

**ANALYSIS OF BROWNFIELD
CLEANUP ALTERNATIVES
(ABCA)
121-123 Reynolds Street
Rochester, New York
NYSDEC Spill No. 1103833**



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Project No: **190502014**

February 28, 2020

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ROCHESTER, NEW YORK
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Revision	Description	Author		Quality Check		Independent Review	
1	Final version	N. Bellus	2/14/20	R. Mahoney	2/14/20	M. Storonsky	2/14/20

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February 28, 2020

Table of Contents

EXECUTIVE SUMMARY	I
ABBREVIATIONS	II
1.0 INTRODUCTION AND BACKGROUND	1
1.1 SITE DESCRIPTION AND HISTORY	1
1.2 PROPOSED FUTURE USE OF SITE	1
1.3 PURPOSE AND CONTENT OF REPORT	1
2.0 ENVIRONMENTAL BACKGROUND	3
2.1 DECEMBER 2011 ENVIRONMENTAL ASSESSMENT AND REMEDIATION SERVICES 121 AND 123 REYNOLDS STREET	3
2.2 APRIL 2015 PHASE I ESA OF THE 121-123 REYNOLDS STREET SITE	3
2.3 JANUARY 2016 PHASE II ESA OF THE 121-123 REYNOLDS STREET SITE	4
2.4 APRIL 2016 OPC FOR REMEDIATION OF THE 121-123 REYNOLDS STREET SITE	4
2.5 JANUARY 2017 SUPPLEMENTAL PHASE II ESA OF THE 121-123 REYNOLDS STREET SITE	5
3.0 APPLICABLE REGULATIONS AND CLEANUP STANDARDS	6
3.1 EXPOSURE PATHWAYS	6
3.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS	6
3.3 CLEANUP OVERSIGHT RESPONSIBILITY	7
4.0 BROWNFIELD CLEANUP ALTERNATIVES FOR THE SITE	8
4.1 ALTERNATIVE A: NO ACTION/MONITORED NATURAL ATTENUATION (MNA)	8
4.2 ALTERNATIVE B: EXCAVATION OF IMPACTED SOILS AND WEATHERED BEDROCK	8
4.3 ALTERNATIVE C: EXCAVATION OF IMPACTED SOILS AND WEATHERED BEDROCK W/ ENHANCED MNA	9
5.0 EVALUATION OF CLEANUP ALTERNATIVES	10
5.1 ALTERNATIVE A: NO ACTION/MONITORED NATURAL ATTENUATION (MNA)	10
5.2 ALTERNATIVE B: EXCAVATION OF IMPACTED SOILS AND WEATHERED BEDROCK	10
5.3 ALTERNATIVE C: EXCAVATION OF IMPACTED SOILS AND WEATHERED BEDROCK W/ ENHANCED MNA	11
6.0 RECOMMENDED CLEANUP ALTERNATIVE	12
7.0 REFERENCES	13



February 28, 2020

LIST OF TABLES AND FIGURES

A	APPENDIX A: TABLE	A.1
	TABLE 1 – UPDATED OPINION OF PROBABLE COSTS FOR REMEDIATION	A.2
B	APPENDIX B: FIGURES	B.1
	FIGURE 1 – SITE LOCATION MAP	B.2
	FIGURE 2 – SITE PLAN WITH INTERPOLATED PEAK PID READINGS ON- SITE AND IN PUBLIC RIGHT-OF-WAY	B.3
	FIGURE 3 – SITE PLAN WITH INTERPOLATED TOTAL VOCs MEASURED IN SOIL SAMPLES	B.4
	FIGURE 4 – SITE PLAN WITH INTERPOLATED PEAK PID READINGS AND REMEDIAL COMPONENTS	B.5
	FIGURE 5 - SITE PLAN WITH INTERPOLATED TOTAL VOCs DETECTED IN ANALYTICAL LABORATORY SOIL SAMPLES AND REMEDIAL COMPONENTS	B.6

EXECUTIVE SUMMARY

This report presents an Analysis of Brownfield Cleanup Alternatives (ABCA) for the remediation of soil, weathered bedrock and groundwater impacts at 121-123 Reynolds Street, Rochester, NY (Site), as shown on Figure 1. The New York State Department of Environmental Conservation (NYSDEC) assigned Spill No. 1103833 to the Site.

Three remediation alternatives were retained following a preliminary screen of applicable remedial methods and technologies. **Alternative A** is the no action alternative and includes monitored natural attenuation (MNA) with an assumed duration of 30 years. **Alternative B** includes the excavation and off-Site disposal of impacted material from three areas on the Site and installation of remediation infrastructure. **Alternative C** includes all components of Alternative B, plus the direct application of a bioremediation amendment to the open excavations of the downgradient petroleum plume and the petroleum source area. Alternatives B and C both include one year of post-excavation groundwater monitoring, with the potential for conducting a second year of monitoring contingent on the first year's results.

Based on the extent of the impacted areas, the contaminants of concern, and the affected media, the recommended remedial approach is **Alternative C**.

Abbreviations
February 28, 2020

ABBREVIATIONS

ABCA	Analysis of Brownfield Cleanup Alternatives
ARARs	Applicable or Relevant and Appropriate Requirements
CAMP	Community Air Monitoring Plan
HASP	Health and Safety Plan
MNA	Monitored Natural Attenuation
NYCRR	New York State Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OPC	Opinion of Probable Cost
RSCO	Remedial Site Cleanup Objective
SCGs	Site Standards, Criteria and Guidelines
SCL	Soil Cleanup Level
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SSDS	Sub-slab Depressurization System
SVOC	Semi-Volatile Organic Compound
TOGS	Technical & Operational Guidance Series
UST	Underground Storage Tank
VOC	Volatile Organic Compound

1.0 INTRODUCTION AND BACKGROUND

1.1 SITE DESCRIPTION AND HISTORY

The Site (New York State Department of Environmental Conservation Spill No. 1103833) is located at 121-123 Reynolds Street (Site) in the City of Rochester (City), Monroe County, New York (Monroe County Tax ID No. 120.52-3-18.001). A Site Location Map is included as Figure 1. The 121 Reynolds Street portion of the Site operated as a wagon repair shop from the early 1910s through the mid-1930s; a gasoline station and blacksmith shop from the mid-1930s through the late 1940s; a gasoline station from the late 1930s through the early 1950s and an auto repair shop from the early 1950s through the late 1980s. The 121 Reynolds Street portion became vacant in 1991. The 123 Reynolds Street portion of the Site was residential from the late 1880s through approximately 2010 and has been vacant land since that time.

The City acquired ownership through involuntary take due to tax delinquency in 2010. The Site is in a City zoning district for low-density residential use (R-1) and is classified by the NYS Department of Taxation and Finance as property class 311 – Vacant Residential Land. There are four parcels adjacent to the Site. Two of the parcels are occupied by single family residences, the other two parcels are vacant residential land.

The funds requested through this grant would help offset the costs for soil and groundwater remediation to facilitate revitalization of 121-123 Reynolds Street.

1.2 PROPOSED FUTURE USE OF SITE

The City has indicated that the redevelopment of this vacant Site is anticipated to be for residential use (specifically a single duplex home), consistent with the Voter's Block LLC In-fill Housing Initiative. Given the lack of use of the property for several years, the current land use will be unaffected by the recommended remedy.

