Evaluation of Corrective Action Alternatives

Former Chemfab Facility
1030 Water Street
North Bennington, Vermont
SMS Site #20164630

Prepared for
Saint-Gobain Performance Plastics

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Abbreviations, Acronyms, and Units

ACM	asbestos-containing material
ASTM	American Society for Testing and Materials
CAAI	Corrective Action Area I
CAP	Corrective Action Plan
ECAA	evaluation of corrective action alternatives
GAC	granulated activated carbon
iRULE	Investigation and Remediation of Contaminated Properties
MMBTU	Million British Thermal Units
OUA	Operable Unit A
OUB	Operable Unit B
PFOA	perfluorooctanoic acid
POET	point-of-entry-treatment
ppb	parts per billion
SMS	Site Management Section
VTANR	Vermont Agency of Natural Resources
VTDEC	Vermont Department of Environmental Conservation

Executive Summary

An evaluation of corrective action alternatives (ECAA) was completed for the former Chemfab facility located at 1030 Water Street (Site) in the Village of North Bennington, Vermont. The Site is identified by the Vermont Department of Environmental Conservation (VTDEC) and Site Management Section (SMS) as Site #20164630, and work is being completed in accordance with the requirements of the Consent Order between the State of Vermont, Agency of Natural Resources (VTANR) and Saint-Gobain Performance Plastics Corporation (Saint-Gobain), dated October 2, 2017 (Consent Order). The ECAA was prepared in response to the VTDEC's letter, dated October 22, 2018 (Appendix A).

The objective of corrective actions is to mitigate the potential impact of perfluorooctanoic acid (PFOA) consistent with Chapter 35-502 of the Investigation and Remediation of Contaminated Properties, Emergency Rule (iRULE; VTDEC, 2019). The objective of the ECAA is to identify potential corrective actions, evaluate corrective actions against the prescribed criteria in Chapter 35-503 of the iRULE, and select a remedy based on that evaluation. Threshold evaluation criteria include: compliance with legal requirements and overall protection of human health and the environment. Modifying and balancing criteria include: long-term effectiveness and permanence; reducing toxicity, mobility, or volume; short-term effectiveness; implementability; cost; environmental impact and sustainability; and community acceptance. The remedies were selected based on achievement of threshold criteria and assessment of the modifying / balancing criteria.

Corrective actions were evaluated for: 1) shallow soil in the northeast portion of the facility and 2) certain building materials. Dried sediment within catch basins had previously been identified in the Former Chemfab Facility Site Investigation Report, Water Street Facility (Site Investigation Report; Barr, 2018a) as a media to be evaluated in the ECAA. As described in the ECAA, additional evaluation of the process sump construction for this ECAA indicated there are no direct discharges from process sumps and further evaluation in the ECAA is unwarranted. Groundwater with PFOA concentrations above the performance standard in Corrective Action Area I (CAAI), of which Water Street is a part, has been investigated and is addressed separately by corrective actions in accordance with the Consent Order. A common area located between the Site and the apartments north of the Site is addressed in a separate memo submitted to the VTDEC on January 22, 2019 (Barr, 2019).

Three soil corrective action alternatives were considered as part of this evaluation: 1) no action, 2) excavation and offsite disposal, and 3) maintain cap with institutional control. Based on the overall protection of human health and the environment, long-term effectiveness, and lack of short-term risks and environmental impact during implementation, Alternative 3 (Maintain Cap with Institutional Control) is the selected remedy.

Four building material corrective action alternatives were considered as part of this evaluation: 1) no action, 2) selected removal, offsite disposal, and cleaning, 3) encapsulate and institutional control, and 4) building demolition. Based on the overall protection of human health and the environment, the permanence provided by removing and cleaning PFOA-impacted building materials, lower environmental

impact during implementation, and greater community acceptance, Alternative 2 (Selected Removal, Offsite Disposal, and Cleaning) is the selected remedy.

The selected corrective actions for soil and building materials, in combination with existing corrective actions for groundwater, would address potential risks to sensitive receptors at the Site and provide the best overall solution based on the ECAA evaluation criteria.

1.0 Introduction

This report presents the evaluation of corrective action alternatives (ECAA) for the former Chemfab facility located at 1030 Water Street (Site) in the Village of North Bennington, Vermont (Figure 1). The Site is identified by the Vermont Department of Environmental Conservation (VTDEC) and Site Management Section (SMS) as Site #20164630, and work is being completed in accordance with the requirements of the Consent Order between the State of Vermont, Agency of Natural Resources (VTANR) and Saint-Gobain Performance Plastics Corporation (Saint-Gobain), dated October 2, 2017 (Consent Order).

1.1 Objectives

The objective of corrective actions is to mitigate the potential impact of perfluorooctanoic acid (PFOA) consistent with the Consent Order and Chapter 35-502 of the Investigation and Remediation of Contaminated Properties, Emergency Rule (iRULE; VTDEC, 2019). The objective of the ECAA is to identify potential corrective actions, evaluate corrective actions against the prescribed criteria in Chapter 35-503 of the iRULE, and select a remedy based on that evaluation.

1.2 Scope of Work

Saint-Gobain retained C.T. Male Associates Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C. (C.T. Male) and Barr Engineering Co. to conduct Site investigation activities and prepare this ECAA. Site investigation activities are summarized in the Former Chemfab Facility Site Investigation Report, Water Street Facility (Barr, 2018a). The media listed below were identified in the Site Investigation Report (Barr, 2018a) for corrective action alternative evaluation in this ECAA:

- shallow soil in the northeast portion of the facility,
- sewer sludge (i.e., dried sediment) within catch basins, and
- building materials with potential exposure during future land use changes.

VTANR approved the Site Investigation Report, with comments in an October 22, 2018 letter from Richard Spiese (VTDEC) to Chris Angier (Saint-Gobain), received October 30, 2018 (Appendix A). The comments included a request for further evaluation of the adjacent / adjoining building interior north of the former facility (940 Water Street), soils above the Vermont direct contact screening value, and the Site building materials. The Site Investigation Report (Barr, 2018a) comment letter is provided in Appendix A. The evaluation of 940 Water Street was submitted to VTDEC under separate cover on January 22, 2019, and is not discussed in this report. Corrective action alternatives for soil and building materials at the Site (1030 Water Street) are discussed in this report.

As part of the ECAA process, the sewers within the building were further evaluated. The dried sediment within Sump01, Sump02, and Sump03 was removed and the condition of the sumps inspected. Sump01 is constructed of poured concrete with a plastic sediment trap insert above the pipe that discharges to the sanitary sewer. The piping at Sump01 is consistent with the details provided in the Site Investigation Report (Barr, 2018a). Sump02 and Sump03 are also constructed of poured concrete but do not have

discharge piping. These sumps contained pumps that conveyed accumulated fluids through above ground piping to a management / discharge location that has since been abandoned. It was initially thought, as presented in the Site Investigation Report (Barr 2018a), that Sump02 and Sump03 discharged to a basement floor drain pipe that discharges to Paran Creek. However, upon cleaning and inspecting Sump02 and Sump03, these sumps were determined to have a solid construction with no outlet, and therefore, do not require further evaluation for corrective actions. A more detailed discussion of the dried sediment removal and sump inspections for the sewers is presented in Appendix B.

Groundwater corrective actions are also summarized in this ECAA. Groundwater with PFOA concentrations above the performance standard in Corrective Action Area I (CAAI), of which Water Street is a part, has been investigated and addressed separately by corrective actions in accordance with the Consent Order.

1.3 Report Organization

The report is organized into the following sections:

- **Section 1.0 – Introduction.** This section provides the basis for the work and outlines the remaining sections of the report.
- **Section 2.0 – Corrective Action Evaluation Criteria.** This section summarizes the criteria used to evaluate the corrective action alternatives for each media.
- **Section 3.0 – Groundwater Corrective Actions.** This section summarizes the groundwater corrective actions that have been completed and the on-going groundwater monitoring.
- **Section 4.0 – Soil Evaluation.** This section describes the soil corrective action alternatives, assesses each alternative against the evaluation criteria, and selects a corrective action based on the evaluation.
- **Section 5.0 – Building Materials Evaluation.** This section describes the building materials corrective action alternatives, assesses each alternative against the evaluation criteria, and selects a corrective action based on the evaluation.
- **Section 6.0 – Conclusions and Recommendations.**
- **Section 7.0 – References.**

2.0 Corrective Action Evaluation Criteria

Corrective actions are evaluated against the nine criteria specified in Chapter 35-503 of iRULE (VTDEC, 2019), as summarized below. Compliance with legal requirements and overall protection of human health and the environment are threshold criteria that must be satisfied for consideration of an alternative. The remaining seven criteria are balancing / modifying criteria used to select the overall alternative.

2.1 Compliance with Legal Requirements

Alternatives are evaluated against the ability to meet applicable regulatory requirements, including federal, state, and local regulations and/or the conditions of applicable permits. This is a threshold criteria.

2.2 Overall Protection of Human Health and the Environment

Alternatives are evaluated for whether they can meet regulatory standards for human health and the environment, by either eliminating, reducing, or controlling exposures to levels established by the corrective action objectives. This is a threshold criteria.

2.3 Long-term Effectiveness and Permanence

Long-term effectiveness and permanence considers the adequacy and reliability of the proposed alternative, such as containment systems and institutional controls, necessary to manage treatment residuals and untreated waste. This factor addresses in particular the uncertainties and potential risks associated with long-term management of the remedy.

2.4 Reducing Toxicity, Mobility, or Volume

Alternatives are evaluated by the degree to which they can reduce toxicity, mobility, or volume through treatment, including how treatment is used to address the principle threats posed by the Site.

2.5 Short-term Effectiveness

Short-term effectiveness considers the short-term risks that might be posed to sensitive receptors during implementation of an alternative, potential impacts to workers during corrective action and the effectiveness and reliability of protective measures, and potential environmental impacts of the corrective action and the effectiveness and reliability of mitigation measures during implementation.

2.6 Implementability

The relative degree of difficulty in implementing the alternatives is evaluated as measured by the technical feasibility, administrative feasibility, and availability of services and materials.

2.7 Cost

The estimated cost for each alternative is assessed as measured by the capital costs, operating and maintenance cost, and net present value cost.

2.8 Environmental Impact and Sustainability

Environmental impact and sustainability considers waste generation and disposal requirements and best management practices to reduce the environmental impact. As part of this ECAA, a life cycle analysis was conducted according to the American Society for Testing and Materials (ASTM) Standard Guide for Greener Cleanups (ASTM, 2016) to quantitatively assess the environmental impact of each alternative.

2.9 Community Acceptance

Community acceptance, including that of the property owner, considers the extent to which the community may support, have reservations about, or oppose each alternative or components of each alternative.

3.0 Groundwater Corrective Actions

3.1 Corrective Actions Completed

As part of the Consent Order, corrective action plans were prepared for CAAI, which encompasses the Site, to provide a long-term remedy for groundwater. The Consent Order defined two areas within CAAI: Operable Unit A (OUA), which includes properties within CAAI that are or will be connected to municipal water; and Operable Unit B (OUB), which includes the remaining properties within CAAI.

The OUA corrective action plan (CAP), defined in the Consent Order, describes the municipal water line extension requirements in OUA and the waste management plan for excess soil and groundwater generated during construction (VTANR, 2017). Groundwater beneath the Site is addressed by the OUA CAP.

