ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES
ENGINEERING BUILDING AND RESEARCH BUILDING/PILOT PLANT
FORMER GREAT NORTHERN PAPER COMPANY
MILLINOCKET, MAINE

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TABLE OF CONTENTS

TABLES

FIGURES

1.0 INTRODUCTION AND BACKGROUND

Ransom Consulting, LLC (Ransom) has completed this Analysis of Brownfields Cleanup Alternatives (ABCA) to evaluate remedial alternatives for the adjoining Engineering Building and Research Building/Pilot Plant (collectively referred to as the "E&R Building") located at the former Great Northern Paper (GNP) Mill in the Town of Millinocket, Penobscot County, Maine (the Site). This report summarizes the evaluation of remedial alternatives for the E&R Building and includes a discussion of each remedial option, a relative cost estimate, the degree of effectiveness, ease of implementation for each remedial alternative, and the resilience of each option in light of reasonably foreseeable changing climate conditions. This report was prepared on behalf of Our Katahdin through United States Environmental Protection Agency (U.S. EPA) Brownfields Cleanup Grant #00A00676.

1.1 Purpose and Scope

The purpose of this report is to evaluate potential remedial action alternatives to mitigate previously identified adverse environmental conditions associated with the E&R Building. Based on the information obtained during previous environmental investigations (summarized in Section 2.0), three remediation options were considered and evaluated based on feasibility, effectiveness, cost, schedule, ability to meet the overall cleanup goal (protection of human health and the environment), and resilience to climate change conditions. Key consideration was given to eliminating or reducing, to the extent possible, the risk of exposure for potential future Site occupants and workers to the identified contaminants at the E&R Building, as well as the ability for the proposed cleanup alternative to meet Our Katahdin's redevelopment goals for the Site.

The overall objectives of this ABCA include the following:

1. Evaluating the remedial alternatives against specific evaluation criteria, including overall protection of human health and the environment; technical practicality; ability to implement; reduction of toxicity, mobility, and volume of contaminant; time required until remedial action objectives are attained; costs; and resiliency to climate change conditions.

2. Selecting the remedial alternative that best meets the objectives and considerations of the project.

Remediation alternatives evaluated in this ABCA include 1) a "No Action" alternative, 2) a "Targeted Hazardous Building Materials Removal with Partial Management in Place" alternative, and 3) a "Full Hazardous Building Materials Removal" alternative. The Evaluation of Remediation Alternatives (Section 5.0) discusses the requirements for each alternative. The alternatives are evaluated on the criteria listed above, and one alternative is recommended for implementation at the Site.

1.2 Site Description

The E&R Building, located within the former 1,400-acre GNP mill complex, is comprised of two adjoining buildings: the Engineering Building and the Research Building/Pilot Plant. The E&R Building was constructed in the 1960's, and has been vacant and unheated since 2008, when the GNP mill closed. Since that time, the building condition has significantly deteriorated due to water intrusion, mold growth, vandalism, and weather impacts.

The Engineering Building component of the E&R Building is a three-story structure with a fully finished basement, covering an approximate ground footprint of 19,600 square feet. The Engineering Building was historically used as offices and laboratory space to support the Research Building/Pilot Plant.

The Research Building/Pilot Plant is a one-story structure with mezzanine and basement, covering an approximate ground footprint of 7,100 square feet. This portion of the E&R Building formerly held a functional paper machine and was used for pilot studies of different paper technologies to support the former Great Northern Paper company.

Both building structures consists of brick, steel, wood, and concrete block. The foundations are poured concrete floor slab and walls. Interior finishes primarily consist of gypsum wallboard systems and plasters, drop ceiling panels below concrete and steel ceiling decks, floor tiles, linoleum floor coverings, and limited areas of carpeting.

1.3 Potential Future E&R Building Use

The overall redevelopment plan for the E&R Building is to serve as the centerpiece for the next generation of engineering, research, development and innovation on Our Katahdin's renewed industrial/commercial use of the former GNP site in Millinocket. The goal is for the E&R Building to be home to companies investing in research and development of innovative new forest products technologies, capitalizing on the Site's proximity to wood, water, rail, road, affordable hydropower and other industrial infrastructure.

1.4 Site Geology and Hydrogeology

According to the 1986 *Surficial Geology of the Millinocket Quadrangle, Maine* map, surficial soils at the Site are identified as stream alluvium comprised of flood-plain and stream-terrace deposits. Developed portions of land surrounding the E&R Building (parking areas, roads, etc.) are likely to contain structural fill material.

According to 1985 *Bedrock Geologic Map of Maine,* the Site is underlain by the Devonian-Silurian Madrid formation, which consists of calcareous quartzite with lime-silicate minerals in middle-grade metamorphic zones, with minor amounts of argillaceous rocks and calcareous beds.