1.3 PURPOSE AND CONTENT OF REPORT

This report presents an evaluation of alternatives for the remediation of the 121-123 Reynolds Street Site, as shown on Figure 1. The New York State Department of Environmental Conservation (NYSDEC) assigned Spill Number 1103833 to the Site. The project objective is to remediate the Site to the degree required to allow its redevelopment for residential use, as per 6NYCRR Part 375 and NYSDEC's Commissioner Policy 51 (CP-51).

On behalf of the City, Day Environmental, Inc. (Day) completed an Opinion of Probable Cost (OPC) for remediation of the 121-123 Reynolds Street Site. Stantec utilized this work and developed three remedial alternatives for consideration: 1) **Alternative A** is the no action alternative and includes monitored natural attenuation with an assumed duration of 30 years; 2) **Alternative B** includes the excavation and off-Site disposal of impacted materials from the two impacted areas, installation of remediation

**ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)
121-123 REYNOLDS STREET
ROCHESTER, NEW YORK
NYSDEC SPILL NO. 1103833**

Introduction and Background
February 28, 2020

infrastructure and one year of post-excavation groundwater monitoring with the potential for conducting a second year of monitoring contingent on the first year's results; and 3) **Alternative C** includes all the components of Alternative B, and direct application of an in-situ, bioremediation amendment to the open excavations of the petroleum source area and downgradient petroleum plume and one year of post-excavation groundwater monitoring, with the potential for conducting a second year of monitoring contingent on the first year's results. Based on the extent of the impacted areas, the contaminants of concerns, and the affected media, the recommended remedial approach is **Alternative C**.

The proposed remedial action includes the following:

- Excavation and off-Site disposal of shallow Lead and Semi-Volatile Organic Compound (SVOC) impacted soils (urban fill) in the northern portion of the Site;
- Excavation and off-Site disposal of Volatile Organic Compound (VOC) impacted soil and bedrock from the area in proximity to the location of former underground storage tanks (USTs);
- Excavation and off-Site disposal of soil and bedrock located within the downgradient petroleum impacted plume, located approximately 7.5 feet below ground surface (bgs). The overlying 7.5 feet of clean fill/soil would be used as backfill material;
- Confirmatory soil sampling of excavation areas to demonstrate sufficient removal of impacted materials;
- Installation of remediation infrastructure for possible future delivery of a bioremediation amendment within the petroleum source area and the downgradient plume area excavations for potential additional treatment of residual contamination;
- Application of an *in-situ*, bioremediation amendment to the open excavation of the petroleum source area and downgradient petroleum plume to promote enhanced natural attenuation of residual petroleum related VOC impacted groundwater;
- Conducting one year of post excavation groundwater monitoring for VOCs, with the potential for conducting a second year of monitoring contingent on the first year's results;
- Preparation of a site management plan (SMP) for future site use and re-development;
- Potential installation of a vapor sub-slab depressurization system (SSDS) for the future home; and
- Implementation of Institutional Controls incorporating the Site into the City of Rochester (City) BIS flagging system to ensure residual impacts are properly managed in the future, as necessary.

The analysis of remedial alternatives includes a summary of previous environmental investigations at the Site, an examination of potential exposure scenarios, applicable relevant and appropriate regulations (ARARs) that will be used as remedial Site cleanup objectives (RSCOs), a discussion of the evaluated remedial alternatives and a recommended remedial alternative.

Environmental Background
February 28, 2020

2.0 ENVIRONMENTAL BACKGROUND

Environmental studies that have been completed for the 121-123 Reynolds Street Site and/or the surrounding area and reviewed for preparation of this ABCA include:

- A December 21, 2011 Data Package, Environmental Assessment and Remediation Services, 121 and 123 Reynolds Street, Rochester, NY NYSDEC Spill # 1103833.
- An April 2015 Phase I Environmental Site Assessment (ESA) of the 121-123 Reynolds Street Site prepared by Day for the City.
- A January 2016 Phase II ESA of the 121-123 Reynolds Street Site prepared by Day for the City.
- An April 2016 OPC for Remediation of the 121-123 Reynolds Street Site prepared by Day for the City.
- A January 2017 Supplemental Phase II ESA of the 121-123 Reynolds Street Site prepared by Day for the City.

2.1 DECEMBER 2011 ENVIRONMENTAL ASSESSMENT AND REMEDIATION SERVICES 121 AND 123 REYNOLDS STREET

In June 2011, petroleum impacts were encountered while excavating the basement foundation of a new home at 125 Reynolds Street, which is the adjacent parcel immediately to the south of 123 Reynolds Street. As part of the City's effort to fulfill their obligations under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §107 – Liability, the City retained Day in June 2011 to investigate the source of petroleum impacts, evaluate the possible presence of abandoned underground storage tanks (USTs) on the Site, and perform remedial activities. Day subsequently performed a geophysical survey and the excavation of nine (9) test pits. As a result, 12 soil samples were collected and analyzed from the test pits, four (4) 1,000-gallon steel USTs were identified with two each in two separate tank pits. Three of the USTs which were found to contain fluids had their contents sampled and analyzed. The UST samples were found to contain petroleum related VOCs and SVOCS. The soils samples exhibited VOC and SVOC concentrations above NYSDEC Protection of Groundwater Soil Cleanup Objectives (SCOs), Residential Use SCOs, and Restricted Residential Use SCOs as well as CP-51 Soil Cleanup Levels (SCLs). Day subsequently provided engineering services for the removal of the four USTs, excavation and off-Site disposal of a limited amount of petroleum impacted soils from the UST excavations, collection and laboratory analysis of eight (8) post excavation soil samples, and excavation backfilling including Site restoration. Soil samples collected from each tank pit excavation indicated residual VOCs remaining above Protection of Groundwater SCOs and SCLs.

2.2 APRIL 2015 PHASE I ESA OF THE 121-123 REYNOLDS STREET SITE

In April 2015, Day performed a Phase I ESA of the 121-123 Reynolds Street Site in accordance with ASTM E1527-13. Funding from the United States Environmental Protection Agency (USEPA) was used

Environmental Background
February 28, 2020

in-part, to fund this effort under Cooperative Agreement BF97207800-0 (CBAP-20). The Phase I indicated that the 121 Reynolds Street portion of the Site operated as a wagon repair shop from the early 1910s through the mid-1930s; a gasoline station and blacksmith shop from the mid-1930s through the late 1940s; a gasoline station from the late 1930s through the early 1950s and an auto repair shop from the early 1950s through the late 1980s. The 121 Reynolds Street portion became vacant in 1991. The 123 Reynolds Street portion of the Site was residential from the late 1880s through approximately 2010 and has been vacant land since that time.

The Phase I ESA identified the Active NYSDEC Spill Incident (NYSDEC Spill No. 1103833), former leaking USTs and the presence of contaminants in urban fill on the Site as recognized environmental conditions on the Site. The Phase I indicates that the 121 Reynolds Street portion of the Site is identified as NYSDEC Petroleum Bulk Storage (PBS) Facility #8-601544. From the PBS Facility Information Report, four (4) USTs were shown to be removed from the Site in 2011. As noted in Section 2.1, four (4) USTs and a limited amount of impacted soil (125 tons) were removed from the Site in 2011.