The OUB CAP (Barr, 2018b), approved by the VTANR on June 25, 2018, includes a series of individual plans for properties that were not part of the municipal water line extension project. Use of point-of-entry treatment (POET) systems is the long-term remedy in those areas where municipal water lines were not extended and the PFOA concentrations in the groundwater are above the performance standard. The OUB CAP also requires long-term monitoring at residential well locations where the PFOA concentrations in groundwater are less than the performance standard.

3.2 Current Site Monitoring Activities

Per the VTDEC approved Site Investigation Work Plan (C.T. Male and Barr, 2018) three additional groundwater monitoring events at the Site have been completed since submitting the Site Investigation Report (Barr, 2018a). Analytical data regarding the groundwater will be submitted to VTDEC under separate cover.

4.0 Soil Evaluation

Three soil corrective action alternatives were considered as part of this evaluation:

1. no action,
2. excavation and offsite disposal, and
3. maintain cap with institutional control.

The corrective action alternatives were evaluated against the threshold criteria of compliance with legal and regulatory requirements and overall protection of human health and the environment. The soil performance standard defines the criteria for overall protection of human health and the environment based on current regulatory standards. The remaining criteria are balancing / modifying criteria that were evaluated to support selection of the corrective action that provides the best overall solution.

4.1 Performance Standards

As detailed in Appendix A, Section VI, paragraph 13 of the Consent Order, the performance standard for soil is the Vermont direct contact soil screening value of 300 parts per billion (ppb) PFOA. The direct contact screening value is appropriate for use as the performance standard because the Site is a developed property and direct contact with soil represents the primary potential exposure pathway at the Site. Biota intake is assumed to be minimal given the development and zoning of the property. Likewise, soil leaching to groundwater is addressed by groundwater corrective actions (Section 3.0). Of the 102 soil samples collected at the Site, one soil sample exhibited a PFOA concentration (380 ppb) greater than the performance standard; the sample was collected from the uppermost one foot of soil beneath the concrete floor within the northeast portion of the Site building at soil boring SB1807. Corrective action alternatives are evaluated for the soil at and adjacent to boring SB1807.

4.2 Alternative 1 – No Action

This alternative would consist of taking no further action with respect to the soils. This alternative provides a baseline for comparison to other soil corrective action alternatives.

4.2.1 Compliance with Legal Requirements

Currently there is no direct exposure pathway since the soil is beneath an intact concrete slab. This action would comply with regulatory requirements and would not require any federal, state, or local permits.

4.2.2 Overall Protection of Human Health and the Environment

This alternative would be protective of human health for the existing Site conditions. It would also be protective of the environment as the existing concrete slab and building roof eliminate infiltration of precipitation into the soils below the slab, and the eastern concrete foundation wall along Paran Creek maintains the impacted soils behind the wall.

Potential future land use changes could expose soil that is currently covered with a concrete cap.

4.2.3 Long-term Effectiveness and Permanence

This alternative would provide a long-term solution to address soil with concentrations above the performance standard as long as the concrete cap and foundation wall are maintained. Potential future land use changes that could make the impacted soil accessible may someday necessitate some soil remediation or mitigation depending upon conditions at that time.

4.2.4 Reducing Toxicity, Mobility, or Volume

This alternative would not provide a reduction in toxicity, mobility, or volume. The mobility is currently limited, and will remain limited, as long as the concrete cap and foundation wall are maintained.

4.2.5 Short-term effectiveness

There would be no short-term risks to sensitive receptors or workers by implementing this alternative. The existing concrete cap is protective of human health and the environment for the current conditions.

4.2.6 Implementability

This alternative would not involve implementation of further actions.

4.2.7 Cost

There would be no cost associated with this alternative.

4.2.8 Environmental Impact and Sustainability

There would be no environmental impacts associated with this alternative.

4.2.9 Community Acceptance

Existing conditions are protective of human health and the environment and the no action alternative would not disrupt the community.

4.3 Alternative 2 – Excavation and Offsite Disposal

This alternative would consist of the following activities: performing an additional design investigation to define the extent of the soil at concentrations above the performance standard; removing sections of the existing concrete floor; excavating soil near soil boring SB1807 to the approximate extents shown on Figure 2; disposing the excavated soil at a permitted offsite disposal facility; backfilling the excavation; and replacing the concrete floor slab. The horizontal extent of the excavation is constrained by the exterior foundation wall / footing to the east (towards Paran Creek) and interior load bearing walls to the north and south of boring SB1807. Soil samples collected during the design investigation would further define the horizontal and vertical extents of soil requiring removal. Excavation plans would also need to consider protection of the building's structural integrity.

4.3.1 Compliance with Legal Requirements

This alternative would remove soil with PFOA concentrations above the performance standard for offsite disposal. This alternative would not require federal or state permits but could require a local construction permit. PFOA-impacted soil is not a listed or characteristic hazardous waste. Waste transport and disposal would be conducted in accordance with local, state, and federal regulations. This alternative would be compliant with regulatory requirements.

4.3.2 Overall Protection of Human Health and the Environment

This alternative would be protective of human health for the long term through removal of PFOA-impacted soil above the performance standard. It would also be protective of the environment as the excavation would be restored with the replacement of the concrete slab.

4.3.3 Long-term Effectiveness and Permanence

This alternative would be effective over the long term because removing impacted soil above the performance standard eliminates impacted soil that could potentially affect sensitive receptors if future land use changes resulted in exposure pathways.

4.3.4 Reducing Toxicity, Mobility, or Volume

This alternative would reduce the volume of impacted soil present at the Site by removing approximately 10 cubic yards of PFOA-impacted soil and disposing it off site. This alternative would not involve any treatment and, therefore, would not address toxicity. The mobility of PFOA in soil left in place following excavation would not change because the concrete floor slab would be replaced as part of this alternative.

4.3.5 Short-term Effectiveness

This alternative would present short-term risk to sensitive receptors during implementation. The shallow depth of excavation (estimated 3 feet below ground surface) and presence of the existing foundation wall and building footing would mitigate potential impact to Paran Creek, adjacent to the Site. However, excavations that extend deeper than 3 feet could present a risk to the building structure that would need to be mitigated. Based on the estimated depth of excavation, further evaluation of geotechnical stability would need to be conducted prior to initiating excavation. Potential exposure to workers during implementation could be addressed with personal protective equipment, decontamination procedures, maintenance of exclusion and support zones during construction, and standard construction practices.

4.3.6 Implementability

This alternative would be implementable using standard construction techniques and equipment. There are local and regional construction companies with the necessary equipment, experience, and qualifications to complete this alternative. Evaluating the effectiveness of the corrective action could be completed using standard environmental sampling techniques and laboratory methods in accordance with the Quality Assurance Project Plan (C.T. Male and Barr, 2018a). It is anticipated that permits for transporting the waste to a permitted disposal facility, and potentially a local construction permit, would be needed to implement this alternative. In addition, this alternative would require a design investigation,

geotechnical investigation, and removal of a portion of the existing building floor and subgrade for a small volume (approximately 10 cubic yards) of soil.

4.3.7 Cost

The estimated cost of excavation and disposal of soil is $120,000 (approximately $12,000 per cubic yard) as detailed in Table 1. The total estimated cost includes engineering, drilling, and laboratory analytical services to delineate the area of soil with concentrations above the soil performance standard, removing the concrete slab, excavating the soil, backfilling the excavation, replacing the concrete slab, and disposing the impacted soil in a landfill. It is assumed an excavation depth of 3 feet would be sufficient to remove the impacted soil. This alternative would not require ongoing operation and maintenance costs.

4.3.8 Environmental Impact and Sustainability

This alternative would generate approximately 22 tons of waste (soil and concrete). Approximately 10 metric tons of greenhouse gases would be emitted and approximately 130 million British Thermal Units (MMBTU) of energy would be consumed during implementation of this alternative. Best management practices that would be implemented during this alternative include avoiding idling equipment and trucks when not in use and recycling the removed concrete slab. Based on quantitative analysis and comparison to the other soil alternatives, this alternative would have a high environmental impact.

4.3.9 Community Acceptance

Except for the environmental impacts described in Section 4.3.8, this alternative would likely have the support of the community since it would remove soil with PFOA above the performance standard and would have minimal impact on the community as work and equipment would be confined to the Site, with the exception of transporting the material to a permitted disposal facility.

4.4 Alternative 3 – Maintain Cap with Institutional Control

This alternative would include preparing an Institutional Control Plan that provided for appropriate institutional controls to maintain the existing concrete floor as a cap over residual PFOA-impacted soil.

4.4.1 Compliance with Legal Requirements

This alternative would not require federal, state, or local permits and would comply with federal, state, and local regulatory requirements. Direct contact with soil containing PFOA concentrations above the performance standard would be eliminated by maintenance of the cap, as would potential pathways to environmental receptors.

4.4.2 Overall Protection of Human Health and the Environment

This alternative would be protective of human health and the environment. The concrete floor would act as a cap and prevent exposure to soil that has concentrations greater than the performance standard, and the foundation wall along Paran Creek would retain the soils behind the wall. The Institutional Control Plan would detail the requirements for maintaining the cap and managing the soil appropriately during future land use changes.

4.4.3 Long-term Effectiveness and Permanence

Institutional controls are a well-established mechanism to mitigate risk of changing land use and exposing soil to potentially sensitive receptors. The Institutional Control Plan would include measures to prevent transport into Paran Creek during construction activities in the case of a potential future land use change.

4.4.4 Reducing Toxicity, Mobility, or Volume

This alternative would not reduce the toxicity, mobility, or volume, but would prevent direct contact / exposure to soil with concentrations greater than the performance standard.

4.4.5 Short-term effectiveness

There would be no short-term risks to sensitive receptors or workers by implementing this alternative. The existing concrete cap and foundation wall would be protective of human health and the environment for the current conditions.

4.4.6 Implementability

This alternative would be readily implementable with cooperation from the property owner. The administrative approach for the Institutional Control Plan is defined in Chapter 35-601 of the iRULE (VTDEC, 2019).

4.4.7 Cost

The estimated cost for this alternative is $91,000 as detailed in Table 1. The estimate includes engineering and legal costs for preparing and submitting the Institutional Control Plan and associated institutional controls. Operation and maintenance costs for this alternative would include long-term monitoring of the cap via an annual site visit to ensure the concrete floor integrity. Costs for long-term monitoring were adjusted for inflation, and were assumed to extend for 30 years.

4.4.8 Environmental Impact and Sustainability

This alternative would not generate waste. This alternative would have low environmental impact because the concrete floor is in good condition and minimal maintenance is anticipated. Best management practices that would be implemented during this alternative include acquiring concrete repair materials from local sources. This alternative has a low environmental impact.

4.4.9 Community Acceptance

Existing conditions are protective of human health and the environment and this alternative would not disrupt the community.

4.5 Selected Remedy

A comparison of soil corrective actions is provided in Table 2. Alternative 3 (Maintain Cap with Institutional Control) is the selected remedy based on the overall protection of human health and the environment, long-term effectiveness, and lack of short-term risks and environmental impact during implementation. Maintenance of the existing concrete floor and foundation wall along Paran Creek

prevents direct contact exposure and mitigates transport of soil impacts. Alternative 3 is also readily implementable and would have negligible impact on the community. In comparison to Alternative 2 (Excavation and Offsite Disposal), Alternative 3 is more easily implemented, has fewer short-term risks, has a lower environmental impact, and is lower in cost.

