

# APPENDIX II

November 9, 2012

**Nichols Project No. 12-001-SRD**

**Via e-mail: [zsolt.margitai@gov.ab.ca](mailto:zsolt.margitai@gov.ab.ca)**

**Original Will Remain on File**

Alberta Environment  
4<sup>th</sup> Floor Twin Atria  
4999 - 98 Avenue  
Edmonton, Alberta  
T6B 2X3

**ATTN: Mr. Zsolt Margitai  
Contaminated Sites Coordinator**

**RE: Proposed Risk Management Plan  
9915 - 76<sup>th</sup> Avenue  
Lots 1-11; Block 6; Plan 5429AL  
Edmonton, Alberta**

Dear Mr. Margitai:

Nichols Environmental is pleased to present the following proposed risk management plan (RMP) for hydrocarbon impacted soil and groundwater, associated with the above-referenced location (herein after referred to as 'the Property'). Figure 1 (attached) outlines the location of the Property relative to the City of Edmonton. A detailed site diagram, including existing borehole and monitoring well locations and other relevant site details, is presented in Figure 2.

## PROPERTY DESCRIPTION

The Property was located in the Ritchie Neighbourhood of Edmonton, Alberta, at LSD W-28-52-24-W4M. According to The City of Edmonton's Zoning Bylaw #12800, the Property currently falls under the Medium Industrial Zone (IM) and has a proposed re-zoning to the Industrial Business Zone (IB). A partially developed steel-frame building structure with steel-framed roofing and aluminum-clad siding is located centrally along the south boundary of the Property.

The Property was immediately bordered by sidewalks and roadways to the north (76<sup>th</sup> Avenue) and west (100<sup>th</sup> Street), a vacant lot to the east, and an alleyway to the south. A residence was located to the northeast of the Property across 76<sup>th</sup> Avenue. Surrounding land uses were mixed industrial and commercial in all remaining directions. The area to the east of the Property, across 99<sup>th</sup> Street, consisted of a residential neighbourhood. Eight groundwater monitoring wells were present along the east and south edges of the Property, and additional groundwater monitoring wells were observed on the neighbouring properties to the east and south. The site and surrounding land uses are summarized in Table 1 (attached).



Nichols Environmental  
(Canada) Ltd.

[nicholsenvironmental.com](http://nicholsenvironmental.com)  
Toll Free: 877 888 6325

Head Office:  
17331 - 107<sup>th</sup> Avenue  
Edmonton, Alberta  
T5S 1E5  
P: 780 484 3377  
F: 780 484 5093

Southern Region:  
427 Manitou Road SE  
Calgary, Alberta  
T2G 4C2

P: 403 452 1820  
F: 403 984 8803

PHASE I ESA  
HISTORICAL REVIEW  
DUE DILIGENCE

PHASE II ESA  
SOIL & GROUNDWATER  
ASSESSMENT  
DELINEATION

REMEDATION  
ENGINEERING DESIGN  
INSTALLATION  
MANAGEMENT  
CLOSURE MONITORING

GEOMATICS  
SPATIAL ANALYSIS  
DATA VISUALIZATION  
CARTOGRAPHY

SPILL RESPONSE  
REGULATORY LIAISON  
INVESTIGATION  
REMEDATION

GEOSCIENCES  
CIVIL/MUNICIPAL  
FOUNDATIONS  
SITE DEVELOPMENT  
TOP-OF-BANK  
SLOPE STABILITY  
EARTHWORKS DESIGN  
TENDERING  
CONSTRUCTION  
SUPERVISION



## **BACKGROUND**

Nichols Environmental recently forwarded to Alberta Environment the following reports which document the history of assessment work and remediation completed on the Property up until October 2012:

- Nichols Environmental (Canada) Ltd., October 29, 2012. Phase I Environmental Site Assessment, 9915 - 76th Avenue, Lots 1-11; Block 6; Plan 5429AL, Edmonton, Alberta. Prepared for: SuRo Developments (Nichols File No. 12-001-SRD); and
- Nichols Environmental (Canada) Ltd., October 29, 2012. Site Remediation, 9915 - 76th Avenue, Lots 1-11; Block 6; Plan 5429AL, Edmonton, Alberta. Prepared for: SuRo Developments (Nichols File No. 12-001-SRD).

## **ASSESSMENT GUIDELINES**

The analytical results for the Property are presented and discussed in context of Alberta Environment and Sustainable Resource Development's Tier 1 and 2 Soil and Groundwater Remediation Guidelines, as amended up to December 2010 (2010 Alberta Guidelines).

Under these guidelines, three management options are provided: Tier 1, Tier 2, and Exposure Control. Tier 1 guidelines are considered applicable for the majority of the sites in Alberta and are somewhat conservative as they have been developed for protection of the more sensitive land uses. Tier 2 guidelines allow for consideration of site-specific conditions through the modification of Tier 1 guidelines and/or by removing exposure pathways that may not be applicable to the site. The Tier 2 approach still provides the same level of protection to human and ecological receptor pathways as the Tier 1 approach, but must be done through the collection of more site-specific data. Exposure Control involves risk management through exposure barriers or administrative controls based on a site-specific risk management approach.

The above remediation criteria may be used as benchmarks to evaluate the need for further investigation, remediation or to guide in the establishment of land-use restrictions.

Surface soil guidelines for benzene, toluene, ethylbenzene, xylenes (BTEX) and petroleum hydrocarbon (PHC) Fractions 1 through 4 must be applied to a depth of 3.0 metres below grade (mbg). Subsoil guidelines for BTEX and PHC Fractions 1 through 4 must be applied to a minimum depth of 3.1 mbg.

## **Land Use Assessment**

The Property was initially developed some time between 1924 and 1950, according to the aerial photograph review as summarized in the Phase I ESA report. The earliest available aerial photograph from 1924 shows a CP Rail Yard to the west of the Property and residential housing to the east. Surrounding land uses were mixed industrial and commercial in all remaining directions. Residential land use was located northeast and east of the Property, across 99<sup>th</sup> Street,



but greater than 30 m from the easternmost Property line. The surrounding land use is summarized in Table 1 (attached).

