BEACON
Environmental Consultants, LLC

1.0 ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES

1.1 Introduction/Background: Site Location and Purpose of Analysis of Brownfields Cleanup Alternatives

The Site is located on the north side of Park Street, between Maine Street and School Street and is associated with a street address of 21 Park Street. The Site includes the M.D.I. YMCA building and associated parking and landscaped areas, as well as a 7,511 square-foot portion of former Bangor Hydro Electric Company property, identified as 18 Edgewood Street. The Property or Properties (hereinafter referred to as the Site) is described as Tax Map 107 Lot 221, and a portion of Tax Map 107 Lot 219.

The YMCA building occupies the western portion of the Site. The building is a 24,500 square-foot steel frame and precast concrete structure that includes a 45 x 75-foot indoor swimming pool, a 73 x 109-foot gymnasium, and various support facilities including restrooms, locker rooms, shower rooms, functional spaces, mechanical rooms, and a lobby. The remainder of the YMCA parcel includes gravel and paved parking areas, and landscaped areas utilized for outdoor childcare/playgrounds. The YMCA parcel includes several catch basins and underground storm drain infrastructure throughout the property. It is not clear if the storm drain infrastructure is owned/operated by the YMCA or the municipality.

The portion of the Site located on the former Bangor Hydro Electric property is currently developed with a temporary Quonset hut-style building. The area occupied by the Quonset hut appears to have been paved with asphalt at some time in the past, however, the pavement is severely degraded and certain areas have been augmented with crushed stone. An underground electrical utility was reportedly installed from a utility pole on the eastern portion of the property, which provides power to an electrical panel inside the Quonset hut. The area surrounding the Quonset hut is occupied by shipping containers used for storage of hardware and various wooden and steel construction materials. See **Figure 1** for a Site Location Map.

Beacon Environmental Consultants, LLC (Beacon) is providing this Analysis of Brownfields Cleanup Alternatives (ABCA) to the Maine Department of Environmental Protection (MEDEP) to evaluate cleanup alternatives associated with redevelopment of the Site. This ABCA includes an *Introduction & Background* (Section 1), a discussion of *Applicable Regulations and Cleanup Standards* (Section 2), and an *Evaluation of Cleanup Alternatives* (Section 3).

1.2 Site Current and Past Uses

The Site was developed with the M.D.I. YMCA building in 1996/1997. Prior to that time, the Site was primarily owned by Acadia National Park and was used as a park ranger residence and facilities maintenance/storage garage.

The 7,511 square-foot portion of the former Bangor Hydro Electric Company property was historically used for storage and maintenance of electrical equipment including electrical

transformers that have the potential to have contained polychlorinated biphenyls (PCBs). From approximately 1892 to 1916, this portion of the property was developed with coal storage buildings, and coal was apparently used for electrical power generation. In approximately 1999, this portion of the property was developed with a temporary Quonset hut building which is utilized by Frenchman's Bay Boating Company for the construction of wood-framed boat docks.

Based on information reviewed during the historical record review, through the Hancock County Registry of Deeds and available file Site Assessments (as discussed below), historical Site ownership and operator information is provided in the table below.

Previous Owner and/or Operator Information

Owner/Occupant	Years
YMCA (Owned by Town of Bar Harbor)	1996-Present
Town of Bar Harbor	1987-1997
United States Department of the Interior	1930/1941-1987
The Wild Gardens of Acadia	1930/1941

1. This prior ownership information was ascertained from limited research at Hancock County's Registry of deeds.

1.3 Previous Site Assessments Findings

Geotechnical Investigation, prepared by S.W. Cole Engineering, Inc., January 1994

S.W. COLE performed a subsurface investigation for the existing YMCA building and provided a geotechnical report dated May 24, 1994. Seventeen test borings (B-1 through B-14, B-4A, 8-SA and B-11A) were made for the YMCA building by Maine Test Borings, Inc. (MTB) under the direction of S.W. COLE. These borings encountered surficial topsoil overlying fills overlying glaciomarine silts and clays overlying a thin veneer of glacial till mantling bedrock.

