CITY OF WINNIPEG

REMEDIAL PLAN

145 OSBORNE STREET, WINNIPEG, MANITOBA

NOVEMBER 15, 2023

FINAL

REMEDIAL PLAN

145 OSBORNE STREET, WINNIPEG, MANITOBA

CITY OF WINNIPEG

FINAL

PROJECT NO.: CA0003621.4465
CLIENT REF: 2022-086 (PO 681182):
DATE: NOVEMBER 15, 2023

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November 15, 2023

Environmental Compliance and Enforcement
Manitoba Environment and Climate Change
Box 36, 14 Fultz Boulevard
Winnipeg, MB R3Y 0L6

Attention: Mr. Warren Rospad

Dear Sir:

Subject: **Remedial Plan - 145 Osborne Street, Winnipeg, Manitoba**
Client ref.: 2022-086 (PO 681182)

WSP Canada Inc. (WSP) was retained by the City of Winnipeg to provide a Remedial Plan (RP) for the property with the civic address 145 Osborne Street, Winnipeg, Manitoba, herein referred to as the "Site" as shown in Figure 1 (Appendix A).

The RP is prepared as required by Manitoba Environment and Climate Change (MECC) according to Section 14.1(1) of *The Contaminated Sites Remediation Act* (C.C.S.M., c. C205). The objective of the RP is to manage soil impacts and other potential environmental concerns identified through previous environmental investigations to be present on-site.

Please accept the submission of the following report:

- Remedial Plan – 145 Osborne Street, Winnipeg, Manitoba.

If you have any questions or concerns please contact the undersigned at your convenience at (204) 259-1679 or Alfred.chan@wsp.com.

Yours sincerely,

Alfred Chan, P.Geo., PMP
Senior Project Scientist

Patrick Legg, P. Biol., P.Ag.
Senior Technical Reviewer

AC/pl
Encl. Remedial Plan - 145 Osborne Street, Winnipeg, Manitoba
cc: Victorino Mendoza (City of Winnipeg), Michelle Robertson (City of Winnipeg), Gordon Chappell (City of Winnipeg)
WSP ref.: CA0003621.4465

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REVISION HISTORY

FIRST ISSUE

November 7, 2023	Senior Review Completed			
Prepared by	Reviewed by	Approved By		
Alfred Chan	Patrick Legg	Patrick Legg		
REVISION 1				
November 10, 2023	Revised Section 4.1, 4.1.1, 4.1.2. with regards to excavation limits and protection of adjacent infrastructure.			
Prepared by	Reviewed by	Approved By		
Alfred Chan	Patrick Legg	Patrick Legg		
REVISION 2				
November 15, 2023	No further comments.			
Prepared by	Reviewed by	Approved By		
Alfred Chan	Patrick Legg	Patrick Legg		

SIGNATURES

PREPARED BY

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Senior Project Scientist
Earth and Environment

November 15, 2023
Date

APPROVED[1] BY

Patrick Legg, P.Biol., P.Ag.
Senior Environmental Scientist
Earth and Environment

November 15, 2023
Date

[1] Approval of this document is an administrative function indicating readiness for release and does not impart legal liability on to the Approver for any technical content contained herein. Technical accuracy and fit-for-purpose of this content is obtained through the review process. The Approver shall ensure the applicable review process has occurred prior to signing the document.

CONTRIBUTORS

CLIENT

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Real Estate Officer 3 Real Estate and Land Development Planning, Property and Development City of Winnipeg	Michelle Robertson
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WSP

Remedial Plan Author	Alfred Chan
Senior Technical Reviewer	Patrick Legg

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1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by The City of Winnipeg (Client) to prepare a Remedial Plan (RP) based on findings from a Phase II Environmental Site Assessment (ESA) conducted by another consultant and a Supplemental Phase II ESA previously completed by WSP on a property with the civic address 145 Osborne Street, Winnipeg, Manitoba ("Site") bounded by Osborne Street to the east and Stradbrook Avenue to the south (Figure 1, Appendix A). The Site is currently an asphalt-paved parking lot owned and managed by the City of Winnipeg and is proposed for future mixed-use residential and commercial redevelopment.

Redevelopment of the Site would consist of a mid-rise building with underground basement parking, commercial/retail on main levels and residential use above. The building foundations are anticipated to be concrete slab flooring supported by concrete piles.