Grain-size analyses were conducted on soil samples from the Property as part of the Phase II ESA completed in September 2011 for The City of Edmonton. Two soil samples, one from borehole M11-05 at a depth of 9.0 mbg and one from borehole M11-07 at a depth of 7.5 mbg, were both reported to be fine grained.

Hydraulic conductivity testing was also carried out as part of the Phase II ESA, previously completed in September 2011 for The City of Edmonton and as summarized in the October 2012 Site Remediation report. A total of five monitoring wells, from both the Property and surrounding area, were tested for hydraulic conductivity. The results indicated that each of these monitoring wells had a hydraulic conductivity greater than  $1 \times 10^{-7}$  m/s, and as such, the domestic use aquifer (DUA) exposure pathway cannot be excluded for the Property.

As such, the Property was assessed using the Alberta Tier 1 Soil and Groundwater Remediation Guidelines for industrial land use and fine-grained soils. A summary of the guideline criteria and land use assessment is provided in Table 2.

## **RISK MANAGEMENT CONDITIONS**

Alberta Environment has conditions that must be met in order to implement a risk management plan (RMP). The conditions are as follows:

1. The source of contamination must be removed;
2. The extent of impact must be defined in both soil and groundwater;
3. A monitoring program must be put into place;
4. There must be a commitment from the owner to undertake this plan; and
5. Any required administrative controls must be established to protect the public from potential exposure to the contamination.

The Property meets the above criteria as follows:

1. AGRA Earth and Environmental Limited (AGRA) removed a 1,890-litre steel underground storage tank (UST), used to contain gasoline, from Lot 9 of the Property in October of 1995. The approximate location of the former UST is presented on Figure 2. Hagstrom Geotechnical Services Ltd. (Hagstrom) completed a site remediation for the Property as reported in January of 2009. The site remediation consisted of the removal of approximately 2.0 m of uncontaminated overburden, followed by removal of contaminated soils from approximately 2.0 m to 4.5 - 4.6 mbg, for a total volume of 1,850 m<sup>3</sup> of impacted soils being removed. Further excavation at depth was not completed as a saturated sand layer was encountered that was unstable (excessive sloughing). Closure soil samples



indicated that petroleum hydrocarbon concentrations were below the applicable guidelines on the west and north walls of the excavation. However, closure soil samples, collected from the east and south walls of the excavation, had petroleum hydrocarbon concentrations above the applicable guidelines. A petroleum hydrocarbon-resistant liner was installed along the south and east Property lines, as shown on Figure 2, to prevent recontamination of the remediated area on the Property. Closure base samples from the saturated sand were not collected during the excavation.

Nichols Environmental completed a Phase II ESA for the Property in September of 2011 which identified the presence of residual soil and groundwater petroleum hydrocarbon contamination on the Property, within the saturated sand layer at depths ranging from 4.5 to 9.0 mbg.

Nichols Environmental then completed an in-situ remediation program for the Property in 2012, which involved the injection of sodium persulphate (oxidant) into the saturated sand layer to oxidize the residual petroleum hydrocarbons. Delineation of the western and northern extent of the soil and groundwater hydrocarbon plumes on the Property was also completed as part of this program. The results of the in-situ remediation program indicated a reduction in dissolved-phase petroleum hydrocarbons by approximately 75% across the Property. The remaining petroleum hydrocarbon impacts in the groundwater were now isolated to the far southeast corner of the Property, outside of the building footprint.

Based on these previous assessments and remediation work completed on the Property, Nichols Environmental concludes that the original source of contamination has been removed and remaining petroleum hydrocarbon impacts have been largely remediated on the Property.

2. Based on the analytical data, it is the opinion of Nichols Environmental that the extent of soil petroleum hydrocarbon concentrations, exceeding the 2010 Guidelines, has been delineated as outlined in Figure 3. Furthermore, it is the opinion of Nichols Environmental that the extent of groundwater petroleum hydrocarbon concentrations, exceeding the 2010 Guidelines, has been delineated as outlined in Figure 4. The petroleum hydrocarbon analytical data for the Property is provided in Tables 3 (soil) and 4 (groundwater) and groundwater monitoring data for the Property is provided in Table 5.
3. An annual soil and groundwater monitoring and sampling program has been proposed to monitor soil and groundwater impacts associated with the Property over time, and the proposed scope of work is outlined below:
  - Complete three boreholes on the southeast corner of the Property and collect soil samples for laboratory analyses of BTEX, PHC Fractions 1 through 4, metals and detailed salinity;
  - Install two soil vapour probes beneath the concrete slab-on-grade floor, within the southeast corner of the building, to monitor potential vapour migration through the unsaturated zone;
  - Collect two soil vapour samples from the probes for laboratory analyses of BTEX and total hydrocarbons;



- Mobilize to the site to monitor the groundwater wells once per year (during frost free periods). All wells would be monitored for water level, hydrocarbon vapour concentrations in the well headspace and for the presence or absence of free-phase hydrocarbon product;
- A maximum of eight groundwater samples would be collected and submitted for BTEX and PHC Fractions 1 and 2 analyses during the monitoring event. Monitoring wells M11-01, M11-04, M11-05, M11-16, M11-17, M12-09, M12-18 and M12-19 would be included in the sampling event; and
- An update report, documenting the sampling event, would be prepared and submitted to the Property owner and Alberta Environment on an annual basis.

The soil and groundwater monitoring program will continue until the hydrocarbon concentrations are reduced to a level that is deemed sufficiently low that human health is no longer at risk. If soil analytical results, collected during the initial sampling event, indicate that all petroleum hydrocarbon, metals and salinity parameters are within the applicable guidelines, future soil sampling events will not be completed. The success of the risk management plan will depend on the future diligence of those managing the site.

A soil management plan will also be put into place to manage any future ground disturbance of contaminated soils. If during any future construction on the Property, contaminated soils are encountered, the following management plan shall be adhered to:

- Contaminated soils will be segregated and stockpiled on an onsite poly liner;
  - Samples of the contaminated soils will be collected for characterization and potential landfill disposal;
  - Soils will not be moved offsite until such time that laboratory analyses are received and contaminated soils have been characterized;
  - Once characterized, if soils are deemed contaminated, they will be hauled offsite and disposed of at an approved landfill facility; and
  - All workers must review MSDS sheets for hydrocarbon impacted soils and use the proper personal protective equipment (chemical resistant gloves, Nomex coveralls, chemical resistant boots, and potentially NIOSH air filter half-masks) prior to excavating contaminated soils.
4. The proposed RMP was forwarded to the Property owner (SuRo Developments) for approval, a copy of their agreement is attached.
  5. A hydrocarbon resistant liner has been installed on the south and east Property lines to prevent the back-migration of contaminants from offsite areas further south and east, as per Figure 2. It is the opinion of Nichols Environmental that additional administrative controls for the Property are not required at this time.