Phase I Environmental Site Assessment, prepared by Ransom, dated February 23, 2021.

On February 3, 2021, Ransom completed a Phase I Environmental Site Assessment (ESA) at the Site.

The Phase I ESA identified *Recognized Environmental Conditions* (REC) in connection with the historic use of the 18 Edgewood Street property as a power generation and electrical substation facility, as well as the reported presence of urban fill material, including bricks, glass, coal, etc. in the area that is proposed to be developed by the YMCA. Ransom recommended additional investigation to characterize soil conditions in the area of the proposed YMCA building expansion.

Geotechnical Investigation Report, prepared by S.W. Cole, March 17, 2021

Seven test borings (B-21-1 through B-21-7) were made at the site on March 3 and 4, 2021 by S. W. Cole Explorations, LLC prior to a proposed expansion of the YMCA. The exploration locations were selected and established in the field by S. W. Cole Engineering, Inc. (S.W. COLE) using a sub-meter mapping grade GPS unit.

The test borings were drilled using cased wash-boring techniques. The soils were sampled at 2-to-5-foot intervals using a split spoon sampler and Standard Penetration Testing (SPT) methods. Pocket Penetrometer Tests (PPT) were performed where stiffer cohesive soils were

encountered. Shelby tube sampling and Vane Shear Testing (VST) was performed where softer cohesive soils were encountered. SPT blow counts, PPT and VST results are shown on the logs.

The test borings encountered a soils profile generally consisting of a surficial layer of topsoil or woodchips overlying fill to depths of about 1.5 to 4 feet. The fills generally consisted of loose to medium dense silt and sand with organics and potential ash and coal fragments. Underlying the fills, the test borings encountered glaciomarine silts and clays overlying a thin veneer of glacial till or bedrock, at depths of about 17 to 25 feet. The glaciomarine silts and clays were relatively thick and generally consisted of an 8 to 13 foot thick, relatively stiff, brown silty clay becoming softer and gray below depths of about 11 to 14 feet below the existing ground surface.

Based on the subsurface findings, the proposed construction appeared feasible from a geotechnical standpoint. The principle geotechnical considerations included:

- Fills extending to depths of about 1.5 to 4 feet were encountered at the boring locations and may extend to deeper depths elsewhere at the site. Based on the presence of organics and loose density, it was recommended that fill soils be removed within the building addition footprint.
- Following removal of fills below the building addition footprint, spread footing foundations and slab-on-grade floors bearing on properly prepared subgrades appeared suitable for the proposed structure. Spread footings would bear on at least 6 inches of compacted Crushed Stone wrapped in geotextile fabric.
- Subgrades across the site mostly consist of moisture-sensitive glaciomarine soils. Earthwork and grading activities should occur during drier, non-freezing weather of Spring, Summer or Fall. Rubber tired construction equipment should not operate directly on the native soils.
- Imported Granular Borrow, Structural Fill and Crushed Stone will be needed for construction. The existing fill and native soils are unsuitable for reuse below the proposed building addition or as backfill for foundations, however they may be utilized in landscape areas, if needed.

Phase II Limited Site Assessment, prepared by Ransom, dated March 25, 2021

On March 5, 2021, test pits TP-1 through TP-6 were excavated by Environmental Projects Inc. of Auburn, Maine using a mini-excavator with a capacity/reach of approximately 10 feet. Soil characteristics and lithology observed in the test pits were logged by Ransom. Soil samples were collected from each test pit at approximate 2-foot intervals for field screening of volatile organic compounds using a photoionization detector (PID).