The purpose of the RP is to outline risk mitigation measures for managing soil and groundwater impacts identified at the Site. The rationale and methodology for each mitigation approach is further elaborated upon in Section 4 below. All figures not included in the body of the report text are provided in Appendix A and Standard Limitations for the Remedial Plan is provided in Appendix B.

1.1 RESULTS OF PREVIOUS ENVIRONMENTAL WORK COMPLETED ON SITE

Eng-Tech Consulting Limited (Eng-Tech). 2022. *Phase II Environmental Site Assessment, 145 Osborne Street, Winnipeg, Manitoba.*

Based on WSP's review of a Phase II ESA report authored by Eng-Tech in May 2022 and entitled "*Phase II Environmental Site Assessment, 145 Osborne Street, Winnipeg, Manitoba*", it is understood that soil samples collected from all three boreholes (TH01, TH02, TH03) advanced during the Phase II ESA drilling program in April 2022 reported concentrations of benzene, petroleum hydrocarbon (PHC) fractions 1 and 2 (F1 & F2) exceeding applicable soil guidelines. Additionally, groundwater samples collected from a monitoring well installed in one of the three boreholes reported concentrations of PHC F1 and F2 in exceedance of Alberta Tier 1 guidelines.

The Eng-Tech (2022) report mentioned that a Phase I ESA was previously completed at the Site, which had identified the location of three former underground storage tanks (UST) and a garage on-site as an Area of Potential Environmental Concern (APEC). WSP also reviewed a Western Canada Underwriters' Association Insurance Plan of the City of Winnipeg from November 1957 and map sheet number 415 showed the Site listed as a garage with three USTs formerly on-site. The findings from the Phase II ESA by Eng-Tech (2022) confirmed the presence of gasoline fuel related contaminant parameters present on-site in exceedance of applicable guidelines, likely as a result of historic fuel storage operations on-site.

WSP. 2023. *Supplemental Phase II Environmental Site Assessment, 145 Osborne Street, Winnipeg, Manitoba.*

WSP was retained by the City of Winnipeg to follow up on the Phase II ESA with a Supplemental Phase II ESA to delineate the areal and vertical extent of contaminant parameters exceeding applicable guidelines so that soil and groundwater impact plumes existing on-site could be inferred, and the quantity of impacted soil and groundwater present on-site could be estimated in support of site remediation options.

A total of seven boreholes (MW01, MW01A, BH02, BH02A, BH03, MW04, MW05) were advanced around the previous Phase II ESA boreholes (TH01, TH02, and TH03) with exceedances, with three of the boreholes completed into monitoring wells.

By comparing field observations and soil analytical concentrations of contaminants, borehole TH01 advanced in the previous Phase II ESA has the highest concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX), PHC F1 and F2 in soil and would likely be closest to the contaminant source zone. The footprint of the former UST nest based on a review of the 1957 insurance plan is identified as a probable contaminant source zone. Soil and groundwater PHC impacts appear to be localized to the central and southeastern portion of the Site. Soil

exceedances of benzene, toluene, xylenes, PHC F1 to F2 is estimated to extend from the ground surface to 3.4 metres below ground surface (mbgs) at the contaminant source zone (location of TH01).

As impacted borehole MW01 with soil exceedances is located approximately 8 m from the east Site boundary and impacted borehole BH03 with soil exceedances is located approximately 5 m from the south Site boundary, it is unknown whether off-site migration of contaminants have occurred. Based on the inferred area of the soil PHC impact plume on-site the area of the lateral extent is estimated to be 190 m^2 (Figure 2, Appendix A), with the total volume of impacted soil present on-site estimated to be approximately 646 m^3.

Exceedances of benzene, PHC F2 to F4 in shallow groundwater on-site was delineated to be localized to the contaminant source zone (location of TH01), with the groundwater PHC impact plume extending towards the east, where more permeable silty sand fill material was encountered surficially at the location of MW01. The extent of the groundwater PHC impact plume is estimated to measure approximately 100 m^2 laterally. Due to the shallow groundwater table observed on-site at monitoring well MW01 and the estimated extent of the groundwater PHC impact plume within the same area as the soil PHC impact plume, it is anticipated that seepage encountered during excavations on-site will likely be impacted.