The Millinocket Stream is located approximately 350 feet east of the Site. Based on local topography and proximity to Millinocket Stream, groundwater is anticipated to flow to the east, towards Millinocket Stream.

2.0 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Several Phase I Environmental Site Assessments (ESAs) have been performed for the former GNP Millinocket Mill property, which includes the E&R Building. Phase I ESAs were completed by S.W. Cole in 2011, TRC in 2014, and Nobis Group in 2018. On November 20, 2019, Ransom completed a Phase I ESA for the entire 1,400-acre GNP Mill Site (which included the E&R Building) on behalf of Our Katahdin, as part of a MEDEP Brownfields Assessment Grant. In addition to the Phase I ESAs, a Hazardous Building Materials Inventory (HBMI) of the E&R Building was completed by Nobis Group of Concord, New Hampshire (Nobis) as part of a Targeted Brownfields Assessment (TBA) on behalf of U.S. EPA, in May 2019.

The 2019 Nobis HBMI identified the following hazardous building materials in connection with the E&R Building that may need to be abated and/or properly disposed of as part of Site redevelopment:

1. Asbestos containing building materials (ACM);
2. Polychlorinated biphenyl (PCB) containing building materials and fixtures;
3. Lead-based paint (LBP);
4. Mercury containing equipment (thermostats, switches, etc.) and other universal wastes; and
5. Potentially hazardous levels of mold.

3.0 PEER REVIEW AND DATA GAP EVALUATION

As part of the development of this ABCA, Ransom completed a Peer Review and Data Gap Evaluation of the 2019 Nobis HBMI. The 2019 HBMI is presented as a Pre-Demolition Impact Survey sufficient to prepare final abatement specifications and remediation designs. Ransom evaluated the Nobis HBMI report for data gaps due to inspection or sampling limitations, materials not sampled, potential ambiguities in the nature or quantities of hazardous building materials identified, and reporting deficiencies, among other items. On October 24 - 25, 2019, Ransom visited the Site to perform a peer review and data gap investigation.

Based on our review of Nobis's Report and the results of our own Site reconnaissance, Ransom concluded that the Nobis HBMI report was satisfactory as a Pre-Demolition Impact Survey; however, Ransom identified the following items which required clarification prior to developing final abatement designs and cleanup design:

- Nobis identified 2,500 linear feet of ACM pipe insulation and associated fittings. Based on Ransom's observations, this estimate appears to be low. It is possible that certain insulation types were assumed to be negative for asbestos; however, this documentation was not provided. Ransom recommended that supplemental sampling be conducted to determine the types and total quantity of ACM pipe insulation present.

- Nobis identified 80,000 square feet of drywall with ACM backing/mastic and ACM joint compound, comprising all drywall in the building. This conclusion was based on a single data point, which may not have been sufficient to characterize the entire building. Ransom recommended that supplemental inspection and/or sampling be conducted to determine the extent of drywall with ACM mastic and joint compound.

- The Nobis report did not include a photograph log to document identified ACM, PCB Bulk Product waste, etc. Ransom recommended that a photograph log be generated once data gaps were satisfactorily addressed.

4.0 SITE CHARACTERIZATION AND CLEANUP GOALS

Previous environmental investigations completed at the Site identified hazardous building materials, including ACM, PCB-containing components, LBP, universal wastes, and mold. The identified contamination and appropriate cleanup goals are summarized below.

4.1 Asbestos-Containing Materials

Various asbestos-containing materials were identified at the E&R Building during the HBMI conducted in May of 2019. The presence of ACM has the potential to pose an exposure risk to future site occupants and/or visitors, in the case of disturbance or other airborne fiber release.

The cleanup goal for the Site relative to ACM is to eliminate the risk of human contact and exposure to asbestos during future redevelopment activities and Site reuse. Cleanup actions, (i.e. removal and proper offsite disposal of ACM), must be completed to meet U.S. EPA and MEDEP regulatory requirements, mitigate human exposure pathways, and allow for Site redevelopment.

4.2 Polychlorinated Biphenyls

PCB containing caulks and paints were identified during the 2019 Nobis HBMI at concentrations ranging from below laboratory detection limits, up to 50,000 milligrams per kilogram (mg/kg). U.S. EPA has established a threshold value of 50 mg/kg PCBs, above which materials are considered "Unauthorized Use" of PCBs and require removal and disposal as PCB Bulk Product Waste under 40 CFR 761.3. Materials testing below 50 mg/kg PCBs may be considered Excluded PCB Products, and are not required to be removed. Excluded PCB Product waste may be disposed of at any licensed solid waste management or recycling facility permitted to accept low-level PCBs.