At the present time, Nichols Environmental is requesting that Alberta Environment review the information collected to date and the proposed RMP for the onsite hydrocarbon impacts, and provide any comments. If Alberta Environment is in agreement with the proposed RMP, we would request a letter stating that it supports this course of action.



## CLOSURE

We trust that this letter meets with your current requirements. If you should have any questions please do not hesitate to contact the undersigned at (780) 484-3377.

Yours truly,

**NICHOLS ENVIRONMENTAL (CANADA) LTD.**

Barry Rakewich, P.Ag., EP  
Senior Project Manager

Reviewed by:

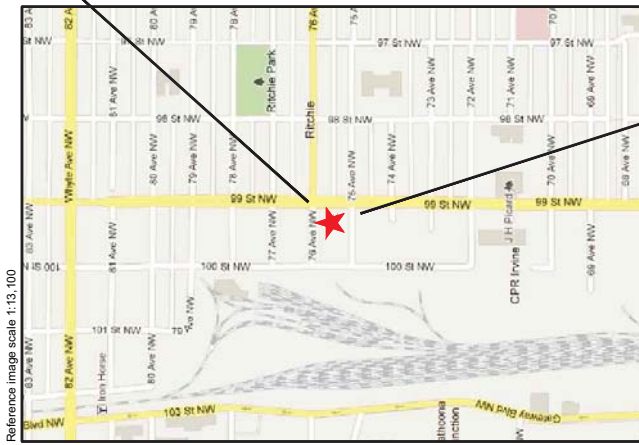
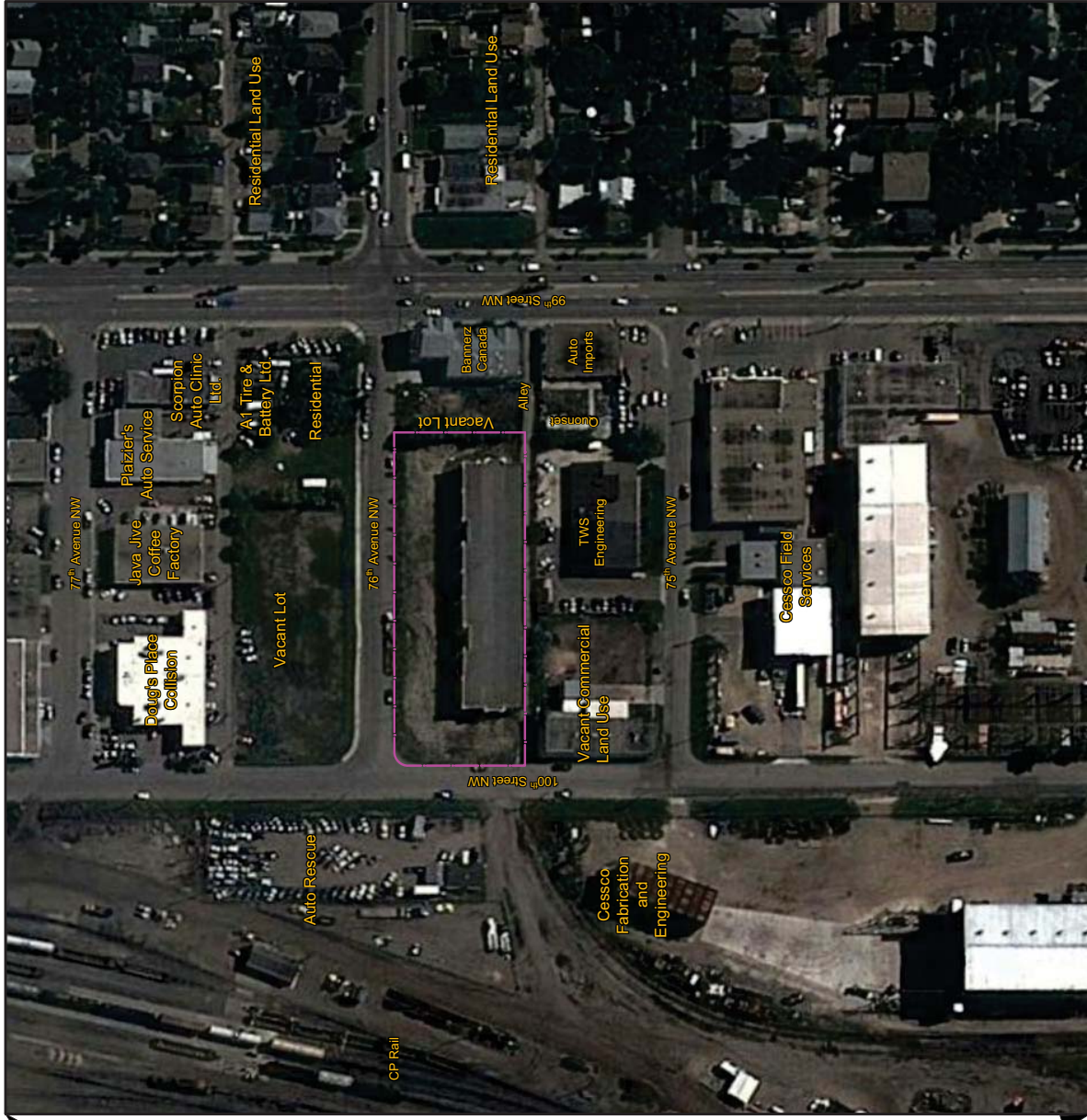
R.W. (Rob) Dickie, P.Geol., R.E.T., EP  
President

BR/RWD/sld

Attachments

cc: Rob Fediuk, SuRo Developments (via email: rfed@shaw.ca)