2 SITE CONDITION CRITERIA

2.1 SOIL QUALITY GUIDELINES

The criteria selected for the evaluation of PHC concentrations in soil on-site are based on the following risk-based governing pathway justification (Table 1). A detailed exposure pathway and receptor assessment is presented in the Supplemental Phase II ESA. The Canadian Council of Ministers of Environment (CCME) Canadian Soil Quality Guidelines (CSQG), the CCME Canada-wide Standard for Petroleum Hydrocarbons (PHC CWS) and the Ontario Minister of Environment, Conservation and Parks (OMECP) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act soil components for Table 3 – Full depth, non-potable water scenario in medium-fine textured soil were considered and selectively applied for use as property specific standards.

Table 1 Risk Based Exposure Pathways and Receptors - Soil

SITE CONDITION	JUSTIFICATION	
Land Use	Proposed mixed Residential and Commercial; commercial guidelines applied.	
Soil Attributes	Texture: Fine grained, confirmed through site investigation for both surface soil (0 to 1.5 mbgs) and subsoil (below 1.5 mbgs)	
Governing Pathways and Receptors: Soil	Indoor Air Check (Human Health in a Commercial Setting)	
	Eco Soil Contact	
	Management Limit	
Applied Soil Criteria	Benzene	Surface Soil: 2.8 mg/kg, Subsoil: 2.9 mg/kg
	Toluene	Surface Soil: 330 mg/kg, Subsoil: 660 mg/kg
	Ethylbenzene	Surface Soil: 430 mg/kg, Subsoil: 860 mg/kg
	Xylenes	Surface Soil: 230 mg/kg, Subsoil: 460 mg/kg
	PHC F1	Surface Soil: 320 mg/kg, Subsoil: 800 mg/kg
	PHC F2	Surface Soil: 260 mg/kg, Subsoil: 1,000 mg/kg
	PHC F3	Surface Soil: 2,500 mg/kg, Subsoil: 5,000 mg/kg
	PHC F4	Surface Soil: 6,600 mg/kg, Subsoil: 10,000 mg/kg

2.2 GROUNDWATER QUALITY GUIDELINES

The criteria selected for evaluation of PHC in groundwater are based on Alberta Environment and Parks (2023) Table B-4 Groundwater Remediation Guideline Values for Commercial/Industrial – All water Uses and supplemented with the OMECP SCS SGWS for use under Part XV.1 of the Environmental Protection Act (2011). As the Site and surrounding properties are supplied potable water by the City of Winnipeg and does not rely on groundwater from production wells for potable use, the protection of potable water pathway is excluded. As there are no significant surface water bodies within 500 m of the Site, the protection of freshwater aquatic life pathway is also excluded.

Table 2 below outlines the governing pathways and receptors which determines the applied criteria for the Site. As there are no guidelines for PHC F3 to F4, the Ontario groundwater background is applied as a reference, but may be

overly conservative as a remediation target. *The presence of non-aqueous phase liquid (NAPL) in groundwater should be verified for groundwater samples with concentrations exceeding the PHC F3 and F4 criteria.

Table 2 Risk Based Exposure Pathways and Receptors - Groundwater

SITE CONDITION	JUSTIFICATION	
Land Use	Proposed mixed Residential and Commercial; commercial guidelines applied	
Soil Attributes	Texture: Fine grained, confirmed through site investigation Surface soil depth: 0 to 1.5 m below grade (mbg) Subsoil depth: Below 1.5 mbg	
Governing Pathways and Receptors: Groundwater	Inhalation (Human Health in a Commercial Setting)	
	Eco Soil Contact	
Applied Groundwater Criteria	Benzene	0.37 mg/L
	Toluene	240 mg/L
	Ethylbenzene	150 mg/L
	Xylenes	74 mg/L
	PHC F1	9.9 mg/L
	PHC F2	3.1 mg/L
	PHC F3	0.5 mg/L *
	PHC F4	0.5 mg/L *

3 DISTRIBUTION AND QUANTITIES OF IMPACTS

3.1 SOIL IMPACTS

The footprint of the former UST nest based on a review of the 1957 insurance plan had been identified as the probable contaminant source zone. Borehole TH01 advanced in the previous Phase II ESA has the highest concentrations of BTEX, PHC F1 and F2, and would likely be closest to the contaminant source zone.