5.0 Building Materials Evaluation

Four building material corrective action alternatives were considered as part of this evaluation:

1. no action,
2. selected removal, offsite disposal, and cleaning,
3. encapsulation and institutional control, and
4. building demolition.

The corrective action alternatives were evaluated against the threshold criteria of compliance with legal requirements and overall protection of human health and the environment. The performance standards define the criteria for overall protection of human health and the environment based on current regulatory criteria, published risk assessments for exposure pathways of interest, and exposure scenarios for building materials. The remaining criteria are balancing / modifying criteria that were evaluated to support selection of the corrective action that provides the best overall solution.

5.1 Performance Standards

There is no promulgated standard for PFOA concentrations in or on building materials. PFOA is a constituent in many building materials used in homes, offices, commercial buildings, and industrial buildings (EPA, 2009). The direct contact exposure pathway is not a pathway of concern (ATSDR, 2017). No quantitative estimates of the absorption of PFOA through dermal exposure have been identified (ATSDR, 2018).

Consistent with the corrective action objectives to prevent exposure to sensitive receptors, the objective of corrective actions on building materials is to mitigate potentially mobile PFOA transport from the Site to sensitive receptors. For the purposes of this analysis, potentially mobile PFOA is defined as visible residues on hard building materials (e.g., accumulations on the floor, interior walls, and ceilings, etc.) and/or residues within soft building materials (e.g., substance within the insulation). The performance standard would be met when visual inspection confirms the exposure pathway to potentially mobile PFOA has been mitigated. Removing or encapsulating residues mitigates the potential transport outside of the building. The major potential transport mechanisms of residues to offsite receptors include: 1) water running off the building slab outside the building as a result of operating the sprinkler system or from roof leaks, and 2) tracking residues outside the building on shoes or other equipment moving inside and outside the building.

The former Chemfab fabricating area is an open space with ceiling heights between 24 and 36 feet to accommodate large equipment. Vapors generated at the time of production during the former Chemfab operations are the primary mechanism for PFOA distribution and accumulation on interior building surfaces and material. Condensation of the vapors during operations accumulated as residues within

portions of the former fabrication area on the floor, walls, structural steel framing, insulation, and ceilings. The visible residues within the former facility footprint would be addressed by corrective actions.

Break rooms, laboratory space, and the mix room were located north of the fabrication area, and office space is present south of the fabrication area. Observation of the former break rooms, lab space, mix room, and office area do not indicate accumulation or presence of residues consistent with the former fabrication area. Based on these observations, corrective actions would focus on residues observed in the former fabrication area only.

5.2 Alternative 1 – No Action

This alternative would consist of taking no further action with respect to building materials at the Site. This alternative provides a baseline for comparison to other building material corrective action alternatives. Equipment and materials associated with the former Chemfab operations have been removed. The building components consist primarily of poured and concrete block exterior walls along the floor; steel structural framing; metal exterior walls with insulation above the concrete walls; ceiling and insulation present at various heights; piping; office space; and a commercial refrigerator reportedly installed after manufacturing operations were discontinued.

5.2.1 Compliance with Legal Requirements

There is no regulatory standard for PFOA concentrations in or on building materials.

5.2.2 Overall Protection of Human Health and the Environment

The direct contact exposure pathway is not a pathway of concern (ATSDR, 2017). This alternative would not address potentially mobile PFOA present in residues on and within building materials that has the potential for transport outside of the building.

5.2.3 Long-term Effectiveness and Permanence

This alternative would not provide a long-term solution to address potentially mobile PFOA on and within building materials.

5.2.4 Reducing Toxicity, Mobility, or Volume

This alternative would not provide a reduction in toxicity, mobility, or volume.

5.2.5 Short-term effectiveness

There would be no to minimal short-term risks to sensitive receptors or workers by implementing this alternative. The Site is not currently used and entrance to the facility is restricted with security features (i.e., locked access points).

5.2.6 Implementability

This alternative would not involve implementing further actions.

5.2.7 Cost

There would be no cost associated with this alternative.

5.2.8 Environmental Impact and Sustainability

There would be no environmental impacts associated with this alternative.

5.2.9 Community Acceptance

The no action alternative would not disrupt the community; however, redevelopment of the building is likely preferred.

5.3 Alternative 2 – Selected Removal, Offsite Disposal, and Cleaning

This alternative would include removing and replacing soft surfaces (e.g., insulation from the outer walls and ceiling) for offsite disposal and cleaning residues on hard surfaces (e.g., the floor, structural framing, and concrete walls), where present. An estimated 10 tons of insulation would be removed for offsite disposal and approximately 77,000 gallons of liquid would be generated for treatment and disposal. The basis for this alternative is shown on Figure 3. Liquid generated, captured, and contained from surface cleaning activities would be treated on site using a granulated activated carbon (GAC) unit and other pretreatment methods, as necessary. Treatment media (e.g., GAC) would be disposed off site or regenerated and permitted disposal of treated liquid would be to the sanitary sewer.

As part of the ECAA evaluation, preliminary testing by an industrial cleaning firm was conducted using typical industrial cleaning products and methods to determine viable cleaning approaches for the different materials at the Site. The cleaning evaluation included: 1) hot water and manual removal and 2) degreaser and manual removal. The testing was conducted on the concrete floor and a steel beam near monitoring well MW1802, where visible residue is present. Based on the results of this testing, hot water, degreasing solutions, manual removal, and steam are viable cleaning alternatives for the concrete floor and walls and steel beams.

5.3.1 Compliance with Legal Requirements

There are no regulatory standards for PFOA concentrations in or on building materials that trigger corrective actions. Building materials with PFOA impacts are not listed or characteristic hazardous wastes.

The generated liquid would be disposed off site or treated prior to discharge to the municipal sewer under a discharge permit. The existing permit (VT 1272 Order) for discharge to the sanitary sewer would need updating to include this activity. Additional pretreatment prior to GAC treatment or offsite disposal could also be pursued to manage wastewater, if necessary. Waste transport and disposal would be conducted in accordance with local, state, and federal regulations.

5.3.2 Overall Protection of Human Health and the Environment

This alternative would be protective of human health and the environment through removal of building materials containing potentially mobile PFOA. Visual inspection would be conducted to confirm that visible residues with the potential for offsite transport were addressed.

5.3.3 Long-term Effectiveness and Permanence

Typical industrial cleaning approaches are anticipated to meet the performance standard of removing potentially mobile residues as demonstrated by the results of the cleaning testing. Residues present within the insulation would be addressed through selected removal and offsite disposal. This alternative would be effective over the long term as it would remove potentially mobile PFOA that, if transported, could potentially effect sensitive receptors.

5.3.4 Reducing Toxicity, Mobility, or Volume

This alternative would reduce the volume of residual waste present at the Site through removal of approximately 10 tons of insulation impacted with PFOA residue and removal of mobile residues through cleaning. The cleaning fluids would be contained, captured, and treated with a GAC unit and the GAC media would be regenerated or disposed. Solids would be containerized and disposed off site at a permitted facility.

5.3.5 Short-term effectiveness

This alternative would result in short-term exposure for the industrial workers who would remove the insulation and clean the facility. Exposure to workers during implementation would be mitigated with appropriate training, personal protective equipment, decontamination procedures, and maintenance of exclusion and support zones during cleaning.

5.3.6 Implementability

This alternative would be implementable using industrial cleaning techniques and equipment. There are regional industrial cleaning companies with the necessary equipment and experience to complete this alternative. Monitoring the effectiveness of cleaning would be based on visual inspections of the cleaned surfaces for evidence of residues. Monitoring effectiveness of the selected removal would be based on removing insulation from the ceiling and walls of the operations area.

5.3.7 Cost

The estimated cost of cleaning and select removal of building materials is $1,200,000, as detailed in Table 3. This cost estimate includes equipment, labor, and engineering for removing insulation; cleaning of hard surfaces; and installing spray foam insulation to replace removed insulation. Also included in this estimate is disposal of the removed insulation and other solid materials at a landfill. Performing an asbestos-containing material (ACM) survey and removing and disposing approximately half of the estimated ACM in accordance with applicable regulatory requirements, as well as management of wastewater generated by cleaning using an onsite GAC system, are also included in the estimate.

5.3.8 Environmental Impact and Sustainability

This alternative would generate approximately 20 tons of waste destined for a disposal facility, including removed insulation and ACM. Approximately 330 metric tons of greenhouse gases would be emitted and 9,080 MMBTU of energy would be consumed during this alternative. The largest contributor to environmental impacts would be the energy consumed from producing / processing the materials used in this alternative, such as spray foam insulation, thermal barrier coating, and degreaser. Best management practices that would be implemented during this alternative include using green insulation materials. Based on quantitative analysis and comparison to the other building material alternatives, this alternative would have a medium environmental impact.

5.3.9 Community Acceptance

Selected removal and cleaning would be completed within the facility with negligible impact on the community during implementation. Cleaning the Site using standard industrial cleaning techniques would further prepare the building for future use.

5.4 Alternative 3 – Encapsulate and Institutional Control

This alternative would consist of constructing sheet metal covering beneath the ceiling and around the inside of the perimeter sheet metal walls (above the concrete block wall and over the existing insulation) and applying an epoxy coating to the lower concrete block wall, concrete floor, and beams. A summary of the encapsulation approach is provided on Figure 4. An Institutional Control Plan would be required to maintain the protective finishes and prevent potential mobilization of PFOA residues during future land use changes.

5.4.1 Compliance with Legal Requirements

There are no regulatory standards for PFOA concentrations in or on building materials that trigger corrective actions.

5.4.2 Overall Protection of Human Health and the Environment

This alternative would be protective of human health and the environment by mitigating exposure to and transport of potentially mobile PFOA residues. Visual inspection would be conducted to confirm that visible residues with the potential for offsite transport were addressed by the remedy.

5.4.3 Long-term Effectiveness and Permanence

Encapsulation would be effective over the long term as it would remove exposure to potentially mobile PFOA residues that, if transported, could potentially effect sensitive receptors. The institutional control plan would include measures to maintain the encapsulation during regular occupancy and measures to manage / repair encapsulated surfaces during construction activities with a potential future building use change.

5.4.4 Reducing Toxicity, Mobility, or Volume

This alternative would not reduce the toxicity or volume of materials left in place. The mobility of residues would be mitigated by preventing exposure and the potential for subsequent transport to sensitive receptors.

5.4.5 Short-term effectiveness

This alternative would have short-term exposure for the construction workers tasked with constructing the sheet metal containment ceiling and outer walls and applying the epoxy coating. Exposure to workers during implementation would be mitigated with appropriate training, personal protective equipment, decontamination procedures, and maintenance of exclusion and support zones.

5.4.6 Implementability

This alternative would be implementable using standard construction techniques and equipment. There are regional construction companies with the necessary equipment and experience to complete this alternative. Monitoring the effectiveness of the corrective action would be based on visual inspections of the surfaces to demonstrate that residues were effectively covered.

5.4.7 Cost

The estimated cost for this option is $1,700,000, as detailed in Table 3. This cost includes equipment, materials, labor, and engineering for encapsulating the ceiling and walls using sheet metal, and applying an epoxy coating to the concrete floors, steel beams, and concrete block wall. Performing an ACM survey and removing and disposing approximately three-quarters of the building's estimated ACM in accordance with applicable regulatory requirements, and managing wastewater generated by cleaning using an onsite GAC system are also included in the estimate. The estimate also includes costs associated with the institutional controls for the encapsulation, and operation and maintenance of the encapsulation for 30 years, adjusted for inflation.