2.3 JANUARY 2016 PHASE II ESA OF THE 121-123 REYNOLDS STREET SITE

The January 2016 Phase II ESA indicated petroleum-type contamination in nine (9) test borings and four (4) monitoring wells located in proximity to, and downgradient of the former USTs as shown on Figures 2 and 3. Soil samples from four (4) of nineteen (19) test locations exceeded applicable SCOs and SCLs for VOCs. Groundwater samples from each of the four (4) monitoring wells exceeded Technical & Operational Guidance Series (TOGS) 1.1.1 Standards and Guidance Values for VOCs. Except for one (1) test location (TB-12), borings near the perimeter of the Site did not contain VOCs above applicable SCOs and SCLs.

Two (2) samples of urban fill material contained elevated concentrations of the metal Lead in exceedance of applicable SCOs, but not in exceedance of characteristic hazardous waste toxicity regulatory levels. Elevated semi-volatile organic compounds (SVOCs) exceeding applicable SCOs and SCLs were detected in urban fill in one (1) test boring location. Urban fill was encountered in 12 of 20 Phase II ESA test borings from the ground surface to depths of up to approximately 6 feet bgs. The three samples containing concentrations of Lead or SVOCs exceeding SCOs and/or SCLs were located on the northern portion of the Site near the locations of the former gasoline station and auto repair facility.

Groundwater was found to generally flow south on the Site.

2.4 APRIL 2016 OPC FOR REMEDIATION OF THE 121-123 REYNOLDS STREET SITE

The April 2016 OPC for Remediation presented a remedial scenario which was similar to Remedial Alternative C. Overall, the OPC prepared by Day accounted for urban fill material excavation and off-Site disposal, petroleum source area and plume area saturated zone excavation, followed by installation of remediation infrastructure and direct application of an in-situ bioremediation amendment, the installation

Environmental Background
February 28, 2020

of an SSDS in a proposed residential home, preparation of a SMP, and post-remediation groundwater sampling and management activities.

2.5 JANUARY 2017 SUPPLEMENTAL PHASE II ESA OF THE 121-123 REYNOLDS STREET SITE

The January 2017 Supplemental Phase II ESA of the Site was performed to better define the extent of petroleum contamination in the overburden. This effort led to nine additional test borings of the overburden with VOC-analysis. Overall, this report confirmed the recommendations of the April 2016 OPC but did reduce the amount of petroleum-impacted material in both the source and the plume areas. Day reduced their estimate of petroleum-impacted soil in the source area from 228 tons to 190 tons and in the downgradient plume area from 160 tons to 118 tons.

Applicable Regulations and Cleanup Standards
February 28, 2020

3.0 APPLICABLE REGULATIONS AND CLEANUP STANDARDS

3.1 EXPOSURE PATHWAYS

Considering that remedial excavation and residential redevelopment activities are anticipated at the Site, and that residential buildings are located near the Site, the construction worker/trespasser, and local resident have been identified as the most appropriate potential human receptors.

Exposures to the construction worker may occur during remediation, construction and other activities that involve excavation at the Site or at its periphery.

Exposure to residents of nearby properties could potentially occur during excavation work at the Site through dispersion of particulates and volatilization of contaminants. Potential routes of exposure include:

- Inhalation of vapors released from volatile substances present in subsurface soils (potential future occupational worker and construction worker/trespasser, and local residents during construction);
- Ingestion and dermal contact of substances in subsurface soils (potential future occupational worker and construction worker/trespasser); and
- Ingestion, inhalation and dermal contact with substances present in groundwater (potential future occupational worker and construction worker/trespasser).

Potential exposure during the remedial work will be managed with a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) designed to protect Site workers and the public. A perimeter fence will be in place during remedial work to prevent the public from accessing the Site to mitigate that potential exposure pathway. Potential future exposures to residual contamination, if any, will be mitigated by way of institutional and engineering controls and a Site Management Plan (SMP).

3.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Title 6 NYCRR Part 375 Residential SCOs and NYSDEC's Commissioner Policy 51 (CP-51) Table 1 SCLs are the ARARs for soil cleanup. Contaminants of Concern (CoCs) at the Site are defined as the substances for which the concentrations in soil exceed the associated Residential SCOs or SCLs. Impacted soil or fill containing contaminants above SCOs or SCLs that are left in-place will be managed with a Site Management Plan (SMP) for potential future disturbances (e.g., utility repair work), and with environmental engineering and institutional controls (e.g., placement of a clean soil cover, installation of a sub-slab depressurization system in future buildings, and flagging the Site in the City's Building Information System).

Even though groundwater in the City cannot be used for potable purposes as per City code; per State regulations, Class GA drinking water-based standards are the applicable ARARs for groundwater. CoCs in groundwater were selected based on exceedances of 6 NYCRR Part 703 Class GA Groundwater Standards, and NYSDEC Technical and Operational Guidance Series 1.1.1: Ambient Water Quality

**ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)
121-123 REYNOLDS STREET
ROCHESTER, NEW YORK
NYSDEC SPILL NO. 1103833**

Applicable Regulations and Cleanup Standards
February 28, 2020

Standards and Guidance Values (GSGVs) and Groundwater Effluent Limitations dated June 1998, revised June 2004.

In the event that it is not feasible to achieve the applicable SCOs/SCLs for soil and/or the GSGVs for groundwater, site-specific cleanup levels will be established for the Site that, in conjunction with institutional and engineering controls, will attain conditions protective of public health and the environment for the intended and reasonably-anticipated use of the Site.

To protect occupants of future buildings, SSDSs will need to be installed, or post-remedial soil vapor sampling will be required to confirm that SSDSs are not necessary based on the Human Health Risk Assessment guidelines outlined in NYSDEC DER-10, the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York dated October 2006, and the May 2017 Updates to Soil Vapor/Indoor Air Decision Matrices.

3.3 CLEANUP OVERSIGHT RESPONSIBILITY

The NYSDEC will oversee the cleanup through the Petroleum Spill Cleanup Program via a Stipulation agreement executed with the City.

Brownfield Cleanup Alternatives for the Site
February 28, 2020

4.0 BROWNFIELD CLEANUP ALTERNATIVES FOR THE SITE

Three brownfield cleanup alternatives were chosen and evaluated for this analysis. The selected alternatives include:

- 1) No Action: Monitored Natural Attenuation (MNA).
- 2) Excavation of Impacted Soils and Weathered Bedrock.
- 3) Excavation of Impacted Soils and Weathered Bedrock with Enhanced MNA.

4.1 ALTERNATIVE A: NO ACTION/MONITORED NATURAL ATTENUATION (MNA)

The No Action alternative does not involve proactive remedial measures but instead relies on periodically monitoring the groundwater contamination to verify that natural attenuation is continuing to occur. For calculating an opinion of probable cost, it was assumed that groundwater would be sampled quarterly from five (5) wells, with associated laboratory analysis and reporting, over the course of thirty (30) years.

4.2 ALTERNATIVE B: EXCAVATION OF IMPACTED SOILS AND WEATHERED BEDROCK

This alternative includes the excavation and off-Site disposal of soil from the northern portion of the Site impacted by Lead and SVOCs, and petroleum-impacted soil and weathered bedrock from the source area in the northeast portion of the Site, as shown on Figures 4 and 5. Impacted soil and bedrock in the downgradient plume area located on the southeast portion of the Site would also be excavated and disposed of off-Site. The contractor on-Site will need to dewater both the source area and the downgradient plume area excavations once bedrock is encountered as the Phase II indicated the top of the groundwater table was situated in proximity to the overburden-bedrock interface. Impacted soil in the plume area is covered by approximately 7.5 feet of clean soil/fill material. Based on the depth to bedrock (approximately 9.5 ft bgs), trench boxes would be utilized during excavation along the northern and eastern sidewalls (adjacent to sidewalks) This would eliminate the need for benching those sidewalls to reduce the potential for sidewall collapse and would maximize the amount of impacted that can be removed. The use of trench boxes will result in excavating in smaller “cells”. Overlying non-impacted soil/fill material would be removed, stockpiled onsite, and re-used as backfill following the excavation of impacted soils. Prior to the placement of backfill, remediation infrastructure would be installed for potential future groundwater treatment. One year of quarterly post-excavation groundwater monitoring would be conducted to evaluate the effectiveness of the removal program in addressing groundwater impacts, with the potential for conducting a second year of semi-annual monitoring contingent on the first year’s results.