A limited number of materials are identified as PCB Bulk Product Waste in the Nobis HBMI; proper site controls, worker protection, and waste disposal methods will need to be implemented during removal and disposal of these materials. The majority of materials tested were below 50 mg/kg and may be treated as Excluded PCB Products. The cleanup goal for the Site relative to PCB is to eliminate the risk of human contact and exposure during future redevelopment activities and Site reuse. Cleanup actions must be completed to meet U.S. EPA and MEDEP regulatory requirements, mitigate human exposure pathways, and allow for Site redevelopment.

4.3 Lead-Based Paint

Lead-based paint was identified throughout the E&R Building during the previous HBMI. Components exceeding the U.S. EPA threshold value for LBP under Housing and Urban Development (HUD) ($\geq$ 1.0 milligram/square centimeter (mg/cm^2)) included ladders, machinery, sinks, cabinets, shelves, handrails, beams, garage doors, posts, and stair stringers. It is noted that HUD guidance is used as a reference value only and is not a regulatory consideration in this redevelopment scenario, as no residential reuse is anticipated. Handling of components coated with lead-containing paint *at any concentration* requires compliance with the Occupational Safety and Health Administration (OSHA) lead standard (*Lead in Construction*, 29 CFR 1926.62).

Under the existing conditions, facility maintenance staff or contractors may perform demolition, renovation, abatement, stabilization, cleanup, and daily operations in buildings that LBP, provided that workers are protected in accordance with OSHA standards. As such, the abatement of LBP is not included in this cleanup plan and will be conducted as part of future Site redevelopment/reuse.

4.4 Universal Wastes

The previous HBMI included a visual inspection to identify and quantify other potentially hazardous materials and universal wastes that may require special handling prior to future renovation or demolition activities. Items identified in the E&R Building included fluorescent bulbs, fluorescent light fixture ballasts, thermostats, electronic devices, fire extinguishers, various containers of maintenance materials, and above ground storage tanks. The cleanup goal for the Site relative to Universal Waste is to eliminate the risk of human exposure during future construction/redevelopment activities. Cleanup actions (i.e. removal and proper offsite disposal) must be completed to mitigate human exposure pathways, ensure proper management/disposal, and allow for Site redevelopment.

4.5 Mold

The previous HBMI included an evaluation for hazardous levels of mold growth. Certain areas of the E&R Building had spore concentrations in excess of 1,000 counts/area. While there are no regulatory assessment limits or cleanup values under U.S. EPA or MEDEP, proper site controls, worker protection and waste handling methods will need to be implemented during removal and disposal of mold-impacted materials. The source of mold in the building is anticipated to be the failed leaking roof drains and failed roofing systems.

5.0 DESCRIPTION OF EVALUATION CRITERIA

The comparison of the remediation alternatives was conducted using the evaluation and threshold criteria discussed below.

5.1 Overall Protection of Human Health and the Environment

Alternatives must pass this threshold criterion to be considered for implementation as the recommended alternative. The goal of this criterion is to determine whether a remediation alternative provides adequate protection of human health and the environment. It also addresses how identified risks are eliminated, reduced, or controlled. Protection of human health is assessed by evaluating how site risks from each exposure route are eliminated, reduced, or controlled through the specific alternative.

5.2 Technical Practicality

The focus of this evaluation criterion is to determine the technical practicality of instituting the specific alternative.

5.3 Ability to Implement

This criterion analyzes technical feasibility and the availability of services and materials. Technical feasibility assesses the ability to implement and monitor the effectiveness of the alternative. Availability of services and materials evaluates the need for off-site treatment, storage or disposal services and the availability of such services. Necessary equipment, specialists and additional resources are also evaluated.

5.4 Reduction of Toxicity, Mobility, and Volume

This criterion evaluates the effectiveness of the remediation alternative to significantly reduce the toxicity, mobility, and volume of the hazardous substances present at the Site. This analysis evaluates the quantity of hazardous substances, regulated wastes, and/or impacted media to be removed, the degree of expected reduction in toxicity, and the way the principle threat is addressed through the remediation alternative.

5.5 Short Term Effectiveness

This criterion addresses the period of time needed to complete the remediation, potential adverse impacts on human health and the environment that may exist until the cleanup goals are achieved, and the time frame for accomplishing the associated reduction in the identified environmental conditions.

5.6 Resiliency to Climate Change Conditions

This criterion evaluates the resilience of the remediation alternative to reasonably foreseeable changing climate conditions, such as increasing/decreasing temperatures, increasing/decreasing precipitation, extreme weather events, rising sea level, changing flood zones, and higher/lower groundwater tables, among others.

5.7 Preliminary Cost

The preliminary cost criterion for the remediation alternatives evaluates the estimated capital, operation, and maintenance costs of each alternative. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering, sampling contingencies, and licenses. Costs

were developed as an evaluation criterion for the remedial alternatives and should not be construed as bid costs or engineer's cost estimates. Cost may be used as a distinguishing factor in the selection of the remedial action. The preliminary costs developed should in no way be construed as a cost proposal, but rather a guide for selecting a remedial action.