A PHC soil impact plume boundary was estimated using an industry accepted method of the halfway distance to adjacent 'clean' boreholes with no soil exceedances. As such, the north extent of the inferred soil PHC impact plume is estimated to lie between impacted boreholes TH02, TH01, and MW01 and un-impacted boreholes MW05, BH02A and BH02. The west extent is estimated to lie between impacted boreholes TH03 and BH03 and un-impacted borehole MW04. The southern and southeastern extent of the soil PHC impact plume remains undelineated as no boreholes were advanced beyond the south property line and under the landscaped retaining wall planter located at the eastern corner of the property. Based on the inferred area of the soil PHC impact plume on-site, the area of the lateral extent is estimated to be 190 m^2.

During the supplemental Phase II ESA, observed peaks in soil headspace vapour measurements for each borehole are noted at the following approximate depths and borehole locations: 2.0 mbgs (MW01), 1.8 mbgs (BH02), 1.8 mbgs (BH03), 2.6 mbgs (MW04). For comparison, the depth of the high-plastic in-situ clay interface at each of the abovementioned boreholes are as follow: 1.7 mbgs (MW01), 1.7 mbgs (BH02), 1.5 mbgs (BH03), 2.1 mbgs (MW04). The soil headspace vapour measurement peaks for each borehole appears to be located between 0.1 m to 0.5 m below depth of the high-plastic clay interface, suggesting that contaminants may be travelling along the more permeable fill-clay interface and seeping through by gravity into the silty clay transition zone above the high-plastic clay interface.

Assuming the estimated depth of impact extending from ground surface to 3.4 mbgs as a conservative worst-case scenario, the volume of impacted soil present on-site is approximately 646 m^3.

The inferred soil impact plume is illustrated in Figure 2 (Appendix A).

3.2 GROUNDWATER IMPACTS

Groundwater from monitoring well TH01 in the Phase II ESA reported exceedances of benzene, PHC F1 and F2 (Eng-Tech, 2022). While groundwater samples from the supplemental Phase II ESA reported no exceedances with the exception of an exceedance of PHC F3 at monitoring well MW01, the reference criteria for PHC F3 and F4 in groundwater are based on the Ontario background groundwater value and may be overly protective as a remediation target. Therefore, the inferred groundwater plume with only exceedances of benzene, PHC F1 and F2 is likely localised to the location of the former UST nest near monitoring well TH01.

4 IMPACT MANAGEMENT METHODOLOGY

4.1 TASK 1 – REMEDIAL SOIL EXCAVATION

The preferred approach to managing soil impacts on-site is the traditional method of contaminant source removal through the excavation of impacted soil and transportation off-site for disposal at a licensed soil treatment facility. The excavation, transportation and disposal of soil should be conducted by a licensed Contractor under contract to the City of Winnipeg. Additionally, an environmental professional qualified to practice within the Province of Manitoba should be retained to guide the excavation of the soil impact plume through soil screening and sampling, as well as to characterize the soil of the final excavation limits through confirmatory soil screening and sampling for submission for laboratory analysis. The remedial soil excavation will not extend beyond the property limits; any impacts identified beyond the property limits will remain in place.

4.1.1 SITE PREPARATION

Prior to undertaking excavation activities on-site, underground utility locates must cleared and daylighting should be coordinated for all excavated areas in close proximity to underground utilities. The asphalt-paved surface overlying the soil PHC impact plume and the landscaped retaining wall planters at the east corner of the property should be removed by the Contractor to access PHC impacted granular soil material. The intended excavation area should be marked out with stakes and/or spray paint and temporarily fenced off to prevent unauthorized access into the work area. The following items may be required on-site:

- Designated ingress and egress route for heavy equipment and soil trucks,
- ramps to enter the excavation safely,
- shoring (e.g. soldier pile walls) to prevent sloughing and failure of the excavation walls, and
- sufficient protective measures in place to prevent damage to the south adjacent sidewalk, street and related infrastructure, including third party utilities during site remediation operations.

Any street, sidewalk, or related infrastructure, including third party utilities, damaged or removed as part of the site remediation project must be restored to an equal or better condition than before the project commenced, as part of the project the expense of the Contractor to the satisfaction of the City of Winnipeg Director of Public Works.

4.1.2 EXCAVATION AND OFF-SITE DISPOSAL

Remediation would require excavation to depths of up to 2.5 mbgs at locations of MW01, BH02, and BH03, up to 3.0 mbgs at MW04, and up to 3.4 mbgs at the location of the former UST nest and borehole TH01. The anticipated remedial excavation extent is outlined in blue on Figure 2 (Appendix A).