Brownfield Cleanup Alternatives for the Site
February 28, 2020

4.3 ALTERNATIVE C: EXCAVATION OF IMPACTED SOILS AND WEATHERED BEDROCK W/ ENHANCED MNA

This alternative includes the components of Alternative B, plus the direct application of a bioremediation amendment to the open excavations to create aerobic conditions and accelerate VOC biodegradation in groundwater. This amendment material would be applied to the open excavations located at:

- 1) The source area for petroleum impacts located in the northeast portion of the Site; and
- 2) The downgradient petroleum impacted plume.

Groundwater samples from monitoring wells in these locations indicated VOC impacts. One year of quarterly post-excavation groundwater monitoring would be conducted to evaluate the effectiveness of the removal program and the addition of the bioremediation amendment in addressing groundwater impacts, with the potential for conducting a second year of semi-annual monitoring contingent on the first year's results.

5.0 EVALUATION OF CLEANUP ALTERNATIVES

Potential cleanup alternatives were evaluated based on the following criteria: effectiveness, implementation feasibility, preliminary opinions of probable cost, general reasonableness, and the potential for extreme weather events to adversely impact proposed cleanup remedies.

5.1 ALTERNATIVE A: NO ACTION/MONITORED NATURAL ATTENUATION (MNA)

Effectiveness - The No Action Alternative is not effective because it does nothing to address the toxicity, mobility, or volume of contamination on the Site. It also is harmful to the overall mission to redevelop this Site for residential purposes and to further the Voter's Block in-fill housing initiative.

Implementation Feasibility - This alternative is easily implemented.

Preliminary Opinion of Probable Cost - The preliminary opinion of probable cost for this alternative is approximately \$168,909 (refer to Table 1).

General Reasonableness - This alternative provides no long-term management of the Site's impacted soil and groundwater and effectively prohibits Site development. As a result, this is not a reasonable cleanup option.

Potential Adverse Impacts Caused by Extreme Weather Events - The Site is not located in a flood plain, near a coast line, or in an area with a potential increase of drought. The City completed a Climate Action Plan in 2017 which identified increased temperatures and precipitation as potential climate change impacts to the City. Neither one of these conditions are believed to impact this alternative.

5.2 ALTERNATIVE B: EXCAVATION OF IMPACTED SOILS AND WEATHERED BEDROCK

Effectiveness - This alternative is an effective way to limit exposure and manage impacted soils and weathered bedrock at the Site. This alternative effectively manages impacted soils and weathered bedrock that require removal from the Site while retaining those soils that meet the criteria for reuse on-Site. However, this alternative does not specifically address VOC-impacted groundwater at the Site which is in exceedance of applicable groundwater standards.

Implementation Feasibility - This alternative is easily implemented.

Preliminary Opinion of Probable Cost - The preliminary opinion of probable cost for this alternative was approximately \$232,937; however, based on adjustments made to the proposed construction methodologies this cost has been reviewed upward to \$327,152, excluding contingency (refer to Table 1).

General Reasonableness - This alternative does address impacted soil and weathered bedrock concerns at the Site which would allow for the redevelopment of the Site for residential purposes. However, this

Evaluation of Cleanup Alternatives
February 28, 2020

alternative does not specifically address VOC-impacted groundwater which is in exceedance of applicable groundwater standards and could lead to soil vapor intrusion concerns in future structures on-Site. This alternative would allow for the installation of in-situ remediation infrastructure which would allow for future remediation if groundwater monitoring proves further efforts to remediate the Site are needed.

Potential Adverse Impacts Caused by Extreme Weather Events - The Site is not located in a flood plain, near a coast line, or in an area with a potential increase of drought. The City completed a Climate Action Plan in 2017 which identified increased temperatures and precipitation as potential climate change impacts to the City. Neither one of these conditions are believed to impact this alternative.

5.3 ALTERNATIVE C: EXCAVATION OF IMPACTED SOILS AND WEATHERED BEDROCK W/ ENHANCED MNA

Effectiveness - This alternative is an effective way to limit exposure and manage impacted soils and weathered bedrock at the Site. This alternative effectively manages impacted soils that require removal from the Site while retaining those soils that meet the criteria for reuse on-Site. This alternative also addresses VOC-impacted groundwater at the Site which is in exceedance of applicable groundwater standards.

Implementation Feasibility - This alternative is easily implemented.

Preliminary Opinion of Probable Cost - The preliminary opinion of probable cost for this alternative was approximately \$245,853; however, based on adjustments made to the proposed construction methodologies this cost has been reviewed upward to \$343,902, excluding contingency (refer to Table 1).

General Reasonableness - This alternative does address impacted soil and weathered bedrock concerns at the Site which would allow for the redevelopment of the Site for residential purposes. This alternative also addresses VOC-impacted groundwater which is in exceedance of applicable groundwater standards. In addition, this alternative allows for the installation of in-situ remediation infrastructure which would allow for future remediation if groundwater monitoring proves further efforts to remediate the Site are needed.

Potential Adverse Impacts Caused by Extreme Weather Events - The Site is not located in a flood plain, near a coast line, or in an area with a potential increase of drought. The City completed a Climate Action Plan in 2017 which identified increased temperatures and precipitation as potential climate change impacts to the City. Neither one of these conditions are believed to impact this alternative.

Recommended Cleanup Alternative
February 28, 2020

6.0 RECOMMENDED CLEANUP ALTERNATIVE

The recommended cleanup alternative for the Site is Alternative C – Excavation of impacted soils and weathered bedrock with enhanced MNA. While this is the most expensive option, it effectively addresses both impacted soil and groundwater at the Site. This option also enables the City to effectively proceed with its in-fill housing redevelopment initiative.

References

February 28, 2020

7.0 REFERENCES

- 1) City of Rochester, May 2017, Climate Action Plan,
<http://www.cityofrochester.gov/climateactionplan/>
- 2) Day Environmental, Inc, December 2011, Environmental Assessment, and Remediation Services, 121-123 Reynolds Street Rochester, New York.
- 3) Day Environmental, Inc, April 2015, Phase I Environmental Site Assessment, 121-123 Reynolds Street Rochester, New York.
- 4) Day Environmental, Inc, January 2016, Phase II Environmental Site Assessment Report, 121-123 Reynolds Street Rochester, New York.
- 5) Day Environmental, Inc, April 2016, Opinion of Probable Cost (OPC) for Remediation, NYSDEC Spill #1103833, 121-123 Reynolds Street Rochester, New York.
- 6) Day Environmental, Inc, January 2017, Supplemental Phase II Environmental Site Assessment Report, 121-123 Reynolds Street Rochester, New York, NYSDEC Spill #1103833.