6.0 EVALUATION OF REMEDIATION ALTERNATIVES

Based on the evaluation criteria outlined in the previous section and the potential exposure pathways identified for the Site, the remedial actions selected should accomplish the following objectives:

1. Minimize the potential for human exposure and contact with hazardous building materials and components in a feasible, resilient, and time- and cost-effective way; and

2. Reduce the toxicity, mobility, and volume of hazardous building materials and components in a feasible, resilient, and time- and cost-effective way.

To achieve these objectives, three remedial options were considered and are discussed in the following subsections.

6.1 Considered Remediation Alternatives

Three remedial alternatives were considered to address hazardous building materials in the E&R Building, including 1) the No Action Alternative, 2) the Targeted Hazardous Building Materials Removal with Partial Management in Place Alternative, and 3) the Full Hazardous Building Materials Removal alternative. These alternatives were evaluated using the criteria described in Section 5.0 and are summarized below. The attached Table 1 includes a Summary of the Evaluation and Comparison of the Remedial Alternatives.

Each alternative considered assumes a complete "gut" renovation of the building interior would occur. Due to the extensive water damage, organic/microbial growth, and generally poor condition of interior finishes, it is assumed that in order for building renovation/reuse to occur, the building would need to be reduced to bare floors, ceiling decks, and steel and concrete structural members. Additionally, regardless of which alternative was selected, it will be necessary to replace the roof of the building. Currently, the roof and roof drains are failing and in poor condition and are allowing a significant amount of rainwater and snowmelt to enter the building; this contributes to mold growth and may impact the structural integrity of the building. Per Maine regulations, the ACM identified in the Pilot Plant roof would require abatement prior to roof replacement.

6.2 No Action Alternative

A "No Action" alternative signifies that no remediation activities would be conducted at the Site, and that hazardous building materials would not be removed. The building would not be gutted, and the roof would not be replaced. The "No Action" alternative does not include a means for mitigating exposure to identified adverse environmental conditions or unacceptable risks remaining from hazardous building materials. Therefore, the potential for human exposure through direct contact, ingestion, and/or inhalation continues to exist for current and future Site occupants, workers, or trespassers. This alternative is not supportive of building redevelopment or reuse.

The "No Action" alternative is not protective of human health and the environment and does not meet the threshold criteria. The "No Action" alternative would not achieve reduction of the toxicity, mobility, and volume of the hazardous substances present at the Site. As such, the "No Action" alternative was not selected for implementation or further consideration.

6.3 Targeted Hazardous Building Materials Removal with Partial Management in Place Alternative

The second remediation alternative evaluated in this ABCA is the "Targeted Removal/Management in Place" alternative. As part of this alternative, ACM would be abated and properly removed for offsite disposal *except* the exterior door and windows, which would be retained for ongoing reuse. Caulks and paints identified as unauthorized use of PCBs, (i.e. concentrations of PCBs which exceed 50 mg/kg), would be properly removed and disposed as PCB bulk product waste (including one caulk which tested 49 mg/kg). All identified universal waste items would be properly removed and recycled or disposed.

LBP would be abated in specific locations to allow for torch cutting or grinding to facilitate interior demolition; some LBP-coated building materials would also be removed as part of building "gut" demolition. Mold impacts would be addressed by gutting the building, which would include removal of all organic materials currently acting as a host and food source for microbial growth.

LBP and/or paints with PCB concentrations below 50 mg/kg (i.e. Excluded PCB Products) may remain on remaining surfaces. Additionally, ACM would remain in the exterior windows and doors. The majority of these items would be mitigated/disposed during future Site redevelopment/reuse activities; however, remaining items (if left in place) would be managed under an Operation & Maintenance (O&M) program during future reuse. The O&M program would require periodic surveillance of these materials and outline best work practices during future renovation/disturbance.

The "Targeted Removal/Management in Place" alternative fulfills the evaluation criteria, as discussed below.

6.3.1 Overall Protection of Human Health and the Environment

This alternative provides adequate protection of human health and the environment by significantly reducing the potential risk of exposure to future Site visitors and/or occupants by removing all but a limited amount of identified ACM, PCBs, universal wastes, LBP, and mold-impacted materials. Remaining hazardous building materials would be managed under and O&M program. The goal of reducing or eliminating the risk of human exposure to hazardous building materials at the E&R Building would be achieved through this alternative.

6.3.2 Technical Practicality

This cleanup alternative utilizes standard methods and techniques, and contractors with experience with similar projects are readily available in the region. Similar O&M programs to the one proposed are common and can be readily prepared and implemented. Therefore, this alternative is technically practical.