Due to limited space for stockpiling soil on-site, impacted soil material may have to be directly loaded onto a tandem truck by an excavator and transported off-site for disposal. The excavated impacted soil would have to be disposed of at a Class 1 landfill such as the Waste Connection Prairie Green Landfill north of Winnipeg or the GFL MidCanada Environmental Services Ltd. Soils Treatment Facility in Ile des Chênes upon approval from the accepting facility based on soil analytical results.

The surface asphalt and granular materials should be segregated from the impacted soil and recycled at an approved facility.

4.1.3 CONFIRMATORY SOIL SAMPLING AND REPORTING

Collection and screening of soil samples by an environmental professional for the identified contaminants of concern will be required during and subsequent to remedial excavation activities, to confirm removal of all soil impacts exceeding the applied guidelines as presented in Table 1 for PHC analytical parameters.

Soil screening involves the collection of soil samples in a 2 m by 2 m grid from each wall and the floor of the excavation for headspace vapour measurements using a combustible vapour analyzer, such as the RKI Eagle II. The selection of soil samples to be submitted for laboratory analysis of BTEX, PHC F1-F4.

The following sampling design outlined in Table 3 for confirmatory characterization of excavations is referenced from the CCME *Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment* and the OMECP *Guide for Completing Phase Two Environmental Site Assessments Under Ontario Regulation 153/04*:

- Discrete soil samples should be collected from each excavation face (i.e., walls and base), if possible, and submitted for laboratory confirmation as outlined in Table 3 below.
- Soil samples should be collected 0.2 m perpendicular to the ground surface.
- Soil samples should be collected in step-outs of three (3) to four (4) directions at 5 m to 10 m spacing.
- Sidewall soil samples for confirmatory laboratory analyses should not all be taken from the same wall and should represent worst-case.
- Confirmatory analytical samples will be submitted to a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory such as ALS Global Environmental in Winnipeg, Manitoba or a Standards Council of Canada (SCC) accredited laboratory such as Bureau Veritas Laboratories (formerly Maxxam Analytics).
- Analytical samples will be submitted based on a "Rush" (1 to 2 days) basis and will incur a 100% mark-up by the laboratory. Should it be determined regular turn-around-time is suitable, there is no additional mark-up.
- The sampling program should include duplicate sampling at a frequency of 10% for quality assurance/quality control (QA/QC) purposes.

Table 3. Minimum confirmation samples required for remedial excavation limits

Floor Area (m^2)	Floor Samples	Sidewall Samples
Less than 25	A minimum of two (2) samples	A minimum of two (2) samples
>25 to 50	A minimum of two (2) samples	A minimum of three (3) samples
>50 to 100	A minimum of three (3) samples	A minimum of three (3) samples
>100 to 250	A minimum of three (3) samples	A minimum of five (5) samples
>250 to 500	A minimum of four (4) samples	A minimum of six (6) samples
>500 to 750	A minimum of four (4) samples	A minimum of seven (7) samples
>750 to 1,000	A minimum of five (5) samples	A minimum of eight (8) samples

Following remedial excavation of the soil impact plume and if not being further developed into a building with basement parking, the excavated area(s) should be backfilled with clean soil that has been previously vetted to meet applicable guidelines outlined in Table 1 above. The clean soils should be compacted as per specification to be provided by a Civil Engineer.

The excavation activities may be completed at the time of Site redevelopment as the presence of the identified soil impacts do not present an immediate concern to human health or environment under current use of the site as an asphalt covered parking lot.

4.1.4 REMEDIAL COMPLETION REPORTING

A Remedial Completion Report will be prepared by the environmental professional describing all remedial activities completed and the results of the remediation attempt. The Remedial Completion Report will be submitted to both Manitoba Environment and Climate Change (MECC) and the City of Winnipeg. The completion summary report may include the decommissioning of monitoring wells and any other environmental observations encountered during site development. Conclusions and recommendations, if any, will be provided if additional work related to well decommissioning is required to mitigate risk to environmental or human health.

4.2 TASK 2 – RISK MANAGEMENT

The following subtasks are outlined in the probable event that apparent risks require mitigation for the Site.

4.2.1 LINER ALONG SOUTH PROPERTY BOUNDARY

As impacts may have migrated from the former UST nest to beyond the south property boundary, and remedial excavation in Task 1 is limited in accessing the pavement beyond the south property boundary, the installation of a hydrocarbon resistant liner along the south property boundary may be a possible mitigation against residual contaminants from migrating back onto the remediated Site. The hydrocarbon resistant liner should extend from as close to ground surface to a depth of 3 metres and span the length of half the south property boundary starting from the east corner. Low permeability clay soil is an effective backfill material to use when installing the liner as it provides an additional barrier against the potential migration of contaminants.