APPENDIX A: TABLE

TABLE 1 – UPDATED OPINION OF PROBABLE COSTS FOR REMEDIATION

Alternative	Associated Tasks	Est. Cost/Task	Total Cost
A	Quarterly groundwater monitoring for 30 years (includes 5 wells with laboratory analysis for VOCs) <i>*Note: Computed as net present value over 30 years using a 6% discount rate.</i>	\$153,554	\$168,909
	Subtotal	\$153,554	
	10% Contingency	\$15,355	
B ¹	Site Preparation	\$30,526	\$359,867
	Fill Material Excavation, Transportation, Disposal and Backfilling	\$75,525	
	Petroleum <u>Source</u> Area and Unsaturated Zone Excavation, Transportation, Disposal and Backfilling (incl. dewatering and remediation infrastructure)	\$87,177	
	Petroleum <u>Plume</u> Area and Unsaturated Zone Excavation, Transportation, Disposal and Backfilling (incl. dewatering and remediation infrastructure)	\$84,570	
	Site Restoration	\$12,681	
	Post-Remediation Tasks (6 rounds of groundwater monitoring, residential SSDS installation, and SMP preparation.	\$27,274	
	Reporting	\$9,400	
	Subtotal	\$327,152	
	10% Contingency	\$32,715	
C ¹	Site Preparation	\$30,526	\$378,292
	Fill Material Excavation, Transportation, Disposal and Backfilling	\$75,525	
	Petroleum <u>Source</u> Area and Unsaturated Zone Excavation, Transportation, Disposal and Backfilling (incl. dewatering, remediation infrastructure and bioremediation amendment)	\$93,889	
	Petroleum <u>Plume</u> Area and Unsaturated Zone Excavation, Transportation, Disposal and Backfilling (incl. dewatering, remediation infrastructure and bioremediation amendment)	\$94,609	
	Site Restoration	\$12,681	
	Post-Remediation Tasks (6 rounds of groundwater monitoring, residential SSDS installation, and SMP preparation.	\$27,274	
	Reporting	\$9,400	
	Subtotal	\$343,902	
	10% Contingency	\$34,390	

(see note next page)

**ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)
121-123 REYNOLDS STREET
ROCHESTER, NEW YORK
NYSDEC SPILL NO. 1103833**

Note:

1) Costs originally obtained from April 2016 Day Environmental, Inc. Opinion of Probable Cost (OPC) for Remediation, NYSDEC Spill No. 1103833, 121-123 Reynolds Street, Rochester, New York were modified based on the January 2017 Day Environmental, Inc. Supplemental Phase II Report for the Site.

ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)
121-123 REYNOLDS STREET
ROCHESTER, NEW YORK
NYSDEC SPILL NO. 1103833

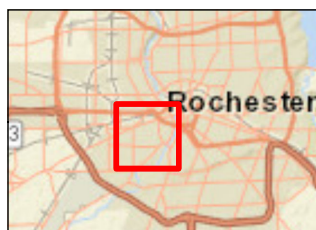
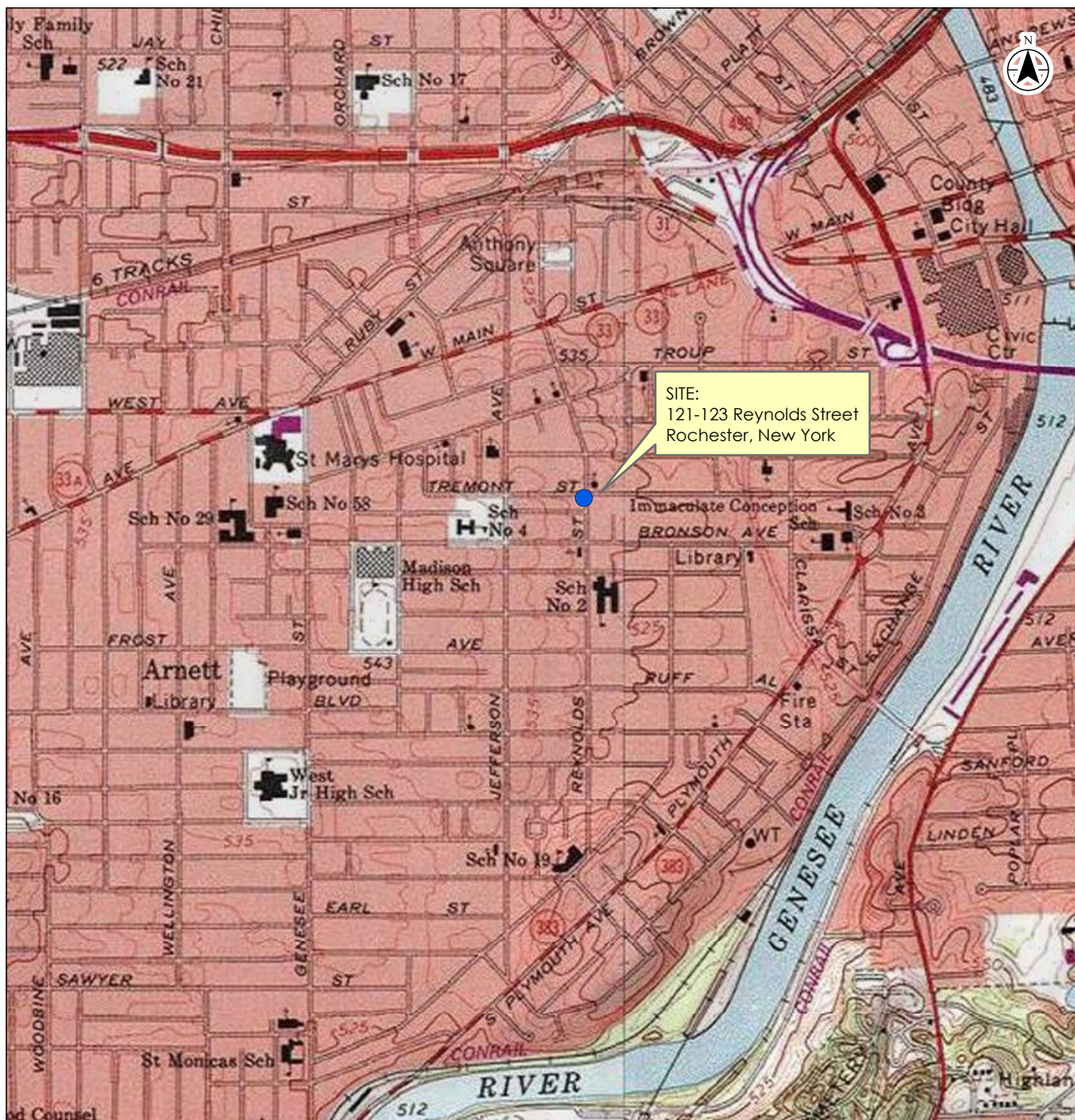
APPENDIX B: FIGURES



ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)
121-123 REYNOLDS STREET
ROCHESTER, NEW YORK
NYSDEC SPILL NO. 1103833

FIGURE 1 – SITE LOCATION MAP





Legend:

- Site Location



Project Location: 121-123 Reynolds Street
Rochester, New York
Site Location Map: REVA
Prepared by: AJK on 2017-10-12
Technical Review by: KI on 2017-10-13
Independent Review by: MFS on 2017-10-13

Client/Project:
City of Rochester
Analysis of Brownfield Cleanup Alternatives
Brownfield Cleanup Grant Application