6.3.3 Ability to Implement

This cleanup alternative is technically feasible and a common approach for reducing or eliminating human health exposure risks associated with hazardous building materials. Services and materials are readily available.

6.3.4 Reduction of Toxicity, Mobility, and Volume

Toxicity, mobility, and volume of each hazardous building material identified would be reduced or eliminated under this alternative.

6.3.5 Short Term Effectiveness

The remedial action objectives would be attained almost immediately upon contracting the abatement work. The work described under this alternative could be performed on a relatively short timeframe, likely within a few months after mobilizing contractors.

6.3.6 Resiliency to Climate Change Conditions

Due to the Site's building's elevation above the Millinocket Stream (approximately 20 feet above), and relative distance from other major water bodies, climate change effects from rising sea level and changing flood zones are not anticipated to represent a major threat. As such, the primary climate change concerns would be associated with extreme weather, increased rainfall, and rising groundwater tables. This remedial approach described under this alternative would not be impacted by extreme weather conditions.

6.3.7 Preliminary Cost

The estimated costs associated with this remedial alternative are outlined in the attached Table 2: "Summary of Estimated Remediation Costs for Targeted Hazardous Building Materials Removal with Partial Management in Place Alternative." Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering and contingencies. The costs associated with this alternative are lower than the costs associated with Alternative 3, presented below.

6.4 Full Hazardous Building Materials Abatement Alternative

The third remediation alternative evaluated in this ABCA is the "Full Hazardous Building Materials Abatement" alternative. This alternative involves the proper removal, transport, and offsite disposal of all identified hazardous building materials identified at the E&R Building, including each ACM, all caulks and paints with PCBs greater 1 mg/kg, all identified LBP, and all universal wastes.

The "Full Hazardous Materials Abatement" alternative fulfills the evaluation criteria, as discussed below.

6.4.1 Overall Protection of Human Health and the Environment

This alternative provides protection of human health and the environment through eliminating the potential risk of human exposure to ACM, PCBs, LBP, universal wastes, and mold for future site visitors and/or occupants. The goal of reducing or eliminating the risk of human exposure to identified contaminants would be achieved through this alternative.

6.4.2 Technical Practicality

This cleanup alternative utilizes standard methods and techniques, and contractors with experience with similar projects are available in the region. Therefore, this alternative is technically practical.

6.4.3 Ability to Implement

Removal and disposal of hazardous building materials is technically feasible and is a common action for reducing or eliminating the human health risks of contact with hazardous building materials. Services and materials are readily available.

6.4.4 Reduction of Toxicity, Mobility, and Volume

Toxicity, mobility, and volume of each hazardous building material identified would be eliminated under this alternative.

6.4.5 Short Term Effectiveness

The remedial action objectives would be attained almost immediately upon contracting the abatement and encapsulation work. The work described under this alternative could be performed on a relatively short timeframe, likely within a few months of mobilizing contractors; however, this alternative would take longer to implement than Alternative 2.

6.4.6 Resiliency to Climate Change Conditions

Due to the Site's building's elevation above the Millinocket Stream (approximately 20 feet above), and relative distance from other major water bodies, climate change effects from rising sea level and changing flood zones are not anticipated to represent a major threat. As such, the primary climate change concerns would be associated with extreme weather, increased rainfall, and rising groundwater tables. The remedial approach described under this alternative would generally not be impacted by extreme weather conditions.

6.4.7 Preliminary Cost

The estimated costs associated with this remedial alternative are outlined in the attached Table 3: "Summary of Estimated Remediation Costs for Full Hazardous Building Materials Removal Alternative." Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering and contingencies. The costs associated with this alternative are higher than the costs associated with Alternative 2.

6.5 Selection of Proposed Remediation Alternative

Based on the results of the initial screening of each alternative, as shown on Table 1 and discussed in detail above, Alternative 2: Targeted Hazardous Building Materials Removal with Partial Management in Place has been selected as the preferred remediation alternative. This alternative is proven to protect human health and the environment; is effective, technically feasible, and practical; and is cost-effective.

This alternative assumes that a complete "gut" renovation of the building interior would occur, and that the building roof would be fully replaced (and that associated ACM would be abated).

7.0 CONCLUSIONS AND RECOMMENDATIONS

Previous environmental investigations conducted at the Site identified the presence of hazardous building materials, including ACM, PCB-containing paints and caulk, LBP, universal waste, and mold-impacted building materials. To address the contamination onsite, three remediation alternatives were evaluated, including a "No Action" alternative, a "Targeted Hazardous Building Materials Removal with Partial Management in Place" alternative, and a "Full Hazardous Building Materials Abatement" alternative.