If confirmatory soil sampling indicate that the south wall of the remedial excavation is unimpacted, there would be no need for the installation of a liner as off-site impacts would likely be non-existent.

4.2.2 GROUNDWATER MONITORING WELL DECOMMISSIONING

The *Groundwater and Water Well and Related Amendments Act* and the accompanying regulations requires that if a monitoring well intersects an aquifer, it shall be removed when abandoned. A total of six monitoring wells were installed throughout the Site during Phase II ESA and the supplemental Phase II ESA in 2022 and 2023, respectively.

Monitoring well decommissioning activities consists of removing any metal surface casings present, backfilling the PVC well pipes with hydrated bentonite chips to ground level and cutting the PVC well pipe 0.25 m or greater below ground surface. The bentonite will be poured slowly into the borehole, no faster than manufacturer recommended rates, and the depth of bentonite will be checked periodically using a weighted line to ensure bridging was not occurring. The ground surface will be observed to be clean of any debris to match existing surface conditions as close as possible (given weather conditions).

Prior to decommissioning, GPS coordinates would be taken at each well, followed by groundwater level and total well depth measurements using a water level tape. During decommissioning, monitoring well decommissioning logs will be completed by a WSP representative and signed off by the drilling contractor once decommissioning of each well was completed. Metal surface casings, PVC pipes, and any additional garbage removed from site will be transported for off-site disposal.

The monitoring well decommissioning could be completed during site development during excavation activities in support of the proposed building foundation.

4.2.3 SITE HEALTH AND SAFETY

A construction Contractor having proven experience in the excavation and management of contaminated soil and related works is to be employed for this project. The Contractor is to be responsible for all earthwork and disposal activities, clearance of public and private utilities, a Health and Safety Plan and dewatering operations (if required).

Earthwork construction activities should be completed under a Health and Safety Plan to be prepared by the Contractor with appropriate measures to mitigate risks to workers. Examples of standard dust and air quality control measures should include, but not limited to:

- Excavation using methods to minimize raising dust from construction operations.
- Excavation in careful manner to avoid contamination of adjacent soil and buried utilities.
- Implementation of dust and particulate control measures during construction in accordance with Manitoba regulations.
- Limiting vehicle speeds on-site to reduce the generation of dust from traffic.
- Applying water to prevent airborne dust from dispersing into atmosphere.
- Utilizing appropriate covers on trucks hauling impacted and fine or dusty material. Watertight vehicles to haul wet materials.
- Grading of truck haul road surfaces, as required, to minimize the accumulation of surface silt. Paved surfaces on adjacent streets should be swept regularly to control dust.
- Disposal and hauling shall conform to all Federal and Provincial Acts and regulations, and Municipal By-Laws.
- Preventing dust from spreading to adjacent properties.

Stoppage of work at any time when control of dust and particulates is inadequate for wind conditions present at the Site, or when visual monitoring indicates that release of dust and particulates into the atmosphere is excessive. The Contractor will be required to make changes to operations prior to resuming any excavation, handling, processing, or any other work that may cause release of dust or particulates.

4.2.4 CONSTRUCTION ENVIRONMENTAL MONITORING (CEM)

CEM should be implemented on-site for the duration of the excavation activities that occur within or immediately adjacent to the PHC soil impact plumes (Figure 2, Appendix A). As the borehole locations advanced during the Phase II ESA and Supplemental Phase II ESA identified fill material of unknown provenance across the Site, fill material with concentrations of PHC exceeding applied criteria may be encountered during construction excavation activities.

An environmental professional designated for CEM can offer immediate advice and recommendations based on field-screening of 'suspect' soil and groundwater samples encountered during construction excavation activities. The Contractor and CEM field personnel should be responsible for identifying soil or groundwater suspected of hydrocarbon contamination, and care should be taken to prevent the mixing of clean and contaminated soils both vertically and horizontally during construction excavation activities. Additionally, the WSP field scientist can submit soil and groundwater samples for characterization and proper off-site disposal at a certified soil treatment facility, as well as estimating soil volumes.