Soils encountered in the test pits generally consisted of fill material extending to a depth ranging from 2.5 to 3.5 feet below grade. The fill material was observed over native clay material, which extended to a depth of at least 8 feet below grade, which represents the maximum depth explored during this assessment. The fill material was categorized as one of the following three categories: wood chips, river- run gravel fill, and urban fill. Wood chips, consisting of chipped wood, had been placed as a cover layer in the area of test pits TP-2 through TP-5. The wood chip layer was observed to range from approximately 3 to 6 inches in thickness. In certain areas (TP-4 and TP-5), the wood chips were placed over river-run gravel fill material consisting of sand, gravel, and rounded cobles. The river-run gravel fill layer was observed to be approximately 1 foot in thickness in TP-4 and TP-5. Urban fill

materials, consisting of brick fragments, coal, coal ash, boiler slag, glass, plastic, and/or scrap metal, was observed at all of the test pit locations. At certain locations (TP-1 and TP-6), the urban fill material was present at the ground surface. In other locations, (TP-2 through TP-5) the urban fill material had been covered by wood chips and/or the river-run gravel fill. Native clay materials, consisting of gray, stiff, glaciomarine clay, were encountered at each test pit location at a depth of approximately 2.5 to 3.5 feet below grade.

Field screening of the materials encountered in the test pits did not indicate the presence of VOCs. Laboratory analysis indicated low concentrations of EPH fractions, SVOCs, and various metals in the samples collected from the test pits. PCBs were not detected above the laboratory reporting limit.

Findings from this investigation suggest the urban fill materials observed at the Site contain arsenic, lead, and benzo(a)pyrene at concentrations that exceed the MEDEP RAGs. These materials may represent a direct contact exposure risk to future Site occupants. Based on the findings of this assessment, Ransom recommended the following:

- The risk of human exposure to contaminated soils at the Site should be mitigated. This may be accomplished by placing an engineered cover system over the contaminated soils (urban fill layer). The cover system may consist of the proposed building foundation, landscaping, clean fill material, or any combination thereof. Alternatively, if the urban fill layer is found to be geotechnically unsuitable, the urban fill layer can be removed from the site and replaced with structurally suitable fill.
- Any soil that is taken off site should be transported for disposal at a licensed disposal facility. The laboratory analytical results obtained during this investigation can be provided to the disposal facility to facilitate disposal. Site soils, including contaminated soils, may be reused on-site. However, consideration should be given to providing a cover over re-used contaminated materials as described above, to prevent the direct contact exposure risk.
- The property owner may wish to consider application to the MEDEP Voluntary Response Action Program (VRAP). The MEDEP VRAP is a voluntary program that offers technical review of environmentally-impacted sites and ultimately provides state liability protections for interested parties, including a "No Action Assurance" (NAA) letter and a "Certificate of Completion" letter (i.e., no further action required), provided that proper and appropriate environmental cleanup or remedial actions are completed, as approved by the MEDEP. If contaminated soils are to remain at the Site, the VRAP program will likely require an environmental covenant be attached to the property deed. The environmental covenant would document the type and disposition of the contaminants identified and may include certain conditions such as prohibiting groundwater extraction and requiring notification to the MEDEP prior to future excavation activities.
- If the property owner chooses to pursue the VRAP for the entire parcel, the VRAP may require additional investigation in areas of the Site not explored by the current assessment. Infrastructure improvements that displace soil (subsurface utilities) or other areas proposed for improvement may also require additional testing.

Phase II ESA, prepared by Beacon, dated July 13, 2023

Beacon developed a Site-Specific Quality Assurance Project Plan (SSQAPP) in April 2023 to support the Phase II ESA. On April 23 and 24, 2023, Beacon performed the following work as part of the Phase II ESA for the Site:

- Advanced thirty-one (31) soil borings utilizing a track-mounted drill rig around the eastern and northern footprint of the building and collected thirty (30) accessible soil samples and one duplicate, and twenty-nine (29) potentially accessible soil samples and one duplicate, as well as one matrix spike and one matrix spike duplicate for laboratory analyses.
- Collected one grab surficial sample and a duplicate for laboratory analyses.
- Collected two hand auger samples and one duplicate for laboratory analyses.
- Collected one equipment blank water sample from the hand auger used for the hand auger samples for laboratory analyses.
- Installed two (2) temporary monitoring well and collected two (2) groundwater samples and one duplicate, one matrix spike and one matrix spike duplicate for laboratory analyses.