The "No Action" alternative was determined to be unacceptable because it did not meet threshold criteria of the overall protection of human health and the environment. The "Full Hazardous Building Materials Abatement" alternative was not selected because it achieved a similar and appropriate degree of risk-reduction for the assumed reuse scenario, at a higher cost. The "Targeted Hazardous Building Materials Removal with Partial Management in Place" alternative was deemed to be most appropriate for the assumed reuse, is appropriately protective of human health and the environment, and is effective, technically feasible, and practical. Because this alternative meets the evaluation criteria, and is not cost-prohibitive, this is the recommended remedial alternative.

8.0 SIGNATURE(S) OF ENVIRONMENTAL PROFESSIONAL(S)

The following Ransom personnel possess the sufficient training and experience necessary to conduct an Analysis of Brownfields Cleanup Alternatives, and from the information generated by such activities, have the ability to develop opinions and conclusions regarding remediation alternatives, as presented herein, for the Site.

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TABLE 1 – SUMMARY OF THE EVALUATION AND COMPARISON OF REMEDIAL ALTERNATIVES
ENGINEERING BUILDING & RESEARCH BUILDING/PILOT PLANT
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Remedial Action Alternative (RAA)	Overall Protection of Human Health and the Environment	Technical Practicality	Ability to Implement	Reduction of Toxicity, Mobility and Volume	Short Term Effectiveness	Estimated Cost	Comments
1) No Action	• Long-term risks to human health by direct contact, inhalation, and ingestion of hazardous building components will remain. • Cleanup levels will not be met.	• Not applicable.	• Not applicable.	• No reduction in toxicity, mobility or volume of hazardous building materials.	• Not applicable.	• This alternative will involve ongoing security and maintenance measures and represents a significant opportunity cost to the owner relative to redevelopment.	• This alternative does not address the documented adverse environmental conditions, human health risks, or contamination stigma at the property. • This alternative does not support Site redevelopment or reuse.
2) Targeted Hazardous Building Materials Removal with Partial Management in Place	• Risks to human health by exposure to hazardous building materials is eliminated or reduced through removal of these items from the Site prior to renovation/ demolition. • Ongoing risk to human health by exposure to hazardous building materials which remain are mitigated through an Operations & Maintenance Plan. • Environmental cleanup is partially completed, and will be further mitigated/completed during building redevelopment/reuse.	• This cleanup alternative utilizes standard and established methods and techniques. Therefore, this alternative is technically practical.	• The necessary contractors, equipment and materials to complete the remedial tasks are readily available.	• Abatement and demolition/disposal activities reduce/eliminate the toxicity, mobility, and volume of hazardous building materials.	• The remedial strategy could be implemented relatively quickly, within weeks of contractor selection. • This cleanup alternative could be achieved in less time than Alternative 3.	• The estimated cost for this alternative is presented in Table 2. • The estimated cost for Alternative 2 is less than the cost for Alternative 3. • Capital costs include materials and equipment, and indirect capital costs such as engineering. • These cost estimates are for budgetary purposes only and in no way should be construed as a cost proposal or bid for services.	• This is the selected remedial alternative, as it provides sufficient risk reduction based on an assumed commercial/ institutional/ light industrial reuse, at a lower financial cost than Alternative 3, and on a shorter timeline. • This alternative is supporting of Site redevelopment and reuse. • Deed restrictions and long-term maintenance associated with an O&M Plan would be necessary to confirm that ACM, LBP, and PCB materials remain in good condition and do not represent an exposure risk to future site occupants.
3) Full Hazardous Building Materials Removal	• Risks to human health by exposure to hazardous building materials are eliminated by removing these items from the Site.	• This cleanup alternative utilizes standard and established methods and techniques. Therefore, this alternative is technically practical.	• The necessary contractors, equipment and materials to complete the remedial tasks are readily available.	• Toxicity, mobility, and volume of all identified hazardous building materials would be eliminated under this alternative.	• This remedial strategy could be implemented relatively quickly, within weeks or months of contractor selection. • This cleanup alternative would take more time to implement than Alternative 2.	• The estimated cost for this alternative is presented in Table 3. • The estimated cost for Alternative 3 is higher than the cost for Alternative 2. • Capital costs include materials and equipment, and indirect capital costs such as engineering. • These cost estimates are for budgetary purposes only and in no way should be construed as a cost proposal or bid for services.	• This alternative meets the criteria and goals associated with risk reduction, environmental criteria, and site redevelopment/reuse; however, this alternative was not selected due to cost.