4.2.5 MANAGEMENT OF ENCOUNTERED UNDERGROUND STORAGE TANKS

At this time there are no suspect in-situ underground storage tanks on-site, however, should one be encountered the following is applicable to the situation. In accordance with the *Storage and Handling of Petroleum Products and Allied Products Regulation (M.R. 188/2001)* and associated guidelines, any underground storage tanks encountered during development are to be decommissioned in-place. Ensure that no workers enter any confined space without proper training and protective equipment.

Generally, the following procedure for decommissioning of USTs will be adhered to:

- The on-site construction environmental monitor should be contacted and notified of the UST encounter.
- To gain appropriate access to each tank, the tank will be cut open to allow for an approximately 0.6 m by 0.6 m opening. Based on visual and olfactory observations from outside the tank, the contents or past contents of each tank could be preliminarily classified.

- The steel of the tanks will be further cut open to gain further access to the interior. The purpose for this is to appropriately evacuate the tanks and ensure any oil residuals in the tank do not mix with concrete or spill out causing further environmental impacts. The USTs will require a hot water pressure wash.
- Any liquid or sludge remaining within the USTs will be evacuated and disposed of appropriately by an environmental subcontractor.
- The USTs will be purged of vapours and the presence of vapours will be checked with an RKI Eagle II combustible gas detector with a photoionization detector (PID).
- The tank will either be pulled and disposed of at a licensed landfill or be filled with a concrete material. The excavation will be backfilled to pre-existing grade.

A written report will be filed with MEC regarding the decommissioning of the USTs. This process will be attended and completed by a qualified firm and Licensed Petroleum Technician.

4.2.6 MANAGEMENT OF GROUNDWATER

As groundwater level measurements obtained during previous Phase II ESAs field investigations range from approximately 1 mbgs to 6 mbgs, water seepage may be encountered during excavations on-site. If groundwater is encountered during excavation activities within the footprint of the inferred soil PHC impact plume, it should be dewatered, contained and managed in accordance with environmental requirements including characterization prior to disposal as required.

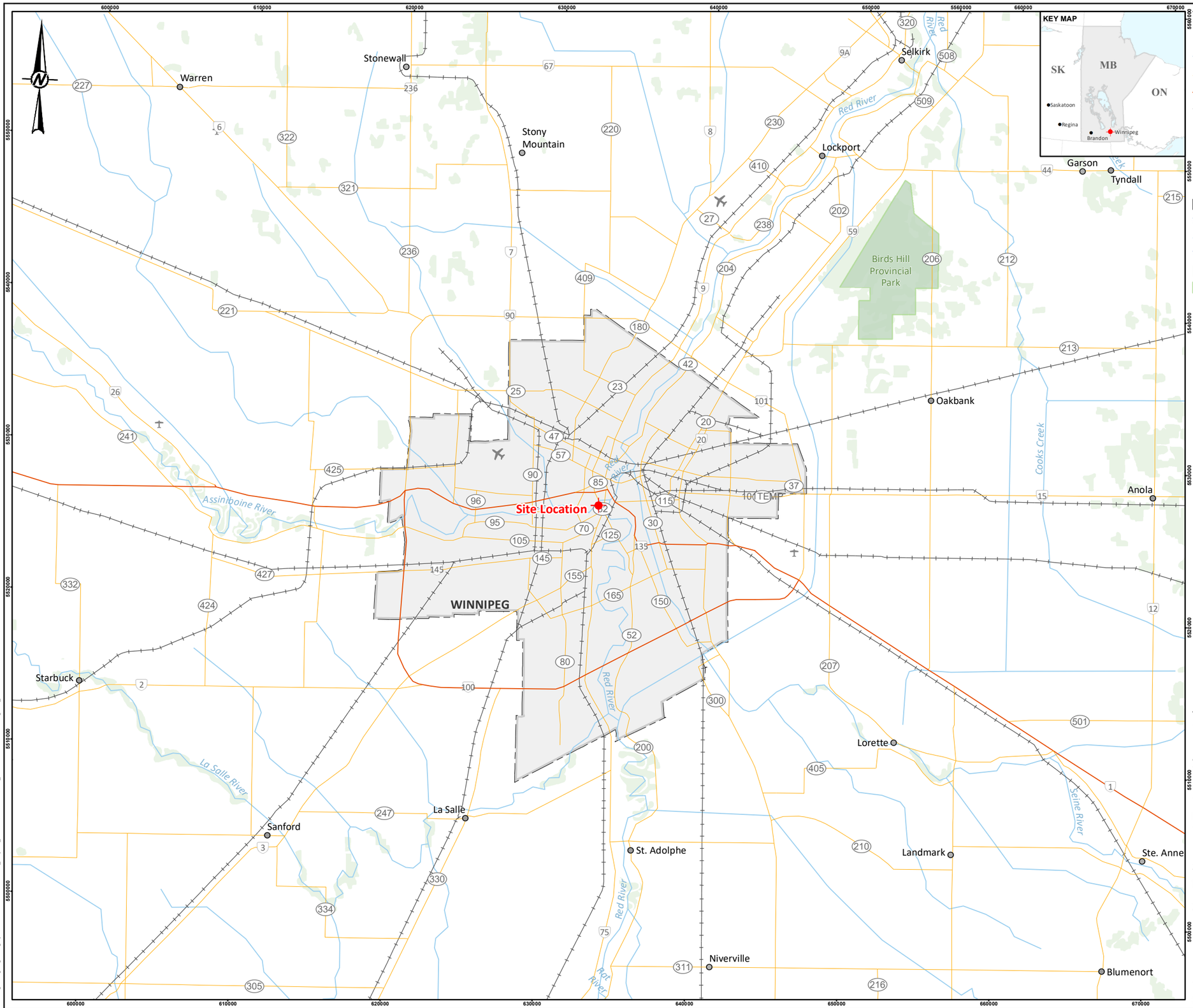
Precipitation and seepage accumulating in excavations could either be pumped and stored temporarily in holding tanks on-site if the volume is sufficiently small or immediately removed from site by a hydrovac truck pending laboratory analysis of BTEX, PHC F1 to F4.