5.4.8 Environmental Impact and Sustainability

This alternative would generate approximately 24 tons of waste destined for a disposal facility, including waste generated from scarifying the concrete floor for epoxy and ACM. Approximately 520 metric tons of greenhouse gases would be emitted and 6,910 MMBTU of energy would be consumed during this alternative. The largest contributor to environmental impacts would be the energy consumed from producing / processing the materials used in this alternative, such as sheet metal and epoxy coating. Best management practices that would be implemented during this alternative include using recycled sheet metal for encapsulation. Based on quantitative analysis and comparison to the other building material alternatives, this alternative would have a medium environmental impact.

5.4.9 Community Acceptance

Encapsulation could be completed within the facility with negligible impact on the community during implementation. Encapsulating the building would prepare the building for eventual redevelopment.

5.5 Alternative 4 – Building Demolition

This alternative would consist of demolishing the building and disposing building materials at an offsite permitted disposal facility. ACM and lead paint abatement would be completed prior to building demolition. An estimated 920 tons of waste would be generated during building demolition. There are no equipment or materials associated with prior facility operations remaining in the building. The building currently consists primarily of concrete block and poured concrete exterior walls along the floor; metal exterior walls with insulation above the concrete walls; roof and insulation present at various heights; structural steel supports; office space; and a commercial refrigerator installed after facility operation. The concrete floor slab would remain in place and cleaned of residues. An evaluation of the potential to clean and recycle structural steel, exterior metal walls, and concrete would be completed; however, offsite disposal is assumed for all materials pending that evaluation and acceptance at recycling facilities.

5.5.1 Compliance with Legal Requirements

There are no regulatory standards for PFOA concentrations in or on building materials that trigger corrective actions.

Building materials with PFOA impacts are not a listed or characteristic hazardous waste. Waste transport and disposal would be conducted in accordance with local, state, and federal regulations. Water generated during floor cleaning would be captured for treatment / discharge or offsite disposal.

5.5.2 Overall Protection of Human Health and the Environment

This alternative would be protective of human health and the environment through removal and disposal of potentially impacted building materials. This alternative would remove potentially mobile PFOA but would necessitate short-term protection of adjacent businesses and residential tenants and generate a significant amount of waste through building demolition.

5.5.3 Long-term Effectiveness and Permanence

This alternative would be effective over the long term as the demolition of the building would remove residues that could potentially affect sensitive receptors with future land use changes.

5.5.4 Reducing Toxicity, Mobility, or Volume

This alternative would reduce the volume of residues present at the Site by removing approximately 920 tons of building materials. The toxicity of the building materials would not be addressed by this alternative. The mobility of the PFOA on or within building materials would be reduced since it would be placed within a permitted disposal facility with engineered liner, cover system, leachate collection, and groundwater monitoring systems.

5.5.5 Short-term effectiveness

This alternative would increase short-term exposure to materials containing PFOA, as well as potentially ACM and lead paint. Exposure to construction workers during implementation would be mitigated with appropriate training, personal protective equipment, decontamination procedures, and maintenance of

exclusion and support zones. This alternative would also present short-term safety risks during demolition for adjacent businesses and residential tenants. Measures would need to be taken to protect the adjacent portion of the building from the demolition activities.

5.5.6 Implementability

This alternative would be implementable using standard construction techniques and equipment. There are local and regional construction companies with the necessary equipment, experience, and qualifications to complete this alternative. Construction challenges would include, but are not limited to, disconnecting utilities without affecting the adjoining building, demolishing the building without affecting the adjoining building, and performing demolition near and above Paran Creek. Monitoring the effectiveness of the corrective action would be based on complete removal of the building. A building permit would be obtained through the town of North Bennington prior to initiating this work.

5.5.7 Cost

The estimated cost for building demolition is $2,200,000, as detailed in Table 3. This cost includes labor, equipment, and engineering for demolition of the building; and disposal of building materials in a disposal landfill. Also included are costs for cleaning the concrete floor slabs and treating wastewater generated by cleaning using an onsite GAC system. An ACM survey and removal and disposal of ACM in accordance with applicable regulatory requirements are also included in the estimate.

5.5.8 Environmental Impact and Sustainability

This alternative would generate approximately 920 tons of waste that would need to be disposed at one or more disposal facilities, including demolition waste and ACM. Approximately 14,000 metric tons of greenhouse gases would be emitted and 3,700 MMBTU of energy would be consumed during this alternative. The largest contributor to environmental impacts for this alternative would be emissions produced from equipment use. Best management practices that would be implemented during this alternative would include avoiding idling equipment and trucks when not in use. Based on quantitative analysis and comparison to the other building material alternatives, this alternative would have a high environmental impact.

5.5.9 Community Acceptance

Construction activities associated with building demolition would have a significant impact on the adjacent businesses and residential tenants. Building demolition would have a larger contractor presence with more equipment, trucks, and support personnel at the Site than the other alternatives. Following demolition, additional impact to the community could also occur during redevelopment of the land with new construction as opposed to the lighter footprint associated with reuse of an existing building. Subsequent development would be subject to zoning regulations.

5.6 Selected Remedy

A comparison of building material corrective actions is provided in Table 4. Alternative 2 (Selected Removal, Offsite Disposal, and Cleaning) is the selected remedy based on the overall protection of human

health and the environment, the permanence provided by removing and cleaning building materials containing PFOA, lower environmental impact during implementation, and greater community acceptance. There is uncertainty about the long-term effectiveness of Alternative 3 (Encapsulation and Institutional Control) and there is negative community impact, environmental impact, and short-term risk for Alternative 4 (Demolition).

6.0 Conclusions and Recommendations

An evaluation of corrective action alternatives was completed for soil and building materials consistent with iRULE (VTDEC, 2019). The installation of municipal water in OUA and implementation of the CAP (Barr, 2018b) activities in OUB for CAAI address groundwater at the Site. Additionally, sewer connections were evaluated as part of this ECAA and it was verified that former process sumps do not discharge to sensitive receptors.

The selected remedy for soil is Maintain Cap with Institutional Control, and the selected remedy for building materials is Selected Removal, Offsite Disposal, and Cleaning. These corrective actions, in combination with existing corrective actions for groundwater, would address potential risk to sensitive receptors at the Site and provide the best overall remedies based on the ECAA evaluation criteria.

7.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 2017. An Overview of Perfluoroalkyl and Polyfluoroalkyl Substances and Interim Guidance for Clinicians Responding to Patient Exposure Concerns, revised on June 7, 2017.

Agency for Toxic Substances and Disease Registry (ATSDR), 2018. Toxicological Profile for Perfluoroalkyls. Draft for Public Comment. June 2018.

American Society for Testing and Materials (ASTM) E2893-16e1, Standard Guide for Greener Cleanups, ASTM International, West Conshohocken, PA, 2016.

Barr Engineering Co., 2019. Summary of Observations at 940 Water Street, North Bennington, Vermont, dated January 22, 2019.

Barr Engineering Co., 2018a. Site Investigation Report, Former Chemfab Facility, 1030 Water Street, North Bennington, Vermont, prepared for Saint-Gobain Performance Plastics, dated June 2018.

Barr Engineering Co., 2018b. Corrective Action Plan, Corrective Action Area I – Operational Unit B, North Bennington and Bennington, prepared for Saint-Gobain Performance Plastics, dated May 2018.

C.T. Male Associates and Barr Engineering Co. 2018. Quality Assurance Project Plan Saint-Gobain Performance Plastics Site, Town of Bennington and Village of North Bennington, Bennington County, Vermont – Revision 1. Dated January 2018.

U.S. Environmental Protection Agency (EPA), National Risk Management Research Laboratory, Office of Research and Development, 2009. Perfluorocarboxylic Acid Content in 116 Articles of Commerce. Dated March 2009.

Vermont Department of Environmental Conservation (VTDEC), 2019. Investigation and Remediation of Contaminated Properties Rule, State of Vermont Agency of Natural Resources Department of Environmental Conservation Waste Management and Prevention Division. Emergency Rule, effective date January 8, 2019.

Tables

Table 1
Summary of Estimated Costs for Soil Corrective Actions
Evaluation of Corrective Action Alternatives
1030 Water Street, North Bennington, Vermont
Saint-Gobain Performance Plastics

Alternative	Net Present Value
Alternative 1 - No Action	
No Action	$ -
Alternative 1 - Total Estimated Present Value Costs:	**$ -**
Alternative 2 - Soil Excavation and Offsite Disposal	
Soil Investigation[1]	$ 40,000
Soil Removal and Disposal[2]	$ 50,000
Engineering and Regulatory Oversight	$ 20,000
Operation & Maintenance	$ -
Contingency (20% of construction costs)	$ 10,000
Alternative 2 - Total Estimated Present Value Costs:	**$120,000**
Estimated Range of Costs:	**+50% $ 186,000**
	-30% $ 87,000
Alternative 3 - Maintain Engineered Cover with Institutional Controls	
Prepare Institutional Controls	$ 50,000
Operation & Maintenance[3]	$ 39,000
Contingency (5% of operation & maintenance costs)	$ 2,000
Alternative 3 - Total Estimated Present Value Costs:	**$91,000**
Estimated Range of Costs:	**+50% $ 140,000**
	-30% $ 64,000

Notes:

1 - Soil investigation assumes that additional soil borings will be installed and soil samples will be collected for laboratory analysis to determine the magnitude and vertical and horizontal extent of impacts identified at soil boring SB1807.

2 - Soil Removal and Disposal includes excavation of approximately 10 cubic yards of impacted soil around soil boring SB1807 to a depth of 3 feet below ground surface and disposal at a Subtitle C landfill. If the excavation depth extends below the building footing or the extent is outside the lateral extent assumed for this estimate, the costs will increase significantly to account for additional geotechnical and structural considerations. The concrete floor in the excavation area will be demolished prior to excavation, disposed at a Subtitle C landfill, and replaced after impacted soil is removed. Soil with PFOA concentrations is not a listed or characteristic hazardous waste; however, this cost estimate assumes disposal at a RCRA Subtitle C landfill.

3 - Operation and Maintenance costs associated with an Institutional Control are calculated using an interest rate of 7% over 30 years. Includes one site visit per year and a summary report to document the site conditions.

The estimated range of costs is associated with the most likely cost of the project based on the level of design that has been completed and the uncertainties in the project as scoped (e.g., quantity uncertainties for soil excavation pending additional testing, variability in transportation and disposal cost, variability in project schedule/phasing, etc.). These costs do not include future scope changes that are not part of the planned project or risk contingency.

