the shallow excavation depth. A total estimated soil volume of 3,000 cubic yards or approximately 4,500 tons of contaminated soils would be removed. The BRELLA Certificate of Completion (COC) will note the presence of contaminated soil below 18" and will be filed with the Town of Brattleboro town clerk. The COC will note the need to coordinate future excavation activities with the DEC.

Cost Estimate: The budgetary cost estimate for Option A is $600,000.

Advantages: The advantages of Option A include:

- It is feasible and can be implemented using local technologies.
- Human health and environmental concerns will be addressed by this option.
- Exposure to surface toxins will be eliminated.
- This option preserves green space on Site and does not result in greater stormwater generation than at present.
- This option is less expensive than Option B.

Disadvantages: The disadvantages of this approach include:

- There is a relatively high amount of soil being moved to and from the Site, resulting in greenhouse gas emissions and wear and tear on area roads.
- Some contamination will remain on Site when the cleanup is done; however, it will not be accessible to humans and will not be at risk due to environmental exposure.

Option B: Paving

Option B specifies that the 1.2-acre area around that plant that is not already paved would be paved to prevent exposure to contaminated soils. Other areas of land around the plant are already paved and the pavement will prevent exposure to shallow soils. A 12" pavement section is specified due to heavy truck traffic around the plant. This will require removal and off-Site disposal of 12" of shallow soil, to preserve the existing Site grading and drainage design. Excavated soils would be loaded and transported to a certified disposal facility. Stabilization of the excavation would not likely be necessary due to the shallow excavation depth. A 6" layer of parking lot gravel would be imported and installed, and a 6" pavement section would be placed over it (3" base course and 3" finish course). A total estimated soil volume of 1,925 cubic yards or approximately

2,900 tons of contaminated soils would be removed. 52,000 square feet of commercial grade pavement would be installed. The BRELLA COC will note the presence of contaminated soil below 12" and will be filed with the Town of Brattleboro town clerk. The COC will note the need to coordinate future excavation activities with the DEC.

Cost Estimate: The budgetary cost estimate for Option B is $908,000.

Advantages: The advantages of paving include:

- It is feasible and can be implemented using local technologies.
- Human health concerns will be addressed by this option.

Disadvantages: The disadvantages of this approach include:

- It is more expensive than Option A.
- Increasing the paved area around the plant will increase the amount of stormwater generated during storms, and will reduce the available area for that water to infiltrate. This is a concern due to the proximity of the Connecticut River.
- Some contamination will remain on Site when the cleanup is done; however, it will not be accessible to humans and will not be at risk due to environmental exposure.
- Pavement is a petroleum-based product and its production and use could have an impact on greenhouse gas emissions. While less soil would be moved off and onto the Site with this option, this advantage could be negated by the use of a petroleum-based cap.

Option C: No Action Alternative

This option specifies that exposed soils at the Site would remain as is without addressing the documented contamination. The paper plant would remain as is. Fencing would be placed around the 1.2-acre area of shallow contaminated soil to restrict access. Although unsightly, the functionality of the Site would be preserved.

Cost Estimate: The budgetary cost estimate for Option C is $51,000.

Advantages: The advantages of this option are the relatively low cost of implementation and since no soil is leaving the Site, the carbon footprint / impact on climate change considerations is lower than options A and B. Human exposure to surface toxins would be restricted.

Disadvantages: This option is not protective of public health and does not address potential migration of surface contamination.

c. Recommended Cleanup Alternative

Partial soil removal and replacement with clean soil (Option A) is recommended because

of its relatively low cost compared with paving, its preservation of greenspace, and because it is protective of human health and the environment. Paving the Site does not present a compelling advantage in light of its significantly higher cost, its negative effect on stormwater infiltration, and a potentially greater carbon footprint. The no-action alternative does not address environmental exposure of surface toxins.

Green and Sustainable Remediation Measures for Selected Alternative

To make the selected alternative green and sustainable, several techniques are planned. The most recent Best Management Practices (BMPs) issued under ASTM Standard E-2893: Standard Guide for Greener Cleanups will be used as a reference in this effort. The owner will actively seek using local contractors for the cleanup and will require the cleanup contractor to follow an idle-reduction policy and use heavy equipment with advanced emissions controls operated on ultra-low sulfur diesel. The number of mobilizations to the Site will be minimized and erosion control measures will be used to minimize runoff into environmentally sensitive areas. In addition, the owner plans to ask bidding cleanup contractors to propose additional green and sustainable remediation techniques in their response to the Request for Proposals for the cleanup contract.