Figure No.
1

Site Location Map

Notes
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
3. Topo Imagery provided by ESRI Online Services and USGS 7.5 Minute Quad of Rochester West, NY, dated 1995.
4. Key Map Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community
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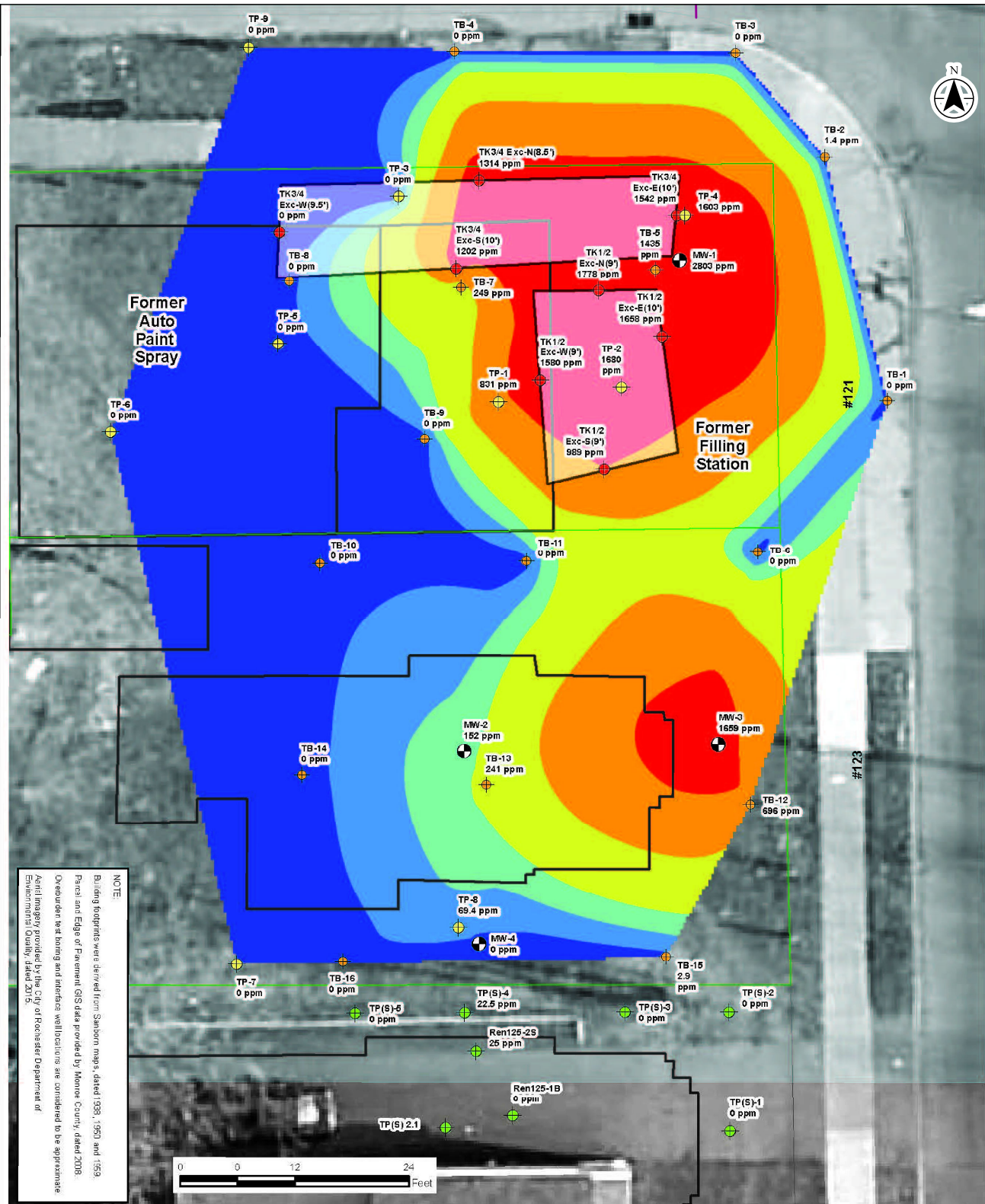
ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)
121-123 REYNOLDS STREET
ROCHESTER, NEW YORK
NYSDEC SPILL NO. 1103833

**FIGURE 2 – SITE PLAN WITH INTERPOLATED PEAK PID READINGS ON-SITE
AND IN PUBLIC RIGHT-OF-WAY**

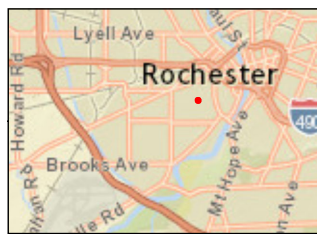


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NOTE:
Building footprints were derived from Sanborn maps, dated 1938, 1950 and 1959. Parcel and Edge of Pavement GIS data provided by Monroe County, dated 2008. Overburden test boring and interface well locations are considered to be approximate. Aerial imagery provided by the City of Rochester Department of Environmental Quality, dated 2015.



Notes
1. Source: Map references Day Environmental Consultants 01-06-2016 Figure 3 of Phase II Environmental Site Assessment

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Legend

- Seeler test pit samples collected June 2011
- Test pit samples collected September 2, 2011
- Test pit samples collected July 7, 2011
- Overburden test boring collected Sept 24, 2015
- Revised proposed interface well
- Excavation area conducted September 2, 2011
- Approximate Parcel Boundary
- Approximate former building footprint based on 1938 and 1950 Sanborn maps.

Peak PID in parts per million (ppm)

- 0 - 25
- 25 - 100
- 100 - 200
- 200 - 500
- 500 - 1000
- 1000 - 3000



Project Location
121-123 Reynolds Street
Rochester, New York

Prepared by AJK on 2017-10-17
Technical Review by KI on 2017-10-17
Independent Review by MPS on 2017-10-17

Client/Project
City of Rochester
Analysis of Brownfield Cleanup Alternatives
Brownfield Cleanup Grant Application

Figure No.