Table 2
Summary of Soil Corrective Action Criteria Scoring
1030 Water Street
North Bennington, Vermont
Saint-Gobain Performance Plastics

Corrective Action	Corrective Action Evaluation Criteria								
	Compliance with Legal Requirements	Overall Protection of Human Health and the Environment	Long-Term Effectiveness and Permanence	Reducing Toxicity, Mobility, or Volume	Short-Term Effectiveness	Implement-ability	Present Value Cost	Environmental Impact	Community Acceptance
No Action	**High**	**Medium**	**Medium**	**Low**	**High**	**High**	**$0**	**Low**	**High**
Soil Excavation and Offsite Disposal	**High**	**High**	**High**	**High**	**Low**	**Medium**	**$120,000**	**Medium**	**High**
Maintain Engineered Cover with Institutional Controls	**High**	**High**	**High**	**Low**	**High**	**High**	**$91,000**	**Low**	**High**

Table 3
Summary of Estimated Costs for Building Material Corrective Actions
Evaluation of Corrective Action Alternatives
1030 Water Street, North Bennington, Vermont
Saint-Gobain Performance Plastics

Alternative	Net Present Value
Alternative 1 - No Action	
No Action	**$ -**
Alternative 1 - Total Estimated Present Value Costs:	**$ -**
Alternative 2 - Selected Removal, Offsite Disposal, and Cleaning	
Building cleaning, removal and offsite disposal[1]	$ 800,000
Operation & Maintenance	$ -
Engineering and Regulatory Oversight	$ 200,000
Contingency (20%)	$ 200,000
Alternative 2 - Total Estimated Present Value Costs:	**$1,200,000**
Estimated Range of Costs:	**+50% $ 1,800,000**
	-30% $ 800,000
Alternative 3 - Encapsulate and Institutional Control	
Building Encapsulation[2]	$ 1,100,000
Prepare Institutional Controls	$ 60,000
Engineering and Regulatory Oversight	$ 300,000
Operation & Maintenance[3]	$ 50,000
Contingency (20%)	$ 200,000
Alternative 3 - Total Estimated Present Value Costs:	**$1,700,000**
Estimated Range of Costs:	**+50% $ 2,600,000**
	-30% $ 1,200,000
Alternative 4 - Building Demolition	
Demolition and Disposal[4]	$ 1,500,000
Engineering and Regulatory Oversight	$ 400,000
Operation & Maintenance	$ -
Contingency (20%)	$ 300,000
Alternative 3 - Total Estimated Present Value Costs:	**$2,200,000**
Estimated Range of Costs:	**+50% $ 3,400,000**
	-30% $ 1,600,000

Notes:

1 - It was estimated that it would take approximately 10 weeks to complete the cleaning and removals. All insulation and miscellaneous piping would be removed and disposed off site at a Subtitle C landfill. Building materials with PFOA concentrations is not a listed or characteristic hazardous waste; however, this cost estimate assumes disposal at a RCRA Subtitle C landfill. The floors, walls and ceiling would be cleaned with hot water pressure washers and a degreaser (if needed). All water from the cleaning activities would be collected and treated on site using granulated activated carbon prior to discharging to the sanitary sewer. Spray foam insulation would be installed on the ceiling and walls.

2 - It was estimated that it would take approximately 19 weeks to complete the encapsulation. Miscellaneous piping would be removed, as necessary, and disposed off site at a Subtitle C landfil. Sheet metal would be installed on the walls and ceiling. The floors and concrete wall would be cleaned to the extent necessary, scarrified, and epoxy coating would be applied. All waste from scarrification of floors and walls would be disposed at a Subtitle C landfill. Building materials with PFOA concentrations is not a listed or characteristic hazardous waste; however, this cost estimate assumes disposal at a RCRA Subtitle C landfill.

3 - Operation and Maintenance costs shown are calculated using an interest rate of 7% over 30 years. Includes one site visit per year and a summary report that would be submitted to VTDEC.

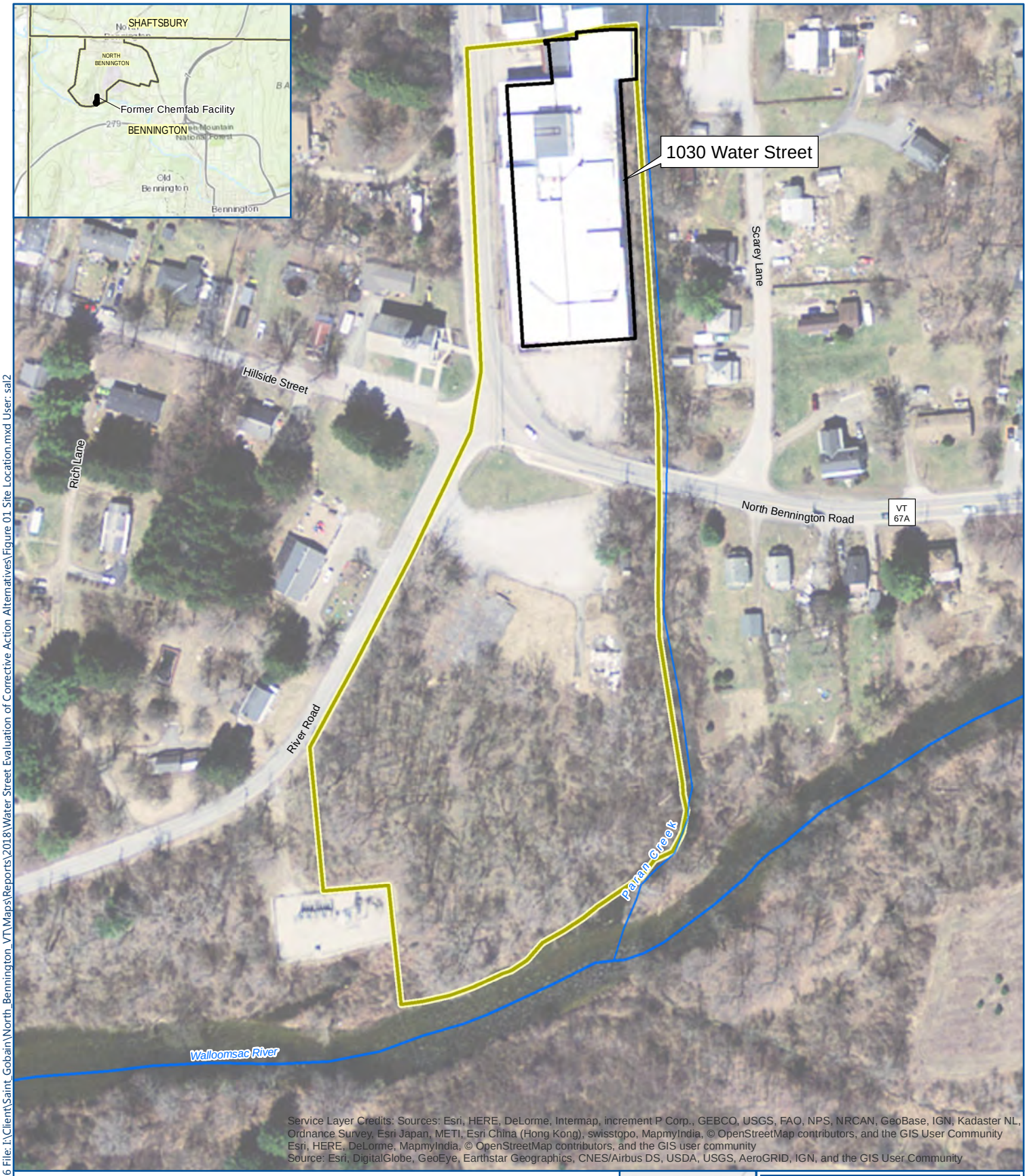
4 - It was estimated that it would take approximately 10 weeks to complete the building demolition. The structure would be demolished to the concrete slab. The remaining slab would be cleaned with hot water and degreaser (if needed). All demolition debris would be disposed off site at a Subtitle C landfill. Building materials with PFOA concentrations is not a listed or characteristic hazardous waste; however, this cost estimate assumes disposal at a RCRA Subtitle C landfill.

The estimated range of costs is associated with the most likely cost of the project based on the level of design that has been completed and the uncertainties in the project as scoped (e.g., uncertainties regarding effectiveness of building cleaning methods, variability in transportation and disposal cost, variability in project schedule/phasing, etc.). Does not include costs for future scope changes that are not part of the planned project or risk contingency.

Table 4
Summary of Building Material Corrective Action Criteria Scoring
1030 Water Street
North Bennington, Vermont
Saint-Gobain Performance Plastics

Corrective Action	Corrective Action Evaluation Criteria								
	Compliance with Legal Requirements	Overall Protection of Human Health and the Environment	Long-Term Effectiveness and Permanence	Reducing Toxicity, Mobility, or Volume	Short-Term Effectiveness	Implement-ability	Present Value Cost	Environmental Impact	Community Acceptance
No Action	**High**	**Medium**	**Low**	**Low**	**High**	**High**	**$0**	**Low**	**Low**
Selected Removal, Offsite Disposal, and Cleaning	**High**	**High**	**High**	**High**	**Medium**	**High**	**$1,200,000**	**Medium**	**High**
Encapsulate and Institutional Control	**High**	**Medium**	**Medium**	**Low**	**Medium**	**Medium**	**$1,700,000**	**Medium**	**Medium**
Building Demolition	**High**	**Medium**	**High**	**High**	**Low**	**Medium**	**$2,200,000**	**High**	**Low**

Figures



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

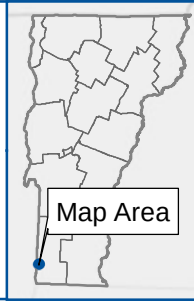
BARR

Site Boundary

N

0 75 150

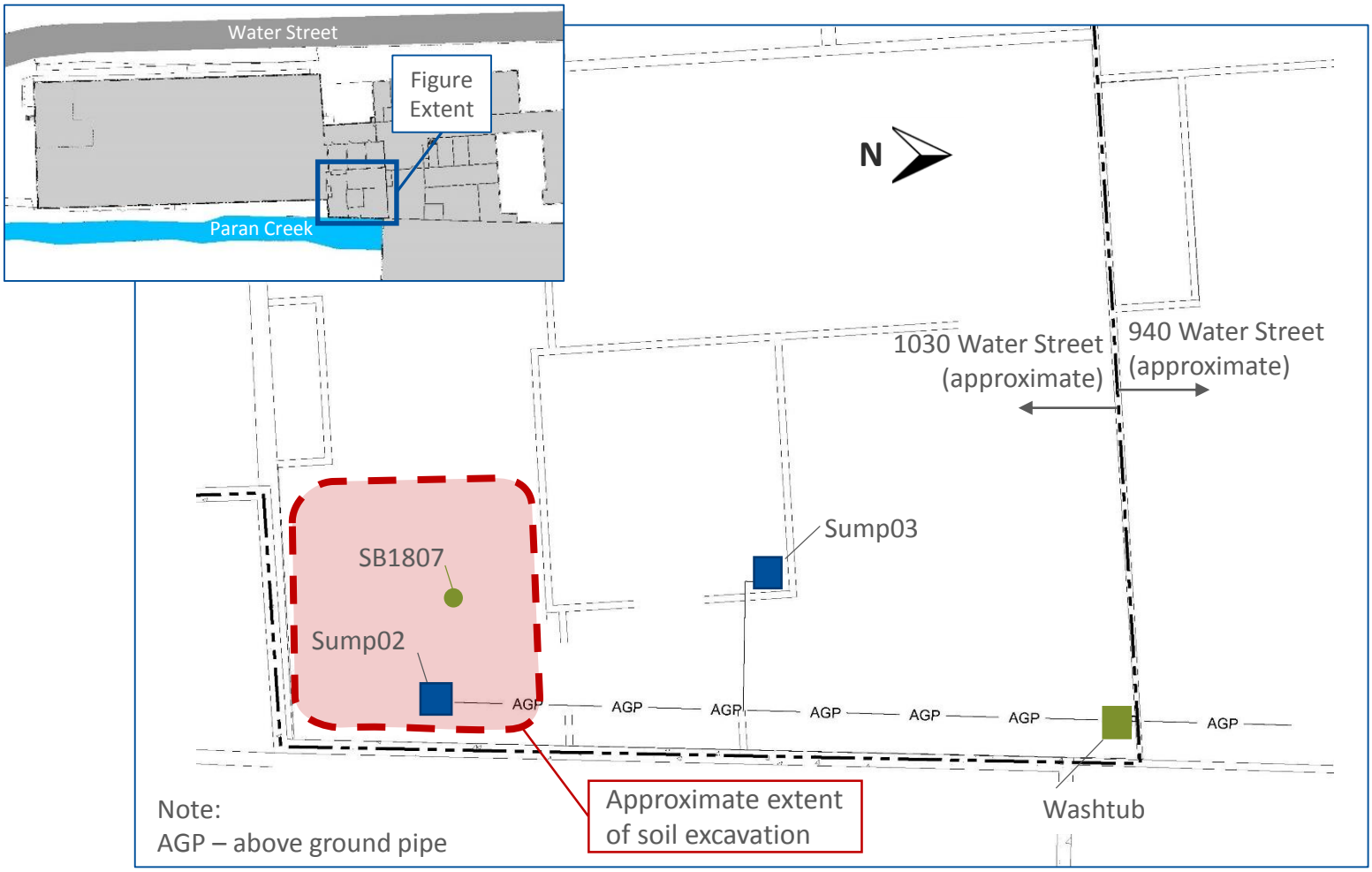
Feet



SITE LOCATION
Evaluation of Corrective Action Alternatives
1030 Water Street
North Bennington, VT
Saint-Gobain