5 CLOSING

Please accept this Remedial Plan prepared by WSP on behalf of The City of Winnipeg. Should you have any questions or concerns, please contact Alfred Chan at your convenience at (204) 259-1679 or alfred.chan@wsp.com.

APPENDIX

A FIGURES



LEGEND

- Site Location

Transportation

- Paved Roads
- TransCanada Highway
- Railways
- Airport
- Airfield

Municipal

- Towns/City
- Major Urban Centre

Water Features

- Perennial Creeks/Streams

Vegetation & Parks

- Vegetation
- Provincial Park

0 5 10 15 20

1:250,000 Kilometers

Coordinate System: NAD 1983 UTM Zone 14N

REFERENCE(S)

1. DATA PROVIDED BY ALTALIS;NATURAL RESOURCE CANADA; ESRI BASEMAPS;GEOGRATIS

CLIENT
CITY OF WINNIPEG

PROJECT
REMEDIAL PLAN
145 OSBORNE STREET, WINNIPEG, MB

TITLE
SITE LOCATION MAP

CONSULTANT

YYYY-MM-DD	2023-11-01
REPORT BY	AC
DRAWN BY	JH
REVIEWED BY	AC
OFFICE	WINNIPEG

PROJECT NO.
CA0003621.4465

FIGURE
1

LEGEND

- No Soil Exceedance
- No Analytical Samples Obtained but Field Observations Indicate PHC Impacts
- Soil Exceedance [1]
- Soil Exceedance
- Site Boundary
- Estimated Extent of Remedial Excavation Limit
- Delineated Soil Impact Plume
- Inferred Soil Impact Plume
- Parcels
- Fenceline

0 5 10 15 20 25

1:300 Meters

Coordinate System: NAD 1983 UTM Zone 14N

REFERENCE(S)

1. ANALYTICAL EXCEEDANCES OF BENZENE, TOLUENE, XYLENES, AND PHC F1-F2 WERE REFERENCED FROM THE PREVIOUS PHASE II ESA (ENG-TECH, 2022)
2. IMAGERY SOURCE: ESRI IMAGERY SERVICE [2022]

CLIENT
CITY OF WINNIPEG

PROJECT
REMEDIAL PLAN
145 OSBORNE STREET, WINNIPEG, MB

TITLE
INFERRED SOIL PHC IMPACT PLUME

CONSULTANT

YYYY-MM-DD	2023-11-01
REPORT BY	AC
DRAWN BY	JH
REVIEWED BY	AC
OFFICE	WINNIPEG

PROJECT NO.
CA0003621.4465

FIGURE
2

APPENDIX

B STANDARD LIMITATIONS AND CONDITIONS

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