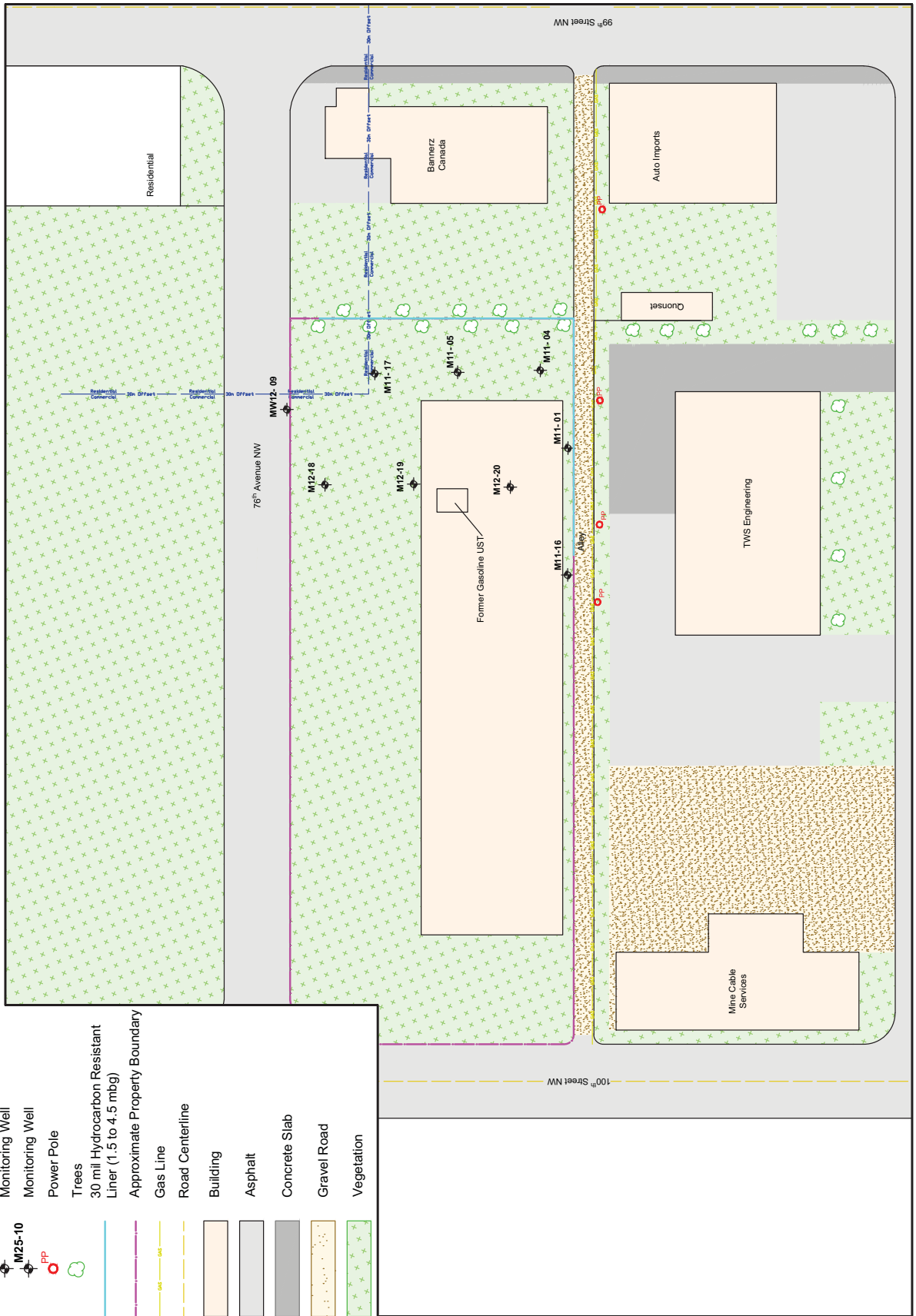


Legend:

Approximate Property Boundary

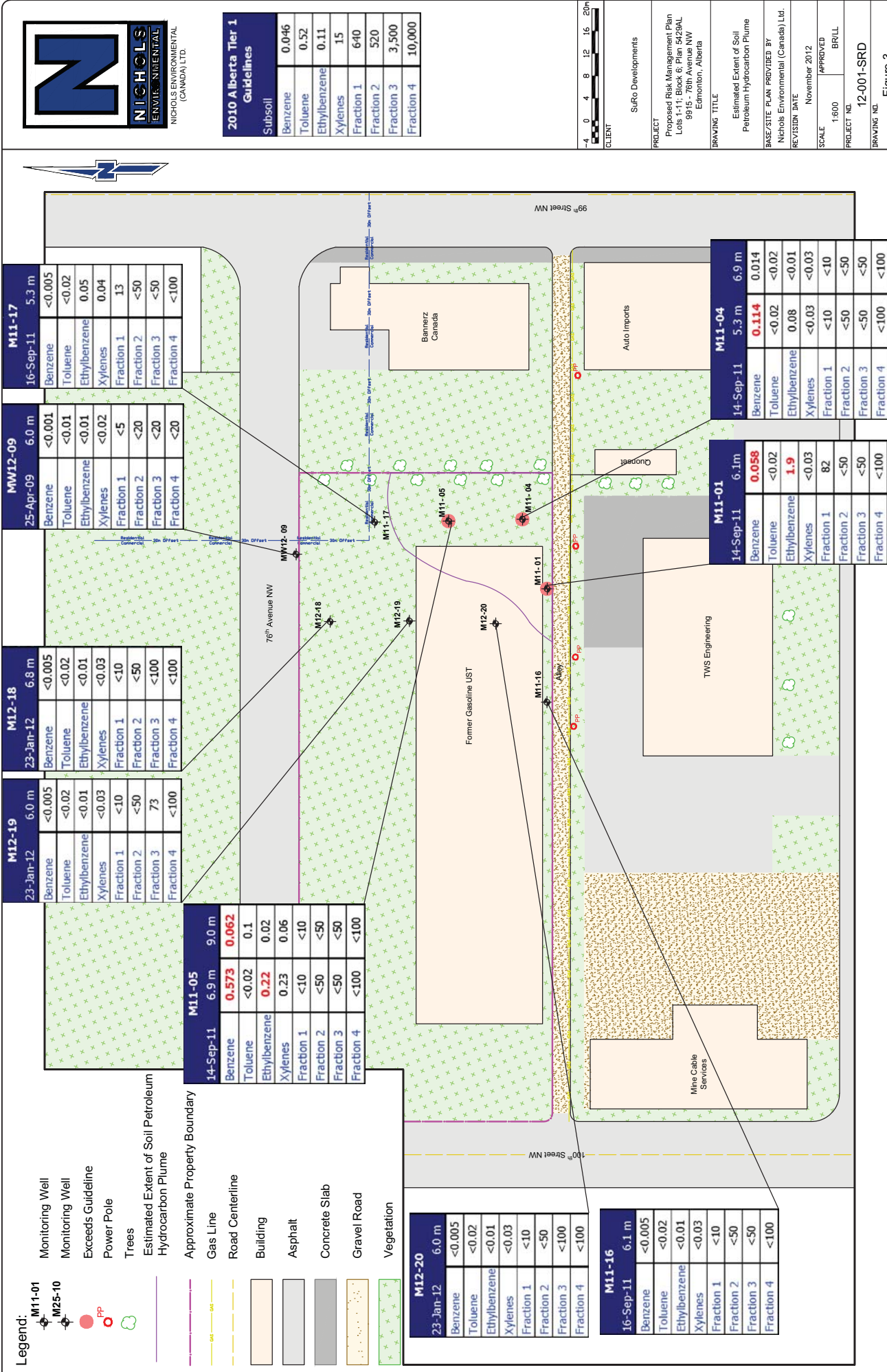


- Legend:
- M11-01 Monitoring Well
  - M25-10 Monitoring Well
  - PP Power Pole
  - Trees
  - 30 mil Hydrocarbon Resistant Liner (1.5 to 4.5 mbg)
  - Approximate Property Boundary
  - Gas Line
  - Road Centerline
  - Building
  - Asphalt
  - Concrete Slab
  - Gravel Road
  - Vegetation



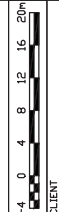
CLIENT		SuRo Developments	
PROJECT		Proposed Risk Management Plan Lots 1-11, Block 6, Plan S429AL 9915 - 78th Avenue NW Edmonton, Alberta	
DRAWING TITLE		Site Detail and Monitoring Well Locations	
BASE/SITE PLAN PROVIDED BY		Nichols Environmental (Canada) Ltd.	
REVISION DATE		November 2012	
SCALE		1:600	APPROVED
PROJECT NO.		BRILL	
DRAWING NO.		12-001-SRD	
		Figure 2	



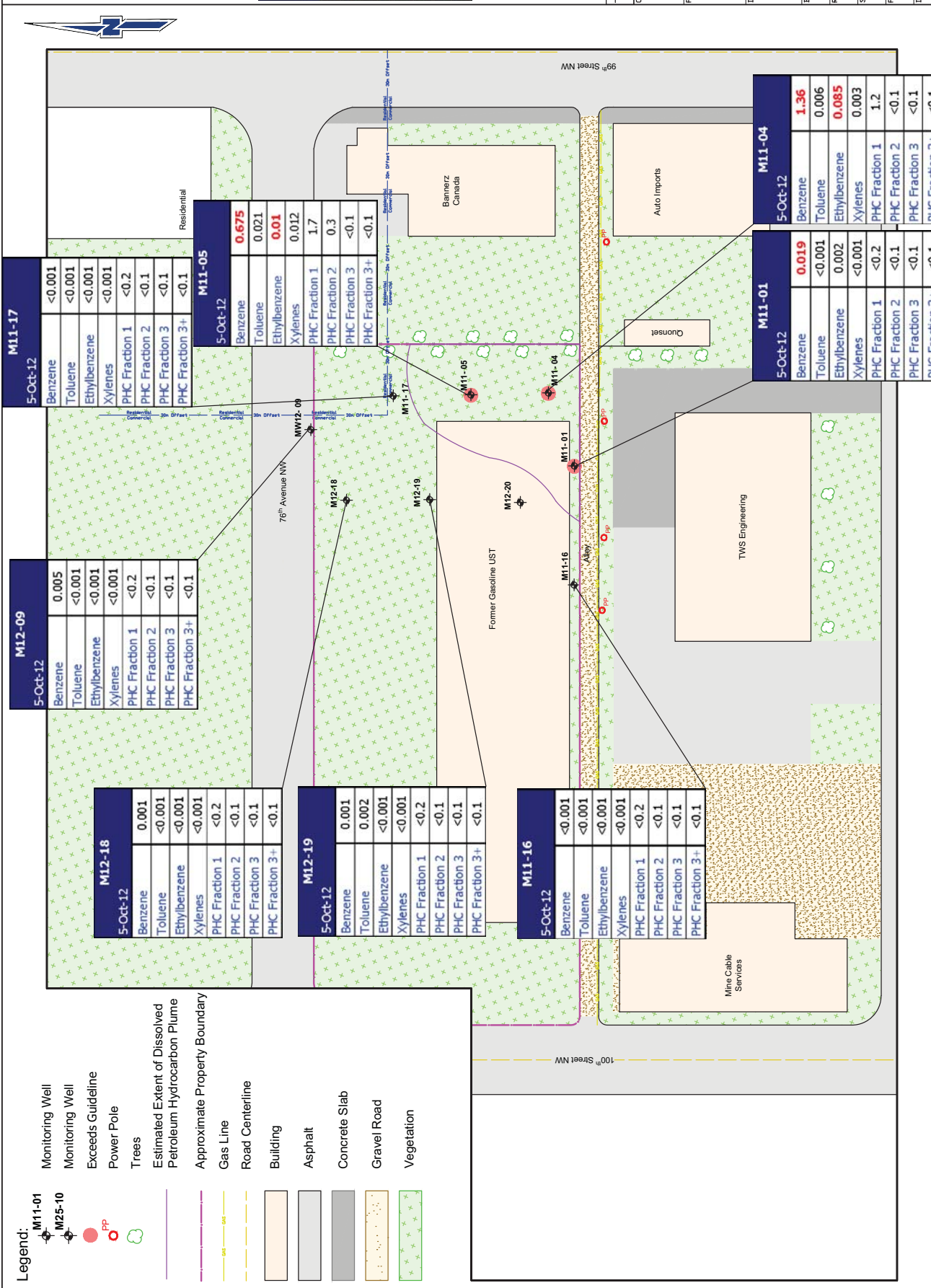


2010 Alberta Tier 1 Guidelines

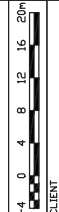
Subsoil	0.046
Benzene	0.52
Ethylbenzene	0.11
Xylenes	15
Fraction 1	640
Fraction 2	520
Fraction 3	3,500
Fraction 4	10,000