FIGURE 1

Barr Footer: ArcGIS 10.6, 2019-01-28 10:06 File: I:\Client\Saint_Gobain\North_Bennington_VT\Maps\Reports\2018\Water Street Evaluation of Corrective Action Alternatives\Figure 01 Site Location.mxd User: sal2



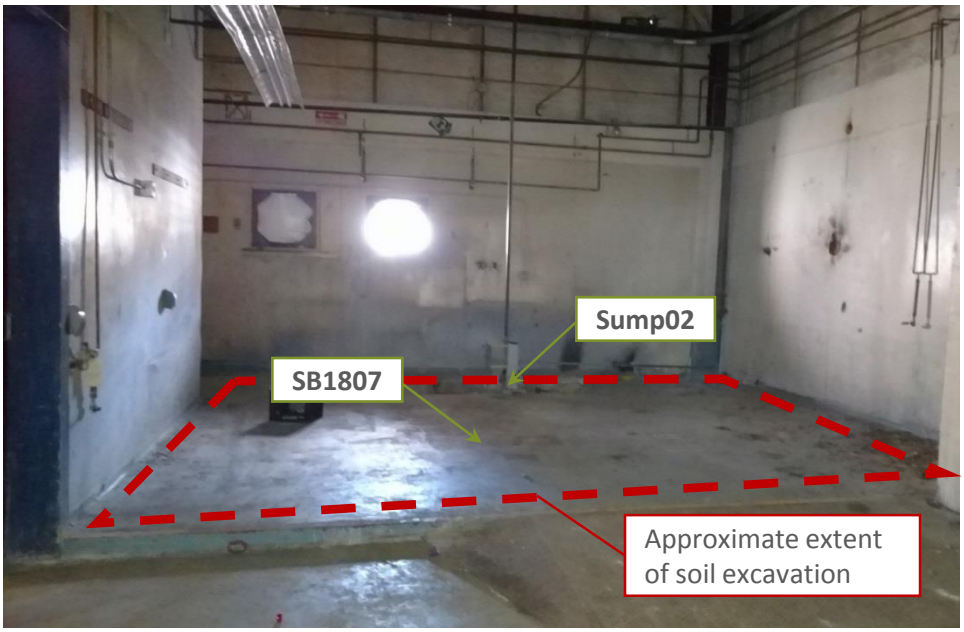


Photo 1: Area of soil excavation

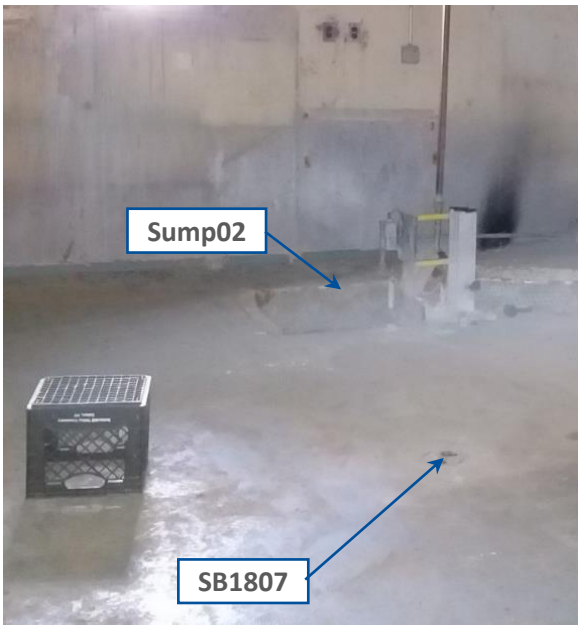


Photo 2: Concrete floor near soil boring SB1807, in good condition

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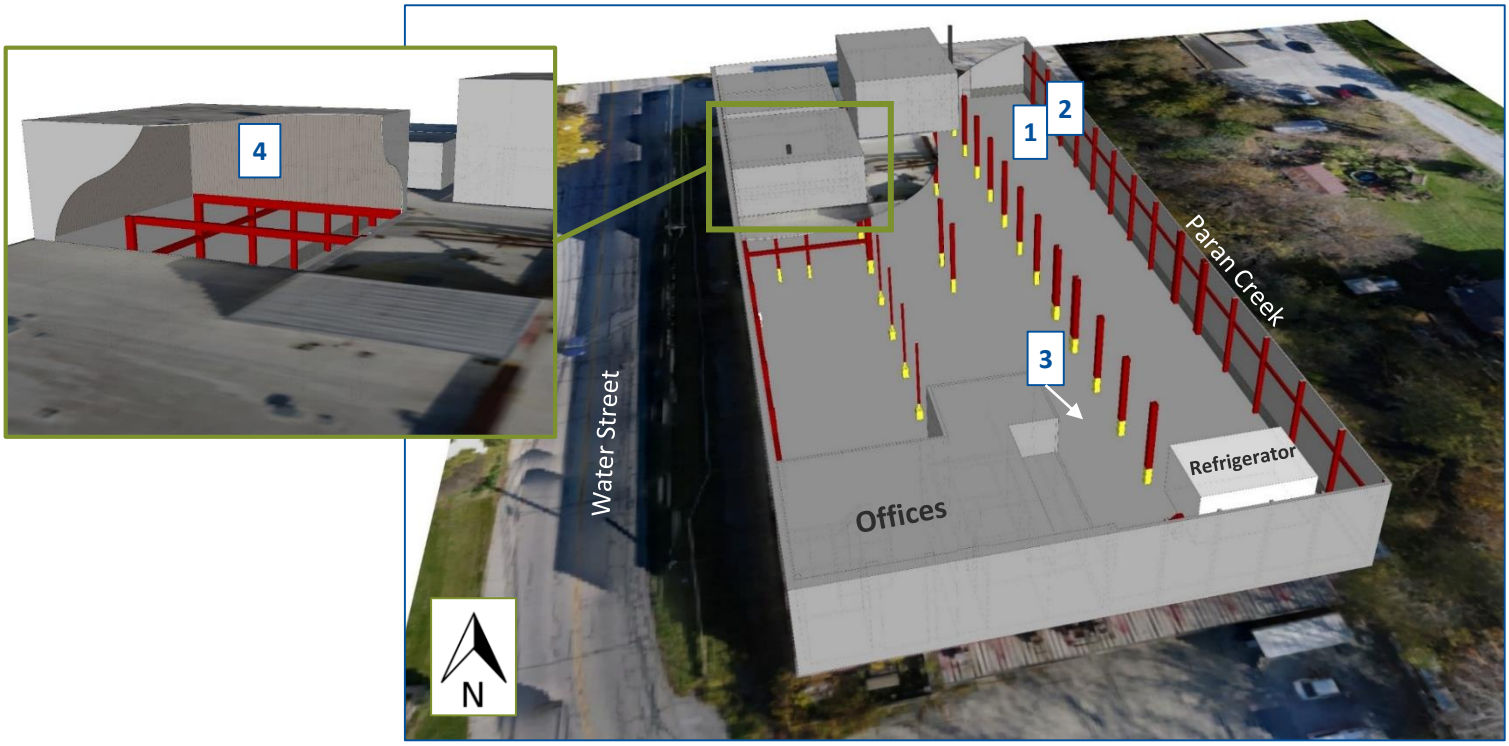
Figure 2
Soil Alternatives Basis – Excavation and Offsite Disposal
Evaluation of Corrective Action Alternatives
1030 Water Street
North Bennington, Vermont
Saint-Gobain