Soil and groundwater samples collected from Site investigations were submitted to Alpha Analytical Laboratory (Alpha) in Westboro, Massachusetts for laboratory analysis.

There are exceedances to the following current MEDEP Remedial Action Guidelines (RAGs) for the following compounds in accessible soils:

- Residential, park user, commercial worker, and construction worker RAGs for arsenic, lead, naphthalene, benzo(a)pyrene; and
- Residential and park user RAGs for benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

There are exceedances to the following current RAGs for the following compounds in potentially accessible soils:

- Residential, park user, and construction worker RAGs for benzo(a)pyrene;
- Residential and park user RAGs for arsenic;
- Residential RAGs for benzo(a)anthracene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene.

There were no exceedances of the current residential or construction worker RAGs for groundwater samples collected.

Beacon recommends the following:

- An Analysis of Brownfield Cleanup Alternatives (ABCA) should be developed for the property; and
- A soil management plan should be developed for the property.

1.4 Redevelopment Project Goals

The current owner plans on developing an activity area for children on the eastern portion of the property with a potential building expansion in the future as well that would necessitate the removal of unsuitable fill.

The project cleanup goals are to remove the accessibility to impacted soils above the

regulatory guidelines.

2.0 APPLICABLE REGULATIONS AND CLEANUP STANDARDS

2.1 Cleanup Oversight and Responsibility

The cleanup will be overseen by an environmental consultant/environmental professional who will coordinate with the MEDEP and follow applicable guidelines and regulations of the MEDEP and the USEPA. The documents prepared in support of the cleanup will be submitted to both MEDEP and USEPA for review and comment as applicable.

2.2 Cleanup Standards for Major Contaminants

Major contaminants identified are below. Applicable Cleanup Standards follow.

Surficial Soils - Surficial soil samples from locations on the northeastern and eastern portions of the property were elevated above the MEDEP Residential User RAGs for lead and polyaromatic hydrocarbons.

Cleanup Objectives - The objective of the remediation at the Site is to remove an environmental and public safety hazard, achieve No Further Action Assurance Letter from MEDEP, and achieve Site closure by elimination or management of environmental conditions that pose a risk to human health and/or the environment. In order to achieve this objective, the following cleanup goals and/or regulatory standards and/or guidelines are applicable:

- Universal, Solid, and Other Regulated Wastes
    - USDOT 49 CFR 100-199 - Transportation of Hazardous Materials
    - MEDEP Chapter 400 – Solid Waste Management
    - MEDEP Chapters 850 - 857 - Maine Hazardous Waste Management Regulations

2.3 Laws and Regulations Applicable to the Cleanup

Applicable laws and regulations associated with this cleanup will include the following:

- Brownfields Revitalization Act
- Federal Davis-Bacon Act
- MEDEP state environmental laws and regulations, and
- City By-Laws, as applicable.

Other laws and regulations that may be applicable are cited above. In addition, federal, state, and local laws which identify procurement of cleanup contractors to conduct and oversee cleanup will be followed during the remediation and cleanup. All applicable permits to conduct the work and hazardous waste manifests for off-site disposal of the contaminated materials will be obtained.

3.0 ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES

Each remedial alternative was evaluated with respect to the comparative evaluation criteria including: effectiveness, reliability, implementability, preliminary cost, and the impact of potential climate changes to the remedy based on selection.

The preliminary cost estimates presented (including preliminary engineering, bidding, remediation, contingency, etc.) are approximate estimates prepared solely for the relative comparison of the identified alternatives. As such, these cost data are not to be used as design- level estimates.

3.1 Areas of Concern (AOCs)

One area of concern has been identified on the property:

1. AOC 1 - Surficial soils on the eastern and northeastern portions of the property.

3.2 Evaluation of Remedial Alternatives

A description of each alternate and the results of the comparative analysis are presented in the following subsections.