PROJECT	SuRo Developments
PROPOSED RISK MANAGEMENT PLAN	Proposed Risk Management Plan
LOTS 1-11, BLOCK 6, PLAN 5429AL	9915 - 78th Avenue NW
REVISION DATE	November 2012
SCALE	1:600
APPROVED	BRILL
PROJECT NO.	12-001-SRD
DRAWING NO.	Figure 3



2010 Alberta Tier 1 Guidelines		
Groundwater	Industrial	
Benzene	0.005	
Toluene	0.024	
Ethylbenzene	0.0024	
Xylenes	0.3	
PHC Fraction 1	2.2	
PHC Fraction 2	1.1	
PHC Fraction 3	-----	
PHC Fraction 3+	-----	



SuRo Developments	
PROJECT	
Proposed Risk Management Plan	
Lots 1-11, Block 6, Plan S429AL	
9915 - 78th Avenue NW	
Edmonton, Alberta	
DRAWING TITLE	
Estimated Extent of Dissolved Petroleum Hydrocarbon Plume (October 2012)	
BASE/SITE PLAN PROVIDED BY	
Nichols Environmental (Canada) Ltd.	
REVISION DATE	
November 2012	
SCALE	
1:600	
APPROVED	
BRILL	
PROJECT NO.	
12-001-SRD	
DRAWING NO.	
Figure 4	



# Nichols Environmental (Canada) Ltd.

**TABLE: 1**  
**TITLE: SITE AND SURROUNDING LAND USE**

PROJECT#: 12-001-SRD  
CLIENT: SuRo Developments  
PROJECT: Risk Management Plan  
SITE: Lots 1 - 11; Block 6; Plan 5429AL  
LOCATION: Edmonton, Alberta

Direction	Land Use*	Land Use Type	Distance from Property (m)
Property	Medium Industrial Zone (IM)	Industrial	0
North	76 Avenue followed by IM	Industrial	15
East	Vacant Lot followed by from west to east IM, 99 Street, Neighborhood Convenience Commercial Zone (CNC), Residential Low Density Development (RF3)	Commercial	0
South	IM and Industrial Business Zone (IB)	Residential	0
West	100 Street followed by Heavy Industrial Zone (IH)	Commercial	15

\* City of Edmonton Land Use Zoning Bylaw #12800



## Nichols Environmental (Canada) Ltd.

**TABLE:** 2

**TITLE:** CRITERIA SUMMARY/LAND USE ASSESSMENT

PROJECT#: 12-001-SRD  
CLIENT: SuRo Developments  
PROJECT: Risk Management Plan  
SITE: Lots 1 - 11; Block 6; Plan 5429AL  
LOCATION: Edmonton, Alberta

Soil			
LAND USE	GRAIN SIZE	TIER	REASONING
Industrial	Fine	1	Cannot rule out DUA due to high hydraulic conductivity of upper water table

Groundwater			
LAND USE	GRAIN SIZE	TIER	REASONING
Industrial	Fine	1	Cannot rule out DUA due to high hydraulic conductivity of upper water table



Nichols Environmental (Canada) Ltd.

TABLE: 3

**SOIL ANALYSES - PETROLEUM HYDROCARBONS**

PROJECT#: 12-001-SRD  
CLIENT: SuRo Developments  
PROJECT: Risk Management Plan  
SITE: Lots 1 - 11, Block 6, Plan 5429AL  
LOCATION: Edmonton, Alberta

2010 Alberta Tier 1*		Fine Grained		Benzene	Toluene	Ethylbenzene	Xylenes	Fraction 1	Fraction 2	Fraction 3	Fraction 4
Subsoil		Industrial		0.046	0.52	0.11	15	640	520	3,500	10,000
Sample ID	Depth (m)	Date	OVC/HVC								
M11-01	6.1	14-Sep-11	490								
M11-04	5.3	14-Sep-11	347	0.058	<0.02	1.9	<0.03	82	<50	<50	<100
M11-04	6.9	14-Sep-11	38.9	0.114	<0.02	0.08	<0.03	<10	<50	<50	<100
M11-05	6.9	14-Sep-11	391	0.014	<0.02	<0.01	<0.03	<10	<50	<50	<100
M11-05	9.0	14-Sep-11	35.7	0.573	<0.02	0.22	0.23	<10	<50	<50	<100
M11-16	6.1	16-Sep-11	8.8	0.062	0.1	0.02	0.06	<10	<50	<50	<100
M11-17	5.3	16-Sep-11	27.4	<0.005	<0.02	<0.01	<0.03	<10	<50	<50	<100
M11-17	5.3	16-Sep-11	27.4	<0.005	<0.02	0.05	0.04	13	<50	<50	<100
M12-09	6.0	25-Apr-09	NM	<0.001	<0.01	<0.01	<0.02	<5	<20	<20	<20
M12-18	6.8	23-Jan-12	270^	<0.005	<0.02	<0.01	<0.03	<10	<50	<100	<100
M12-19	6.0	23-Jan-12	220^	<0.005	<0.02	<0.01	<0.03	<10	<50	73	<100
M12-20	6.0	23-Jan-12	170^	<0.005	<0.02	<0.01	<0.03	<10	<50	<100	<100

^ Applicable Guideline Criteria  
- Parameter Exceeds Recommended Guideline Criteria

\*Alberta Environment, Alberta Tier 1 Soil and Groundwater Remediation Guidelines (Table 3), December 2010.