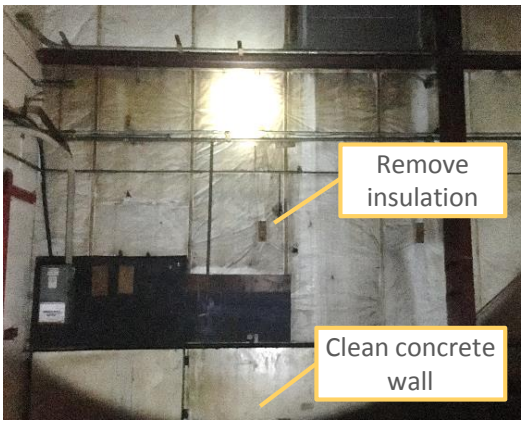


Photo 1: Concrete wall and insulation

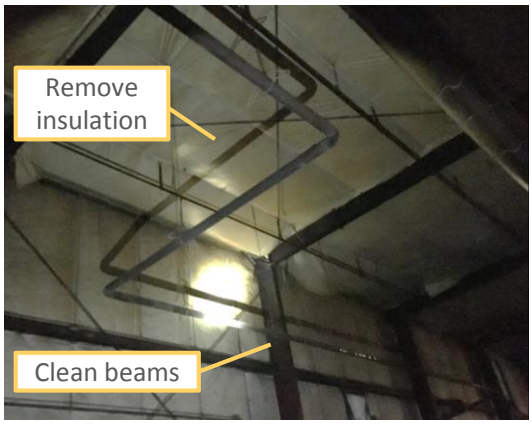


Photo 2: Insulation on wall and ceiling

Photo 4: Corrugated sheet metal in cupola

Photo 3: Concrete floor and beams

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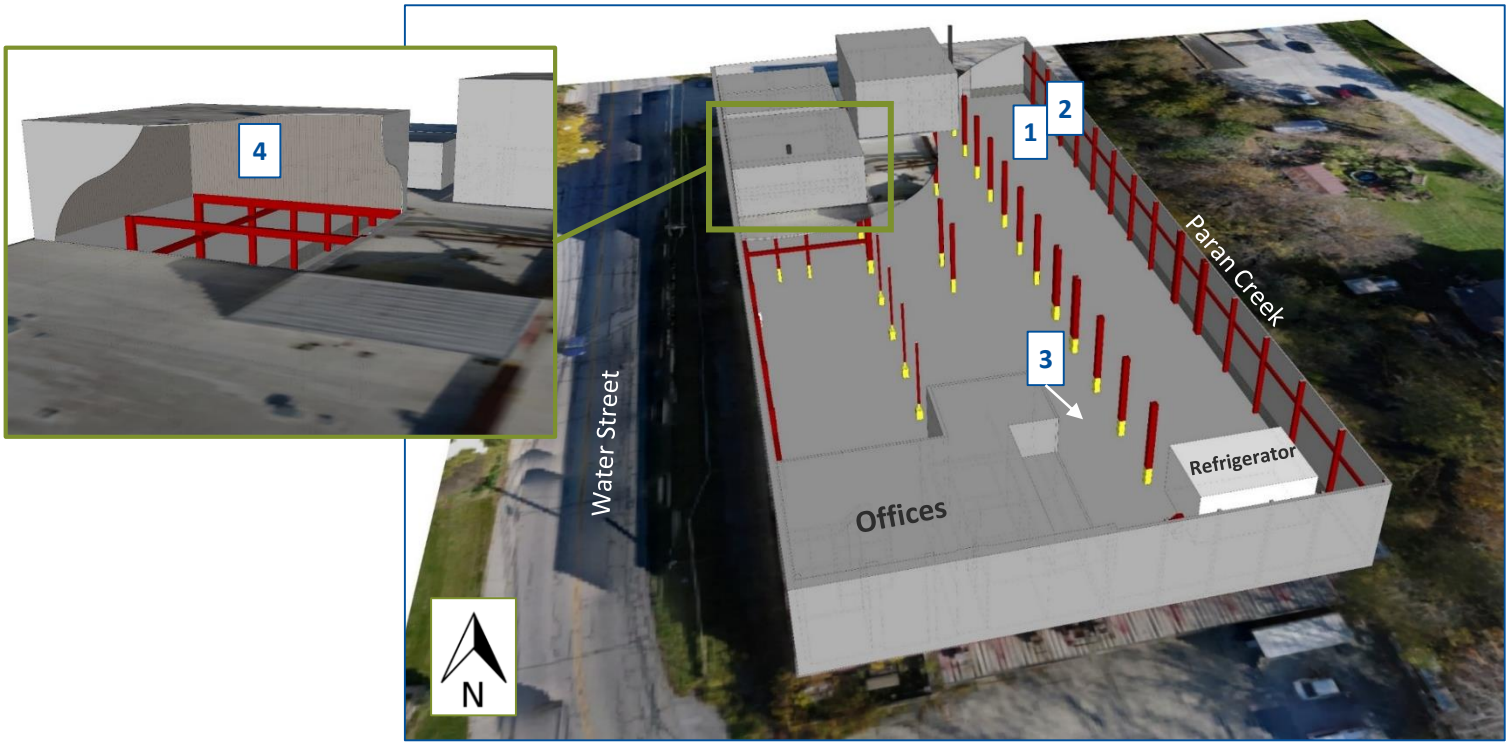
Figure 3
Building Materials Alternatives Basis – Selected Removal, Offsite Disposal, and Cleaning
Evaluation of Corrective Action Alternatives
1030 Water Street
North Bennington, Vermont
Saint-Gobain



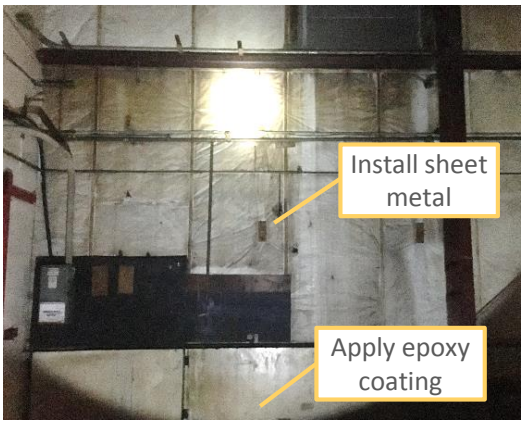


Photo 1: Concrete wall and insulation

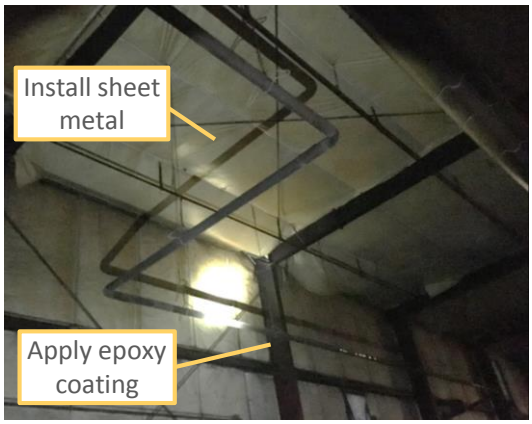


Photo 2: Insulation on wall and ceiling

Photo 4: Corrugated sheet metal in cupola

Photo 3: Concrete floor and beams

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Figure 4
Building Materials Alternatives Basis – Encapsulation
Evaluation of Corrective Action Alternatives
1030 Water Street
North Bennington, Vermont
Saint-Gobain

Appendices

Appendix A

VTDEC Approval Letter of Site Investigation Report

VERMONT

State of Vermont
Department of Environmental Conservation
Waste Management and Prevention Division
1 National Life Drive – Davis 1
Montpelier VT 05620-3704
(802) 249-5083
FAX (802) 828-1011
richard.spiese@vermont.gov

AGENCY OF NATURAL RESOURCES

October 22, 2018

Christopher Angier
Saint-Gobain Performance Plastics
One Sealants Park
Granville, NY 12832

RE: Comments on Former Chemfab Facility Site Investigation Report, Water Street Facility, Prepared by Barr Engineering, North Bennington, Vermont (SMS Site #20164630)

Dear Mr. Angier:

The Vermont Agency of Natural Resources (ANR), Sites Management Section (SMS) has received and reviewed the Barr Engineering June 2018 Site Investigation Report for the Former Chemfab Facility, 1030 Water Street, North Bennington. After a detailed review of the Site Investigation (SI) report, the SMS approves the SI report and concurs with Barr's recommendations for further investigation into the polyfluoroalkyl substances (PFAS) inside the former facility as well as exiting the facility via piping. The SMS is also requiring several additional actions not included in the recommendations of the SI report listed later in this letter.

The Barr Engineering recommendations to be implemented include:

Proceed with the preparation of a corrective action feasibility investigation (now referred to as an Evaluation of Corrective Action Alternatives (ECAA) in the Investigation and Remediation of Contaminated Properties Rule (iRule)). The report recommends the ECAA include an evaluation of the following potential receptors:

- Sewer sludge within stormwater catch basins with potential exposure to utility workers and contribution to downgradient surface water bodies,
- Building materials with potential exposure during future land use changes, and
- At least three additional quarterly groundwater monitoring events be completed to further evaluate temporal variability of groundwater quality, as proposed in the Supplemental Site Investigation Work Plan (C.T. Male, 2018a).

In addition to an evaluation of the receptors listed above, the SMS is requiring further evaluation of the following:

- The inside of the building between the Chemfab facility and the newly constructed apartments on the north side of the building. This work should be focused on any potential risk PFAS on or in building material could pose a to residents of these apartments,
- Soils above the Vermont direct contract screening value for PFOA in surface soils. This media, where it is above the Vermont screening value of 0.30 milligrams PFOA per kilogram of soils (mg/kg), should be evaluated in the ECAA as part of the corrective action of this property, and
- Further evaluation of the building materials, listed above, to include what potential risk these materials pose to future users of the building as well as the risk the PFAS poses to the environment should the PFAS in the building get out into the environment. As an alternative, should Saint-Gobain decide to just remediate the PFAS in the building on the building material, then a further evaluation of potential risk would not be needed at this time.

Please have Barr move ahead with the preparation of the ECAA to address the issues listed above. As specified in the signed CD, the ECAA is due within 90 days of receiving approval (this letter). Should you have any questions with the requirements of the Secretary, feel free to contact me.

Sincerely,

Richard Spiese

Richard Spiese, Project Manager
Sites Management Section

Cc: Mary Sands, Barr Engineering
Chuck Schwer, Director, WM&PD
Matt Chapman, General Counsel, ANR
John Beling, General Counsel, DEC
Laura Murphy, VT Attorney's General Office
Carol M. Gary, Attorney, Saint-Gobain PP
Brett E. Slensky, Attorney, Saint-Gobain PP
David Edelstein, Attorney, Archer Law
Chris Gibson, Attorney, Archer Law
Ray Wuolo, Barr Engineering
Kirk Moline, CT Male
Dan Reilly, CT Male

Appendix B

Sewer and Sump Evaluation, 1030 Water Street, North Bennington, VT

resourceful. naturally.
engineering and environmental consultants

BARR

Technical Memorandum

To: File
From: Alec Danielson, Mary Sands, Kristen Schimpke
Subject: Sewer and Sump Evaluation, 1030 Water Street, North Bennington, VT
Date: January 28, 2019
Project: 45021004.01

The purpose of this memorandum is to provide an updated summary of the information available regarding the sumps and wastewater management at the former Chemfab facility in North Bennington, Vermont (Site). An initial characterization of the wastewater system at the Site was presented in the *Former Chemfab Facility Site Investigation Report, Water Street Facility* (Barr, 2018). At that time, it was believed that two sumps were connected to floor drains that discharged to Paran Creek, but since that time additional work has been completed to learn that this is incorrect. An updated summary of the former wastewater components based on December 2018 investigation and cleaning activities and conclusions and recommendations are provided below.

Former Wastewater Components

The former wastewater management components remaining in the Site building consist of three sumps and four washtubs: one sump and three washtubs in the fabrication area and two sumps and one washtub in the area north of the fabrication area. The wastewater in these two areas appear to have been managed separately. To-date, original or copies of facility drawings or figures depicting the historical wastewater flow and/or piping configuration within the Site building have not been identified. The configuration of the sumps and washtubs in the fabrication area and north area are shown on Attachment B-1 and Attachment B-2, respectively, along with photographs showing these features and existing conditions.

Fabrication Area – Sump01

One sump (Sump01) and washtub (Tub01) are currently present along the west wall of the fabrication area and two washtubs (Tub02 and Tub03) with above grade plastic tanks are present along the east wall of the fabrication area. Disconnected above grade piping was also observed north of Sump01, which, based on site inspection activities, collected water from a washtub and tank that have since been removed (Tub04) and discharged to Sump01. Based on historical documentation and sewer video activities, Sump01 is connected to manhole SMH-5 located along Water Street approximately 15 feet west of Sump01.

On December 18, 2018, dried sediment in Sump01 was removed and the condition of the sump was assessed. Precision Industrial Maintenance completed the sediment removal and cleaning activities, and a representative from C.T. Male performed oversight during the activities. The removed sediment was containerized in a 55-gallon steel drum and is labeled and stored on Site.

During sediment removal at Sump01, a plastic tub with a vertical pipe was encountered. After the tub was removed, additional sediment and debris was observed in the bottom of the concrete sump. A pipe that discharges to the sanitary sewer was also observed. A cross-sectional schematic of Sump01 is shown in Figure B-1 and photographs taken during the investigation and cleaning activities are provided in Attachment B-1.