2

Title

Site Plan with Interpolated Peak PID Readings On-Site and Public Right-of-Way

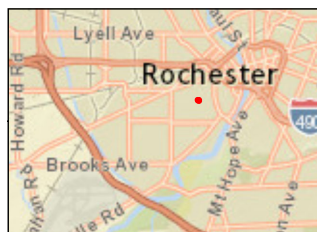
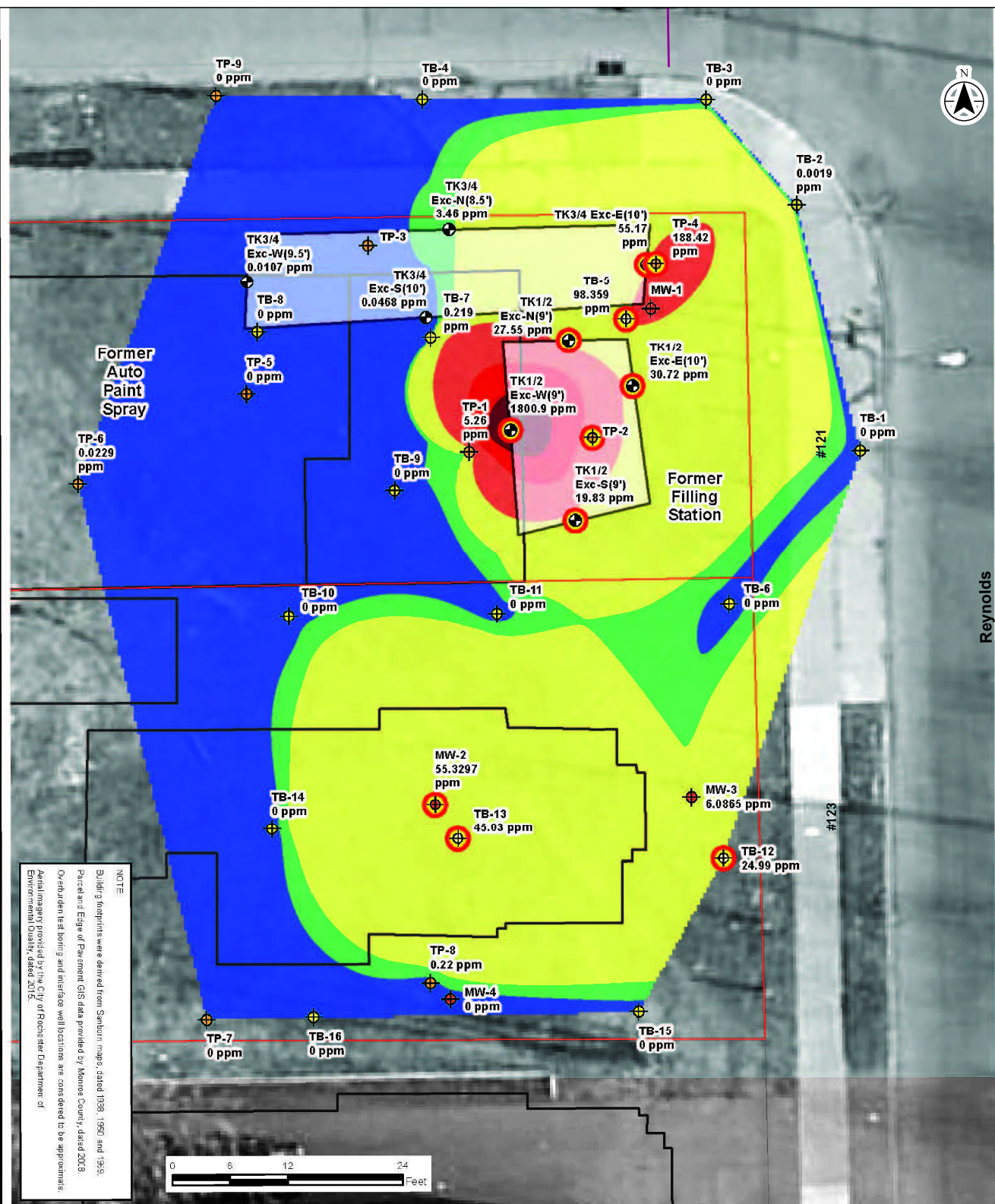
ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)
121-123 REYNOLDS STREET
ROCHESTER, NEW YORK
NYSDEC SPILL NO. 1103833

**FIGURE 3 – SITE PLAN WITH INTERPOLATED TOTAL VOCs MEASURED IN SOIL
SAMPLES**



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1. Source: Map references Day Environmental Consultants 01-11-2016 Figure 4 of Phase II Environmental Site Assessment

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Project Location
121-123 Reynolds Street
Rochester, New York

Prepared by AJK on 2017-10-17
Technical Review by KI on 2017-10-17
Independent Review by MPS on 2017-10-17

Client/Project
City of Rochester
Analysis of Brownfield Cleanup Alternatives
Brownfield Cleanup Grant Application

Figure No.

3

Title

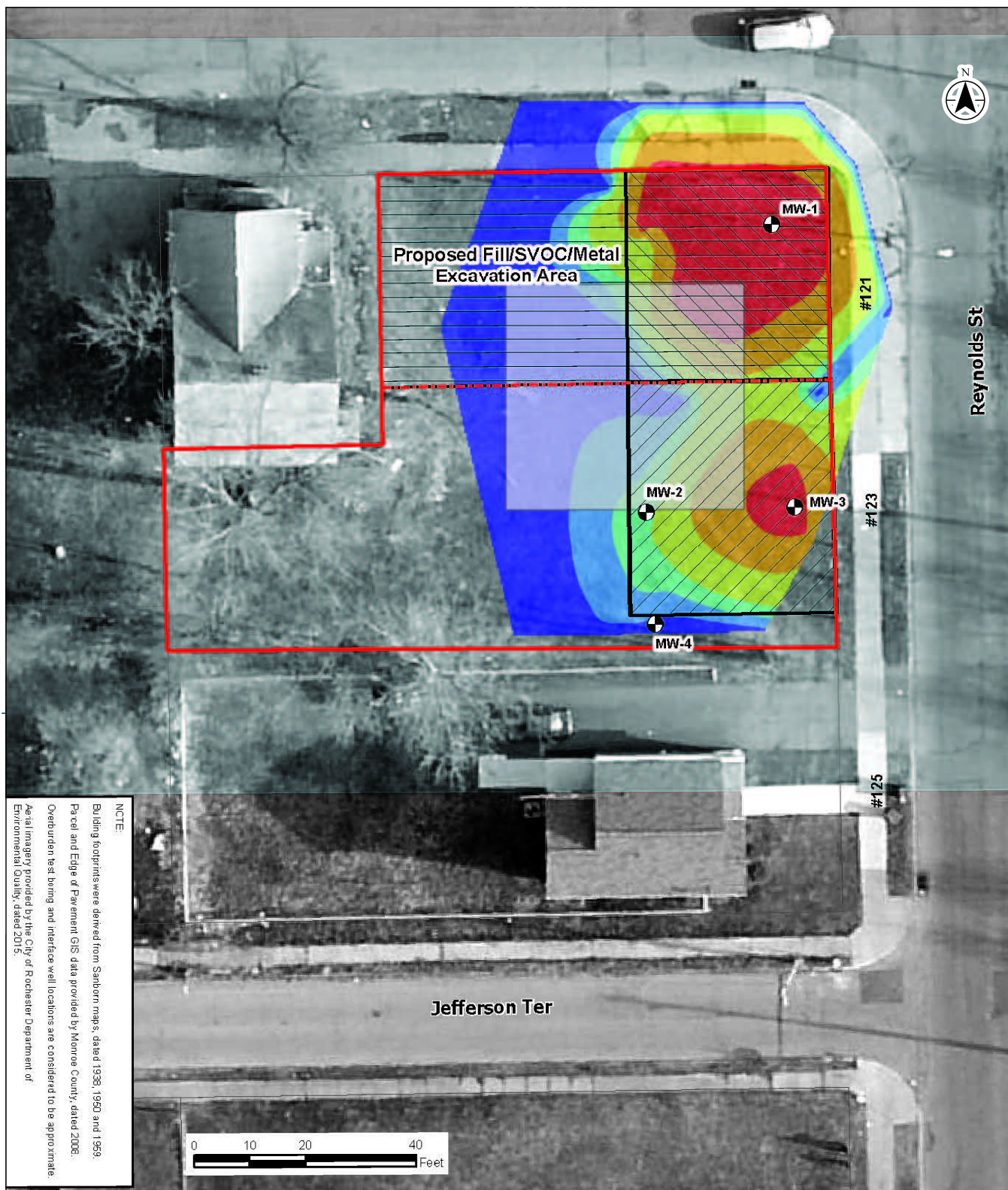
Site Plan with Interpolated Total VOCs Measured in Soil Samples

ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)
121-123 REYNOLDS STREET
ROCHESTER, NEW YORK
NYSDEC SPILL NO. 1103833

**FIGURE 4 – SITE PLAN WITH INTERPOLATED PEAK PID READINGS AND
REMEDIAL COMPONENTS**



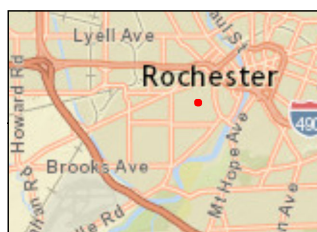
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NOTE:

Building footprints were derived from Sanborn maps, dated 1938, 1950, and 1959. Parcel and Edge of Pavement GIS data provided by Monroe County, dated 2006. Overburden test boring and interface well locations are considered to be approximate. Aerial imagery provided by the City of Rochester Department of Environmental Quality, dated 2015.