Table 2: Summary of Estimated Remediation Costs for Targeted Hazardous Building Materials Removal with Partial Management in Place

Analysis of Brownfields Cleanup Alternatives, E&R Building, Millinocket, Maine			
	Number	**Units**	
Abatement of Hazardous Building Materials - Engineering Building			
Asbestos Abatement (Excluding Windows & Doors)	1	LS	
Removal/Disposal of Universal Waste	1	LS	
Removal/Disposal of PCB Bulk Product Waste (>50 mg/kg)	1	LS	
Stabilization and Encapsulation of Remaining PCB Caulk & Paint (<50 mg/kg)	1	LS	
Abatement of Hazardous Building Materials - Research Building/Pilot Plant			
Asbestos Abatement (Excluding Windows and Doors)	1	LS	
Removal/Disposal of Universal Waste	1	LS	
Removal/Disposal of PCB Bulk Product Waste (>50 mg/kg)	1	LS	
Stabilization and Encapsulation of Remaining PCB Caulk & Paint (<50 mg/kg)	1	LS	
Gut Building Demolitions/Disposal	1	LS	
Asbestos Abatement - Research Building/Pilot Plant Roof	1	LS	
Research Building/Pilot Plant Roof Replacement	1	LS	
Development of an O&M Program for Materials to Remain	1	LS	
Engineering Design/Oversight/Closure Report			
Design	1	LS	
CRP & Public Meetings	1	LS	
SSQAPP & Confirmatory Sampling	1	LS	
Construction Oversight	240	Hrs	
VRAP Closure Report	1	LS	
Subtotal			
Contingency 10% [3]			
TOTAL			

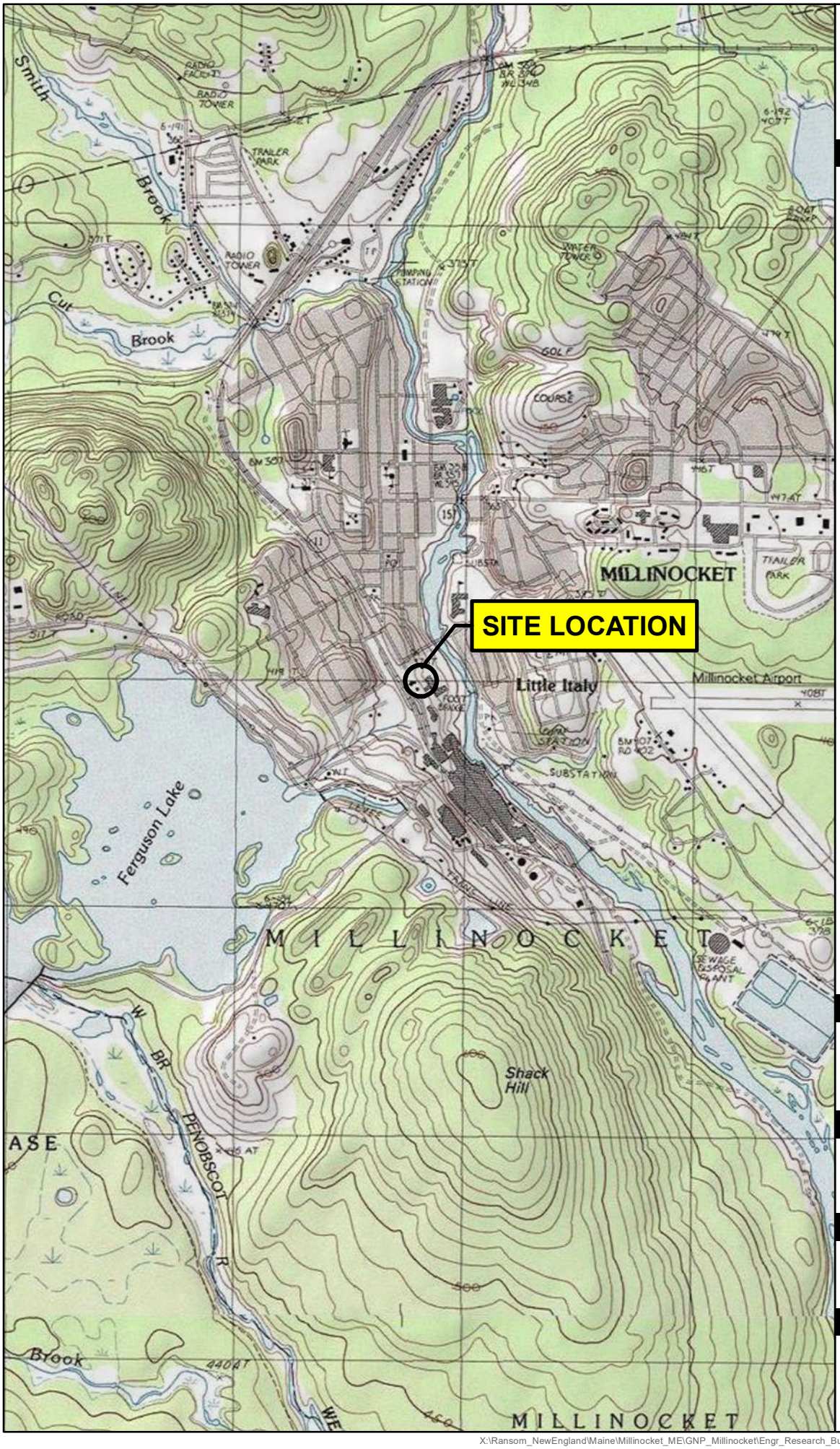
1 Cost includes creation of bidding documents, pre-bid meeting, bidding phase services, and contractor selection
2 Abatement costs based on recent projects and costs for similar type and construction of buildings.
3 Covers previously unidentified issues that could come up during cleanup activities on Site.