3.3 Identification of Remedial Alternatives

Potential alternatives were evaluated for addressing the environmental conditions that could pose a risk to human health and/or the environment at the Site. A limited number of practicable remedial alternatives that could be implemented at the Site based on available Site data were developed. The "No Action" alternative was included as part of the evaluation to establish a basis for conducting remedial actions at the Site and as required in the Cleanup Grant application.

The remedial alternatives identified for consideration under this alternatives analysis include:

1. No Action Alternative;
2. Off-Site Soil Disposal
3. On-Site Soil Disposal under a Cover System

A description of each alternative and the results of the comparative analysis are presented in the following subsections.

Alternative #1: No Action

This alternative involves no additional response actions at the Site. Under this alternative, the Site is not redeveloped. The No Action alternative would not prevent exposure of Site contaminants to humans and the environment. Therefore, the No Further Action alternative will not meet the remedial action objectives and cleanup goals and will not be evaluated further with respect to the comparative evaluation criteria.

The costs for Remedial Alternative #1 are estimated to be **$0.00**.

Alternative #2 –Soil Removal and Off-Site Disposal

This alternative involves excavation and removal of impacted soils in the top three (3) feet of the accessible portions of the eastern and northeastern property (approximately 11,365 square feet), with soil sample results above the current RAGs, and replace it with three

feet of clean material (See **Figure 2**). The alternative will utilize standard construction techniques to excavate soils and load them into dump trailers for off-site disposal at a licensed disposal facility. Disposal characterization was performed as a portion of the Phase II ESA completed by Beacon in April 2023. The alternative would include proper management of wastes for off-site disposal, as applicable. The estimated cost ranges for implementing Remedial Alternative #2 are presented below.

Soil Excavation of 1,265 cubic yards	$30,000 to $35,000
Disposal of Soil	$180,000 to $200,000
1,265 cubic yards of Clean Soil and Placement	$38,000 to $45,000
Confirmation Analytical	$12,000 to $15,000
Site Oversight/Engineering/Closure	$10,000 to $20,000

The range of costs for Remedial Alternative #2 is estimated to be between **$270,000.00 and $315,000.00**.

Alternative #3 – Installation of a Marker Layer and Cover System

This alternative is different from Alternative #2 in that instead of the off-site disposal of the entirety of the impacted soils, the top foot of impacted soil would be excavated for off-site disposal and a marker layer and cover system of one (1) foot of clean soil would be placed over these soils on the property. Disposal characterization was performed as a portion of the Phase II ESA completed by Beacon in April 2023. This alternative would be effective at reducing risk at the Site; however, may limit future use if excavation is necessary. The estimated cost ranges for implementing Remedial Alternative #3 are presented below.

Soil Excavation of 420 cubic yards	$10,000 to $15,000
Disposal of Soil	$60,000 to $70,000
Marker Layer	$1,000 to $3,000
420 cubic yards of Clean Soil and Placement	$15,000 to $20,000
Site Oversight/Engineering/Closure	$6,000 to $12,000

The range of costs for Remedial Alternative #3 is estimated to be between **$92,000.00 and $120,000.00**.

3.4 Comparison to Evaluation Criteria – Sitewide Soils

This Section presents a relative comparison of the selected remedial alternatives (Alternatives #2 and #3). Alternatives #1 is not carried through for review based on the fact that this alternative does not meet the remedial objectives.

Effectiveness: Remedial Alternative #2 would be effective at achieving Site closure. Alternative #3 would have continuing obligations in the form of annual site inspections of the cover system to verify that it does not have erosion issues.

Reliability: Remedial Alternative #2 is more reliable in preventing exposure to future users of the Site because the soils will be completely removed from the property. Alternative #3 is a simple approach involving the covering the soils on the property.

Difficulty of Implementation: Remedial Alternative #3 would be moderately more difficult to implement as impacted soils would be present on the property during the excavation phase and would need to be kept secure. The cover system created on the property would require an annual inspection. Remedial Alternative #2 would be relatively

easy to implement as it includes the removal of all impacted soils from the property and disposal at a licensed disposal facility.