Notes
1. Source: Map references Day Environmental Consultants 03-03-2016 Figure 1 of Opinion of Probable Cost for Remediation

Legend

- Revised proposed interface well
- Approximate Parcel Boundary
- Proposed petroleum plume excavation
- Proposed Fill/SVOC/Metal excavation area
- Proposed petroleum source excavation
- Proposed construction area
- Approximate lot separation

Peak PID in parts per million (ppm)	
	0 - 2
	2 - 5
	5 - 100
	100 - 500
	500 - 1000
	1000 - 2000



Project Location
121-123 Reynolds Street
Rochester, New York
Prepared by AJK on 2017-10-17
Technical Review by KI on 2017-10-17
Independent Review by MPS on 2017-10-17

Client/Project
City of Rochester
Analysis of Brownfield Cleanup Alternatives
Brownfield Cleanup Grant Application

Figure No.

4

Title

Site Plan with Interpolated Peak PID Readings and Remedial Components

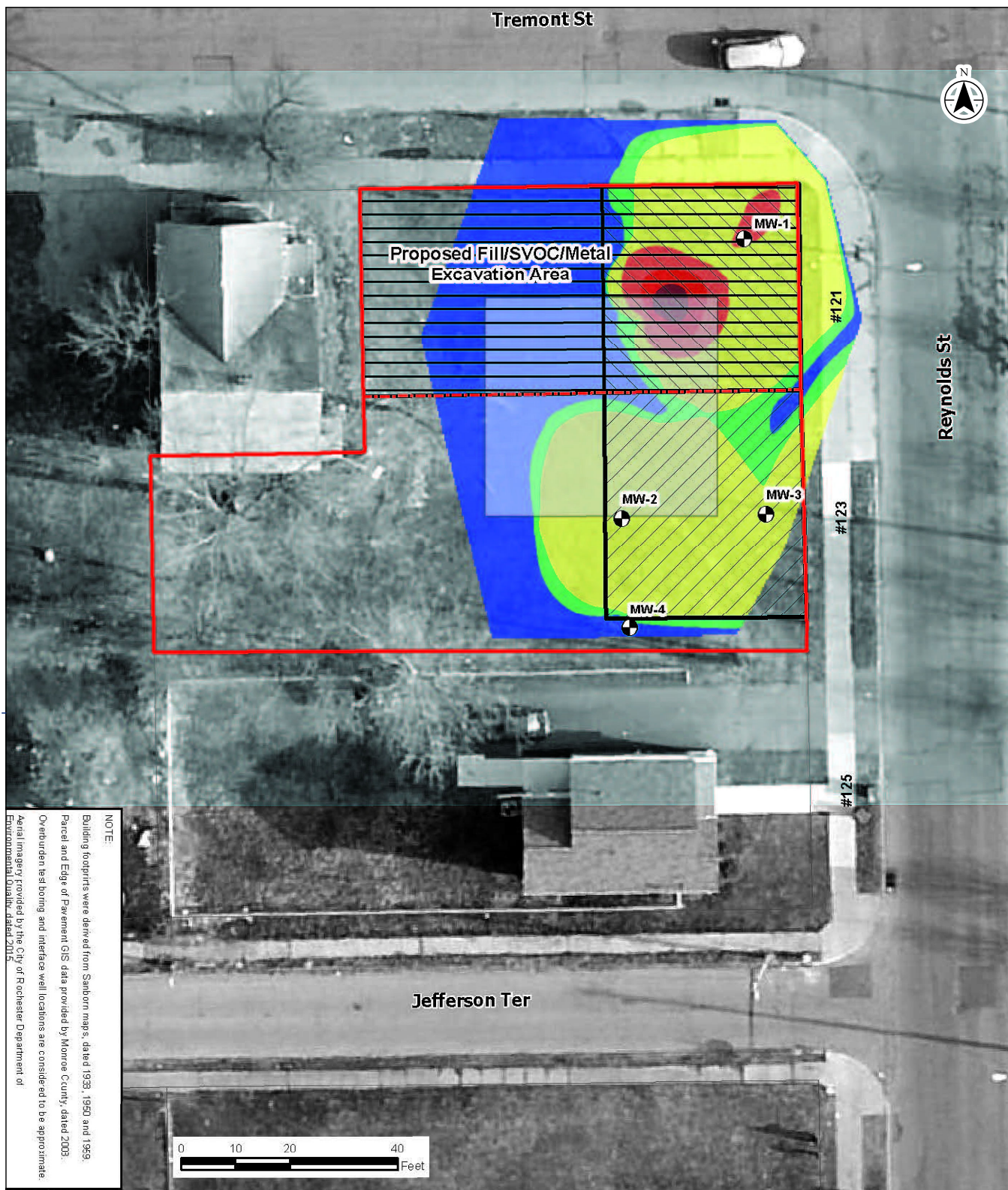
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ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)
121-123 REYNOLDS STREET
ROCHESTER, NEW YORK
NYSDEC SPILL NO. 1103833

**FIGURE 5 - SITE PLAN WITH INTERPOLATED TOTAL VOCS DETECTED IN
ANALYTICAL LABORATORY SOIL SAMPLES AND REMEDIAL COMPONENTS**



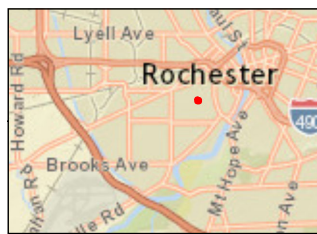
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NOTE:

Building footprints were derived from Sanborn maps, dated 1939, 1950 and 1959. Parcel and Edge of Pavement GIS data provided by Monroe County, dated 2003. Overburden test boring and interface well locations are considered to be approximate. Aerial imagery provided by the City of Rochester Department of Environmental Quality, dated 2015.



Legend

- Revised proposed interface well
- Approximate Parcel Boundary
- Proposed petroleum plume excavation
- Proposed Fill/SVOC/Metal excavation area
- Proposed petroleum source excavation
- Proposed construction area
- Approximate lot separation

VOCs in Soil Measured in parts per million (ppm)

- 0 - 2
- 2 - 5
- 5 - 100
- 100 - 500
- 500 - 1000
- 1000 - 2000



Project Location
121-123 Reynolds Street
Rochester, New York

Prepared by AJK on 2017-10-17
Technical Review by KI on 2017-10-17
Independent Review by MPS on 2017-10-17

Client/Project
City of Rochester
Analysis of Brownfield Cleanup Alternatives
Brownfield Cleanup Grant Application

Figure No.

5

Title
Site Plan with Interpolated Total VOCs Detected in Analytical Laboratory Samples and Remedial Components

Notes
1. Source: Map references Day Environmental Consultants 01-04-2016 Figure 2 of Opinion of Probable Cost for Remediation

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