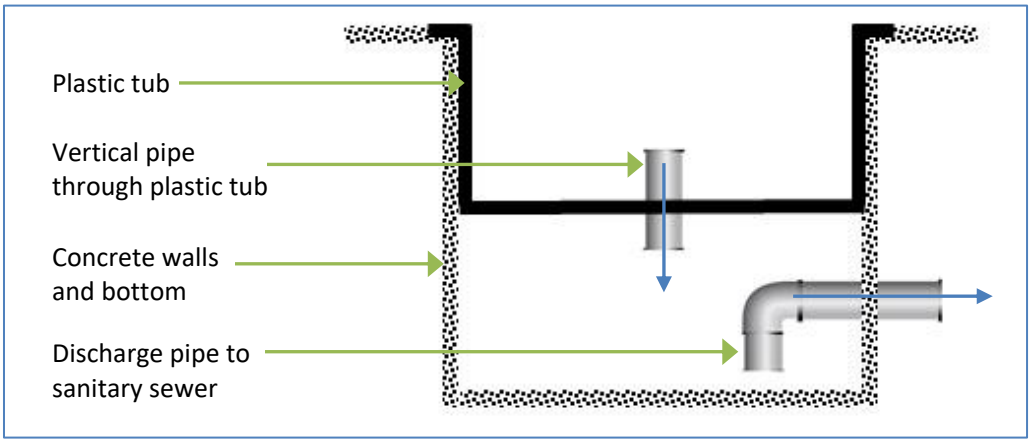

Figure B-1 Cross-sectional schematic of Sump01

The pipe wrap on the pipe that discharges to the sanitary sewer appeared to be a potentially asbestos-containing material (PACM). Due to the presence of the PACM, the sediment and debris removal at Sump01 was discontinued and the condition of Sump01 was not further assessed; however, the bottom of the sump was probed with findings of no penetrations encountered and the bottom was possibly constructed of concrete. The concrete walls of the sump that could be viewed appeared in good condition (i.e., no cracking, spalling, etc.).

North Area – Sump02 and Sump03

Two sumps (Sump02 and Sump03) are present in the area north of the fabrication area and a washtub (Tub05) is located in the northeast corner of this area. Remnants of a former sump pumps and above grade piping were also observed associated with the two sumps and washtub.

On December 18, 2018, the sediment in Sump02 and Sump03 was removed. The piping and remnants of the sump pump remained in place. The removed sediment was containerized in a 55-gallon drum and is labeled and stored on Site with sediment from Sump01.

Both sumps are constructed with poured concrete. The concrete was in good condition (i.e., no cracking, spalling, etc.) with some staining (e.g., rust) observed on the walls and base of Sump02. No discharges, penetrations, or drainpipes are present in Sump02 and Sump03.

Former Wastewater Management Practices at the Site

In the fabrication area, the wastewater from Tub02, Tub03, and Tub04 was discharged to plastic tanks at their respective locations, pumped through above grade piping and discharged to Sump01 located on the west side of the building. Tub01 discharged directly to Sump01.

Similarly, the wastewater generated north of the fabrication area was pumped through above grade piping from Sump02 and Sump03 into t Tub05. From Tub05, the wastewater was pumped through above grade piping to the adjacent building, 940 Water Street. During a walkthrough of the 940 Water Street building, the building owner stated that he had previously abandoned this pipe.

Conclusions and Recommendations

Based on the results of the investigation and cleaning activities, wastewater in the fabrication area was managed on site and was discharged to the sanitary sewer. Sump01 discharges to the sanitary sewer at manhole SMH-5 on the west side of the building. The wastewater collected in Sump02 and Sump03 was managed in above grade piping into the building at 940 Water Street. Sump02 and Sump03 are not connected to the floor drains which discharge to Paran Creek.

Based on this updated conceptual site model, the sewers and floor drains at the 1030 Water Street facility do not provide a complete exposure pathway to downgradient surface water bodies. The potential exposure of utility workers to sediment will be addressed through cleaning the sanitary sewer between Sump01 and manhole SMH-5. This cleaning process has already been initiated; however, management of PACM will need to be completed before the cleaning can be finished. No further action is recommended following completion of the sanitary sewer cleaning between Sump01 and manhole SMH-5.

References

Barr, 2018. Site Investigation Report, Former Chemfab Facility, 1030 Water Street, North Bennington, Vermont, prepared for Saint-Gobain Performance Plastics, dated June 2018.

Attachments

Attachment B-1 Fabrication Area Location and Photolog
Attachment B-2 North Area Location and Photolog

Attachments

Attachment B-1

Fabrication Area Location and Photolog

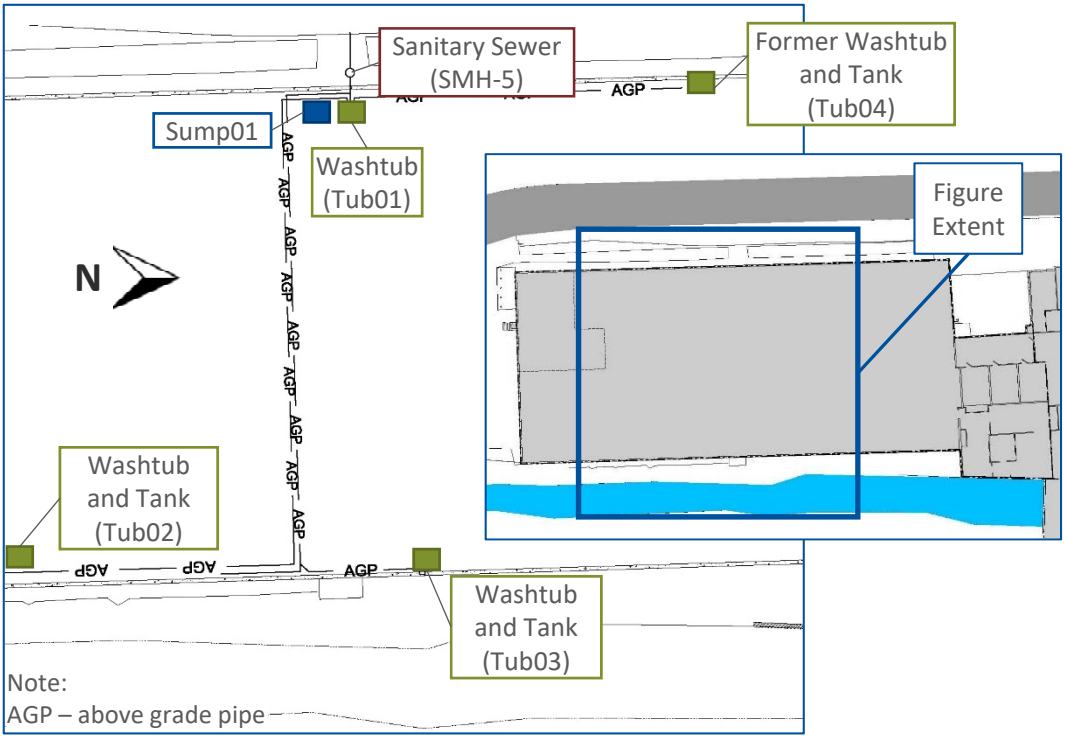

Photo 1: Washtub (Tub01) and sump (Sump01)

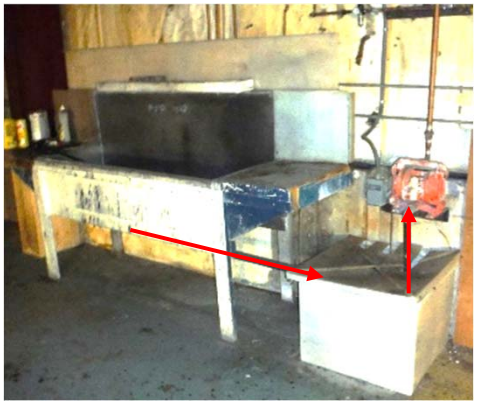

Photo 2: Washtub (Tub02) and above grade tank on east side of the building

Photo 3: Interior of above grade tank on east side of building, ball float and piping present, associated with Tub02

Photo 4: Debris removal at Sump01

Photo 5: Sump01 after sediment removal; plastic tub present

Photo 6: Plastic tub removal at Sump01

Photo 7: Sump01 after plastic tub removed; sanitary sewer piping exposed

Attachment B-2

North Area Location and Photolog

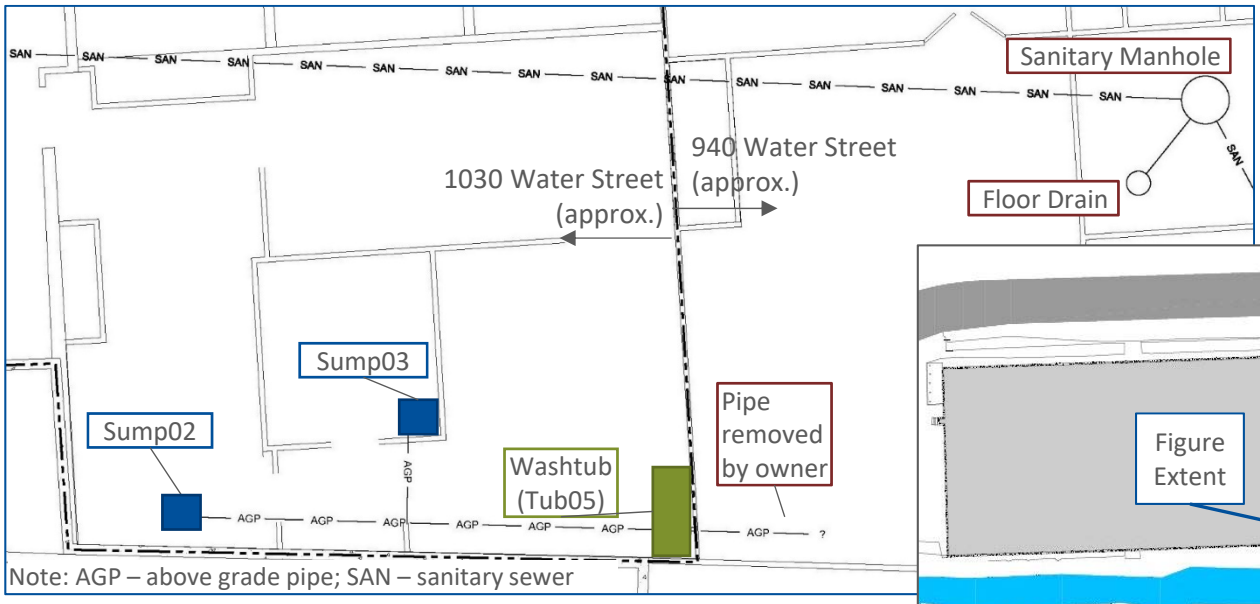

Photo 1 (top): Sump02 before cleaning
Photo 2 (bottom): Sump03 before cleaning

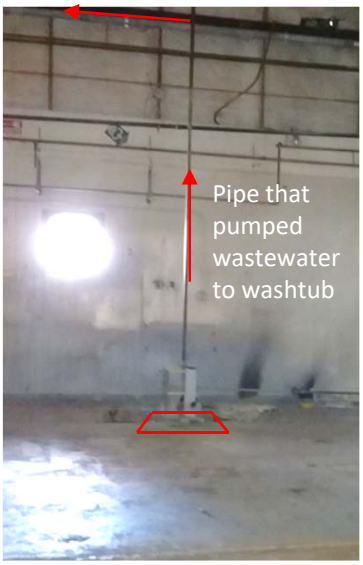

Photo 3: Location of Sump02

Photo 4: Location of Sump03

Photo 5: Washtub (Tub05) and piping

Photo 6: Sump03 during cleaning

Photo 7: Sump02 after cleaning; concrete bottom in good condition

Photo 8: Sump03 after cleaning; concrete bottom in good condition