\*\*CCME: Canadian Council of Ministers of the Environment (CCME) 1999 Canadian Environmental Quality Guidelines (as amended to Update 7.0)

^ Hydrocarbon Vapour Concentration

(All concentrations in mg/kg = ppm, unless noted)

Grain size MUST PSA D50 > 75 um

Grain size MUST PSA D50 > 75 um

8.0% M11-05 @ 9.0 m (fine-grained)

47.3% M11-07 @ 7.5 m (fine-grained)

Fraction 1 = C<sub>6</sub> to C<sub>10</sub> (n-TEX)

Fraction 2 = > C<sub>10</sub> to C<sub>14</sub>

Fraction 3 = > C<sub>14</sub> to C<sub>20</sub>

Fraction 4 = C<sub>20</sub>+

OVC = Organic Vapour Concentration (ppmv)

ND = Non-detect (either < 5 ppmv HVC or <0.1 ppmv OVC)

--- = No value provided in guidelines





Nichols Environmental (Canada) Ltd.

4

TABLE:

TITLE: GROUNDWATER ANALYSES - PETROLEUM HYDROCARBONS

PROJECT#: 12-001-SRD  
CLIENT: SuRo Developments  
PROJECT: Remedial Action Plan  
SITE: Lots 1 - 11; Block 6; Plan 5429AL  
LOCATION: Edmonton, Alberta

2010 Alberta Tier 1 *	Fine Grained		Benzene	Toluene	Ethylbenzene	Xylenes	Fraction 1	Fraction 2	Fraction 3	Fraction 3+
	Natural Area		0.005	0.024	0.0024	0.3	2.2	1.1		
	Agricultural		0.024	0.024	0.0024	0.3	0.81	1.1		
	Residential / Parkland		0.005	0.024	0.0024	0.3	0.81	1.1		
	Commercial		0.005	0.024	0.0024	0.3	2.2	1.1		
	Industrial		0.005	0.024	0.0024	0.3	2.2	1.1		

Land Use	Industrial	OVC	Benzene	Toluene	Ethylbenzene	Xylenes	Fraction 1	Fraction 2	Fraction 3	Fraction 3+	% Reduction
M11-01	22-Sep-11	850	0.031	0.003	0.139	0.016	4.5	0.6	<0.1	<0.1	
	24-Jan-12	NM	0.055	<0.001	0.043	0.003	7.9	1.3	<0.1	0.4	
	10-Apr-12	NM	0.092	<0.001	0.004	0.002	0.8	<0.1	<0.1	<0.1	91.73%
	10-Aug-12	ND	0.008	<0.001	0.009	0.001	<0.2	<0.1	<0.1	<0.1	99.83%
	5-Oct-12	ND	0.019	<0.001	0.002	<0.001	<0.2	<0.1	<0.1	<0.1	99.80%
M11-04	22-Sep-11	28.4	1.02	0.01	0.131	0.009	2.5	<0.1	<0.1	<0.1	
	24-Jan-12	NM	1.31	0.01	0.053	0.004	0.4	<0.1	<0.1	<0.1	
	10-Apr-12	33	1.38	0.01	0.102	0.005	0.7	<0.1	<0.1	<0.1	
	26-Apr-12	NM	0.255	0.002	0.005	0.001	0.2	<0.1	<0.1	<0.1	40.14%
	10-Aug-12	316.1	0.244	0.001	0.011	<0.001	<0.2	<0.1	<0.1	<0.1	87.38%
M11-05	5-Oct-12	2.4	1.36	0.006	0.085	0.003	1.2	<0.1	<0.1	<0.1	93.02%
	22-Sep-11	546	0.315	0.025	0.256	0.578	2.6	1	<0.1	<0.1	27.68%
	24-Jan-12	NM	2.06	0.04	0.233	0.179	4	1.1	0.1	<0.1	
	10-Apr-12	68.3	0.375	0.004	0.016	0.021	4.7	<0.1	<0.1	<0.1	34.31%
	26-Apr-12	NM	0.147	0.004	0.006	0.009	0.5	<0.1	<0.1	<0.1	91.36%
M11-16	10-Aug-12	119.1	1.69	0.024	0.143	0.191	1.5	<0.1	<0.1	<0.1	54.02%
	5-Oct-12	265.0	0.675	0.021	0.010	0.012	1.7	0.3	<0.1	<0.1	64.76%
	22-Sep-11	50	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	5-Oct-12	ND	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	22-Sep-11	335	0.01	<0.001	0.004	0.003	0.3	<0.1	<0.1	<0.1	
M11-17	24-Jan-12	NM	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	10-Apr-12	0.6	0.002	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	10-Aug-12	ND	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	5-Oct-12	ND	<0.001	0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	22-Sep-12	ND	0.013	0.002	0.001	0.004	<0.2	<0.1	<0.1	<0.1	
M12-09	10-Aug-12	ND	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	5-Oct-12	ND	0.005	0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	24-Jan-12	NM	<0.001	<0.001	<0.001	0.002	<0.2	0.2	0.1	<0.1	
	10-Apr-12	0.5	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	5-Oct-12	ND	0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
M12-18	24-Jan-12	NM	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	10-Apr-12	0.5	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	5-Oct-12	ND	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	24-Jan-12	NM	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	10-Apr-12	0.5	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
M12-19	24-Jan-12	NM	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	10-Apr-12	0.5	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	5-Oct-12	ND	0.001	0.002	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	24-Jan-12	NM	<0.001	0.002	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	
	10-Apr-12	12.5	<0.001	<0.001	<0.001	<0.001	<0.2	<0.1	<0.1	<0.1	

**BOLD** = Applicable Guideline Criteria  
**BOLD** = Parameter Exceeds Recommended Guideline Criteria

\* Alberta Environment, Alberta Tier 1 Soil and Groundwater Remediation Guidelines (Table 2), December 2010.

(All concentrations in mg/L = ppm, unless noted)  
Grain size: M11-05 @ 9.0 m (fine-grained) 8.0%  
Grain size: M11-07 @ 7.5 m (fine-grained) 47.3%

Fraction 1 = C<sub>6</sub> to C<sub>10</sub> (aromatic)

OVC = Organic Vapour Concentration (ppmv)

ND = Non-detect (either < 5 ppmv HVC or < 0.1 ppmv OVC)

--- = No value provided in guidelines



Nichols Environmental (Canada) Ltd.