Cost-Benefit: Due to the significant removal and off-disposal, as well as more vehicle emissions, versus removing a smaller amount of soil and creating a cover system over the soils on-site, Remedial Alternative #2 is most likely to be the highest cost.

3.5 Selection of Remedial Alternative

The No Action Alternative (Remedial Alternative #1) was included in this analysis for comparative purposes only and is not a feasible alternative because it does not meet the remedial action objectives.

Remedial Alternatives #2 and #3 were evaluated to address cleanup of impacts within the surficial soils. Alternative #2 provides the most effective method of providing site closure and Alternative #3 would limit redevelopment on the subject property; however, it would meet the current reuse plan for the YMCA. Therefore, Alternative #3 is chosen as the preferred remedial alternative.

3.6 Costs for Selected Alternatives

In addition to the selected alternatives, MEDEP would request that the property be entered into the Voluntary Response Action Program (VRAP) so that work performed on the property to remediate the impacts is documented and a Commissioner's Certificate of Completion (COC) can be issued to the property owner at the completion of the site work.

Total costs associated with the selected alternatives are tabulated below:

Selected Alternative	Cost Range
Alternative #3 – Limited Soil Removal and Off-Site Disposal with Cover System	$92,000.00 to $120,000.00
VRAP Application Fee	$15,000.00
Total	**$117,000 to $135,000.00**

3.7 Green and Sustainable Remediation and Climate Change

The following measures will be implemented where applicable, beneficial, or feasible to improve the overall sustainability of the proposed remedial alternative as recommended by the EPA Region 1 Green and Sustainable Remediation Guidance.

Administrative

- Green remediation principles will be incorporated into the contracting process, as possible.
- Interim and final documents will be submitted in digital rather than hardcopy format, unless otherwise requested by EPA or required by law, in an effort to save paper. This is especially applicable to voluminous data reports.
- Optimize the use of electronic and centralized communication and outreach to the local community

General Site Operations

- Use energy efficient equipment
- Use of local contractors to limit vehicle emissions
- Reuse or recycle waste

- Protect and conserve water
- Use alternative fuel vehicles (hybrid-electric, biodiesel, ultra-low sulfur diesel)
- Carpool for site visits and project meetings and/or use public transportation
- Schedule activities efficiently so as to minimize travel to and from the site

Remediation Operations

- Encourage use of fuel-efficient / alternative fuel vehicles and equipment
- Minimize mobilizations
- Provide for erosion control to minimize runoff into environmentally sensitive areas
- Encourage use of diesel engines that meet the most stringent EPA on-road emissions standards available upon time of project's implementation
- Maximize use of machinery equipped with advanced emission controls

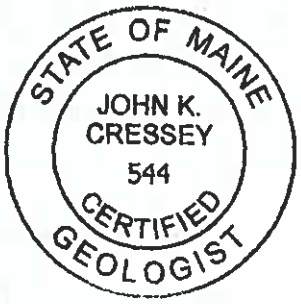
Climate Change Conditions

In evaluating climate change conditions, the proposed cleanup activities were evaluated with regard to proximity to a coastline, flood plain, in an area with a potential increase of drought, and impact of increased frequency and intensity of storms. The Site is located near the coastline of Maine. The Site topographic elevation is approximately 32 feet above mean sea level, and local topography slopes south/southeast towards Cromwell Brook. The remedial activities proposed for the Site include the removal of surficial soils (0-3' BGS) and therefore flooding or other climate-related activities are not believed to be a concern for the Site.

Please feel free to contact me with any questions.