Table 3: Summary of Estimated Remediation Costs for Full Hazardous Building Materials Removal Alternative

Analysis of Brownfields Cleanup Alternatives, E&R Building, Millinocket, Maine

	Number	Units	Unit Cost	Total
Abatement of Hazardous Building Materials - Engineering Building				
Asbestos Abatement	1	LS		
Asbestos Abatement of Windows & Doors	1	LS		
Removal/Disposal of Universal Waste	1	LS		
Removal/Disposal of PCB Bulk Product Waste (>50 mg/kg)	1	LS		
Full Removal of Remaining PCB Caulk & Paint (<50 mg/kg)	1	LS		
Window Replacement	1	LS		
LBP Abatement	1	LS		
Abatement of Hazardous Building Materials - Research Building/Pilot Plant				
Asbestos Abatement	1	LS		
Asbestos Abatement - Windows & Doors	1	LS		
Removal/Disposal of Universal Waste	1	LS		
Removal/Disposal of PCB Bulk Product Waste (>50 mg/kg)	1	LS		
Full Removal of Remaining PCB Caulk & Paint (<50 mg/kg)	1	LS		
Window Replacement	1	LS		
LBP Abatement	1	LS		
Gut Building Demolitions/Disposal	1	LS		
Asbestos Abatement - Research Building/Pilot Plant Roof	1	LS		
Research Building/Pilot Plant Roof Replacement	1	LS		
Engineering Design/Oversight/Closure Report				
Design	1	LS		
CRP & Public Meetings	1	LS		
SSQAPP & Confirmatory Sampling	1	LS		
Historic Preservation Coordination and Reporting	1	LS		
Construction Oversight	320	Hrs		
VRAP Closure Report	1	LS		
Subtotal				
Contingency 10% [3]				
TOTAL				

1 Cost includes creation of bidding documents, pre-bid meeting, bidding phase services, and contractor selection
2 Abatement costs based on recent projects and costs for similar type and construction of buildings.
3 Covers previously unidentified issues that could come up during cleanup activities on Site.



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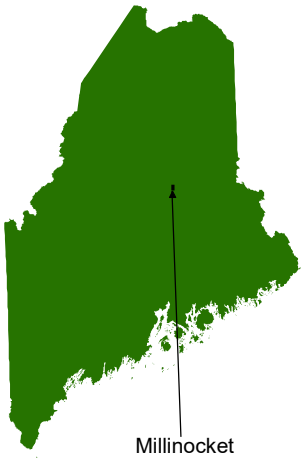
Regional Locator Map



Notes

1. Data Source: Copyright: © 2013 National Geographic Society, i-cubed
2. USGS Quad Name(s): Millinocket and Nollesemic Lake, Maine
3. Latitude: 45° 39' 00.5" N
   Longitude: 68° 42' 24.2" W

Scale and Orientation

0 1,000 2,000

1 inch = 2,000 feet

Prepared For

Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333

Site Address

Engineering & Research Building
1 Katahdin Avenue
Millinocket, Maine

171.06116.011 | Nov 2019

Figure 1

Site Location Map

X:\Ransom_NewEngland\Maine\Millinocket_ME\GNP_Millinocket\Engr_Research_Building\GNP_Engr_Research_Millinocket-F1_SLM.mxd

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Legend & Notes

Notes

1. Site Plan based on ESRI and Digital Globe Orthophotography
2. Some features are approximate in location and scale
3. This plan has been prepared for Maine Department of Environmental Protection. All other uses are not authorized unless written permission is obtained from Ransom Consulting, Inc.

Scale & Orientation

0 35 70

1 inch = 70 feet

Prepared For

Maine Department of
Environmental Protection
17 State House Station
Augusta, Maine 04333

Site Address

Engineering & Research Building
1 Katahdin Ave
Millinocket, Maine 04462

171.06116.011 | Nov 2019

Figure 2
Site Plan

X:\Ransom_NewEngland\Maine\Millinocket_ME\GNP_Millinocket\Engr_Research_Building\GNP_Engr_Research_Millinocket-F2_SM.mxd