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TABLE:

TITLE: GROUNDWATER MONITORING DATA

PROJECT #: 12-001-SRD  
CLIENT: Sulro Developments  
PROJECT: Risk Management Plan  
SITE: Lots 1 - 11; Block 6; Plan 5429AL  
LOCATION: Edmonton, Alberta

Installation Data										Monitoring Data				
Monitoring Well	Install Date	Top of Casing Elevation (m)	Stick Up (m)	Total Depth (m)	Well Screen		Monitor Date	Groundwater		HVC/OVC (ppmw)	Product Thickness (cm)			
					Depth (m)	Elevation (m)		Depth (m)	Elevation (m)					
M11-01	14-Sep-11	670.31	0.90	7.3	1.5	- 4.6	668.81	- 665.71	20-Sep-11	1.630	668.69	850	ND	
									24-Jan-12	3.740	Frozen	666.57	NM	ND
									3-Apr-12	4.450	Frozen	665.86	NM	ND
									10-Apr-12	2.830	667.48	665.86	ND	ND
									10-Aug-12	4.240	666.07	ND	ND	ND
									5-Oct-12	4.240	665.81	28.4	ND	ND
M11-04	14-Sep-11	669.85	0.82	8.3	3.7	- 6.7	666.15	- 663.15	24-Jan-12	4.160	665.69	NM	ND	
									3-Apr-12	4.120	665.73	33.0	ND	ND
									10-Apr-12	4.700	665.15	NM	ND	ND
									10-Aug-12	4.590	665.26	316.1	ND	ND
									5-Oct-12	4.870	664.98	2.4	ND	ND
									20-Sep-11	3.290	666.48	546	ND	ND
M11-05	14-Sep-11	669.77	0.95	9.8	2.1	- 5.2	667.67	- 664.57	24-Jan-12	3.990	665.78	NM	ND	
									3-Apr-12	3.930	665.84	68.3	ND	ND
									10-Apr-12	4.110	665.66	NM	ND	ND
									10-Aug-12	4.200	665.57	119.1	ND	ND
									5-Oct-12	4.800	664.97	265.0	ND	ND
									20-Sep-11	0.970	669.19	50	ND	ND
M11-16	16-Sep-11	670.16	0.82	9.5	1.5	- 4.6	668.66	- 665.56	24-Jan-12	3.250	667.81	NM	ND	
									10-Apr-12	3.270	666.94	ND	ND	ND
									5-Oct-12	3.835	665.86	335	ND	ND
									20-Sep-11	4.030	665.67	NM	ND	ND
									24-Jan-12	3.980	665.72	0.6	ND	ND
									3-Apr-12	3.940	665.76	NM	ND	ND
M11-17	16-Sep-11	669.70	0.70	9.8	2.4	- 5.5	667.30	- 664.20	10-Apr-12	4.280	665.42	ND	ND	
									5-Oct-12	4.580	665.12	ND	ND	ND
									20-Sep-12	3.970	665.93	ND	ND	ND
									24-Jan-12	Frozen	ND	NM	ND	ND
									3-Apr-12	Frozen	ND	NM	ND	ND
									10-Apr-12	Frozen	ND	NM	ND	ND
M12-09	25-Apr-09	669.90	---	6.8	2.0	- 5.1	667.90	- 664.80	5-Oct-12	5.170	664.73	ND	ND	
									5-Apr-12	3.590	666.31	ND	ND	ND
									24-Jan-12	3.960	665.69	NM	ND	ND
									3-Apr-12	3.940	665.71	0.5	ND	ND
									10-Apr-12	4.200	665.45	NM	ND	ND
									10-Aug-12	4.650	665.00	ND	ND	ND
M12-18	23-Jan-12	669.65	1.20	6.9	2.3	- 5.3	667.35	- 664.35	5-Oct-12	5.010	664.64	ND	ND	
									24-Jan-12	3.900	665.75	NM	ND	ND
									3-Apr-12	3.940	665.71	0.5	ND	ND
									10-Apr-12	3.850	665.82	NM	ND	ND
									10-Aug-12	4.450	664.73	ND	ND	ND
									5-Oct-12	4.920	664.32	NM	ND	ND
M12-19	23-Jan-12	669.65	1.10	6.1	2.3	- 5.3	667.35	- 664.35	24-Jan-12	4.480	665.21	NM	ND	
									3-Apr-12	3.510	666.18	12.5	ND	ND
									10-Apr-12	3.920	665.77	NM	ND	ND
									10-Aug-12	3.400	666.29	Destroyed	ND	ND
									5-Oct-12	3.400	666.29	Destroyed	ND	ND
									20-Sep-12	3.400	666.29	Destroyed	ND	ND
M12-20	23-Jan-12	669.69	---	6.1	2.3	- 5.3	667.39	- 664.39	5-Oct-12	3.400	666.29	Destroyed	ND	
									20-Sep-12	3.400	666.29	Destroyed	ND	ND
									20-Sep-12	3.400	666.29	Destroyed	ND	ND
									20-Sep-12	3.400	666.29	Destroyed	ND	ND
									20-Sep-12	3.400	666.29	Destroyed	ND	ND
									20-Sep-12	3.400	666.29	Destroyed	ND	ND

(All concentrations in parts per million by volume = ppmv, unless noted)  
HVC = Hydrocarbon Vapour Concentration  
OVC = Organic Vapour Concentration  
ND = Non-detect (<0.1 OVC or no water in well)  
NM = Not Measured

November 1, 2012

Via Fax 780-484-5093

Nichols Environmental (Canada) Ltd.  
17331 - 107<sup>th</sup> Avenue  
Edmonton, Alberta  
T5S 1E5

Attention: Mr. Barry Rakewich  
Project Manager

Dear Mr. Rakewich:

As per your reports (Phase I ESA and Site Remediation) dated October 29, 2012, which provided the recommendation that a risk management plan (RMP) be implemented to manage the residual impacts on the Property, SuRo Developments wishes to inform you that we are in agreement and are committed to this plan.

This letter shall also serve to ensure Alberta Environment that no upgrades, improvements of any kind, or sale of the property mentioned below will take place prior to notification of Alberta Environment. The property in question is described as:

Lots 1 through 11, Block 6, Plan 5429AL  
9915 - 76<sup>th</sup> Avenue, Edmonton, Alberta

Trusting this will give Alberta Environment the assurance required to approve the risk management plan, we cordially sign.

Rob Fediuk  
SuRo Developments

A large, stylized handwritten signature in black ink, likely belonging to Rob Fediuk, is written over the printed name and company.