Sincerely,
BEACON ENVIRONMENTAL CONSULTANTS, LLC

John K. Cressey, LG, PG
President



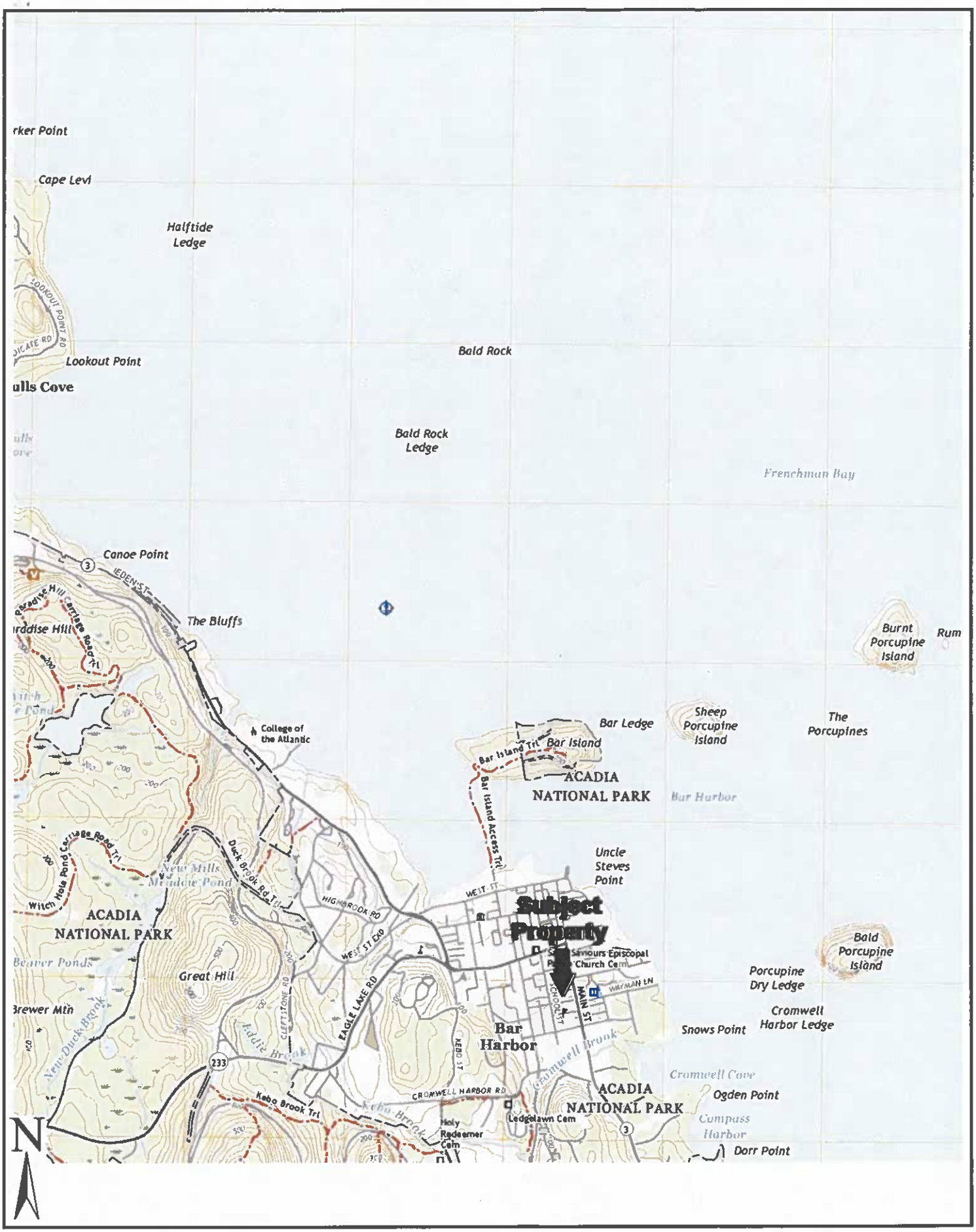


FIGURE 1 – SITE LOCATION MAP
Project No. BE-592

Drawing Not To Scale

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FIGURE 2: SOIL REMOVAL AREA
YMCA, 21 PARK STREET, BAR HARBOR, MAINE
Project No.: BE-592

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