

28 June 2022

Erran Woodward
Environment Manager
Acciona Ferrovia Joint Venture
Sydney Metro West – Central Tunnelling Package

Via email only: erran.woodward@ctp-afjv.com.au
Cc: Coffey@rare-enviro.com.au

Dear Ms Woodward,

RE: Interim Site Audit Advice – Site Auditor Endorsement of Detailed Site Investigation Addendum – Outside Station Box The Bays Construction Site, Sydney Metro West, Central Tunneling Package dated 27 June 2022.

Introduction

James Davis of Enviroview Pty Ltd has been engaged by Acciona Construction Pty Ltd and Ferrovia Construction Pty Ltd (the 'AFJV') to provide the services of a NSW EPA Contaminated Land Accredited Site Auditor, to conduct a Site Audit in accordance with the *Contaminated Land Management Act 1997* and relevant guidelines made or approved under s.105 of that Act in relation to the Site identified as The Bays Site, Sydney Metro West Central Tunnelling Package (the 'Site').

The objective of the Site Audit is to provide a Site Audit Report and Site Audit Statement to certify, in relation to contaminated land, the Site Auditor's opinion of whether the Site is suitable for the proposed use or the Site can be made suitable with the implementation of a Remedial Action Plan.

The requirement for the Site Audit is to meet specific conditions of the Conditions of the State Significant Infrastructure approval (SSI 10038) and clauses of an agreement made between the NSW Government and the AFJV (the *Deed Agreement*).

A Site Audit Interim Advice is issued by a Site Auditor following the review of reports and to assist in the management of contamination issues at a Site regarding requirements of the Site Audit at a particular stage of the Site Audit prior to the Site Audit being concluded. An interim advice does not constitute a Site Audit Statement or a Site Audit Report and does not pre-empt the final Site Audit conclusions. A Site Audit Report and Site Audit Statement will be prepared at the conclusion of the Site Audit.

The purpose of this interim advice is to provide an endorsement of the Detailed Site Investigation Addendum – Outside Station Box by the Site Auditor as required by the *Deed Agreement* (clause 12.19). This Interim Advice is made to supplement the the previous Interim

Advice¹ that endorsed the Detailed Site Investigation. The purpose of the addendum to the Detailed Site Investigation was to report on further assessment of the potential vapour intrusion risks from two locations with soil which reported concentrations of benzene and/or total recoverable hydrocarbons (TRH C6 – C10 less benzene, toluene, ethylbenzene, and xylenes [BTEX]) above the adopted health screening levels (HSLs) protective of indoor commercial workers and to report on risk from these residual soil impacts to future users of the site under the proposed future commercial / industrial land use.

Detailed Site Investigation Addendum Review

The Detailed Site Investigation undertaken at the site is reported in the following report:

Environmental Resources Management Australia Pty Ltd (ERM). *Detailed Site Investigation Addendum – Outside Station Box The Bays Construction Site, Sydney Metro West, Central Tunneling Package*. Dated 27 June 2022 Project No.: 0577577_R04

The report reasonably details the contamination concerns and presents a quantitative risk assessment that evaluates potential exposures to the contamination through a vapour intrusion to future buildings pathway for a commercial/industrial land use. While the auditor could debate minor issues with input parameters utilised in the risk assessment – it is unlikely to alter the outcome of the modelling in this scenario.

Site Auditor Endorsement of the Station Box Detailed Site Investigation Addendum

The auditor agrees with the consultant – that with reference to the risk assessment results calculated and the conservatism of the assumptions utilised, the isolated distribution of contamination observed, and the high potential for ongoing degradation and attenuation of these petroleum contaminants over time (and particularly during the construction works) – the potential for unacceptable risk to future indoor workers/users is low. Remediation to address the petroleum hydrocarbon soil impacts observed at E25 and S31, in relation to vapour intrusion, is not warranted.

Closing

Thank you for your time regarding this matter. If you require additional information or clarification, please do not hesitate to contact me.

Yours sincerely



James Davis
NSW EPA Contaminated Land Site Auditor
Enviroview Pty Ltd

¹ Interim Advice 0301-2117_02rev01 RE: Interim Site Audit Advice – Site Auditor Endorsement of Detailed Site Investigation, The Bays Construction Site, Sydney Metro West. Dated 21 February 2022. James Davis - Site Auditor, Enviroview.



Detailed Site Investigation Addendum Outside Station Box

SMWSTCTP-AFJ-TBY-EN-RPT-000035 Revision 01

Sydney Metro West – Central Tunnelling Package

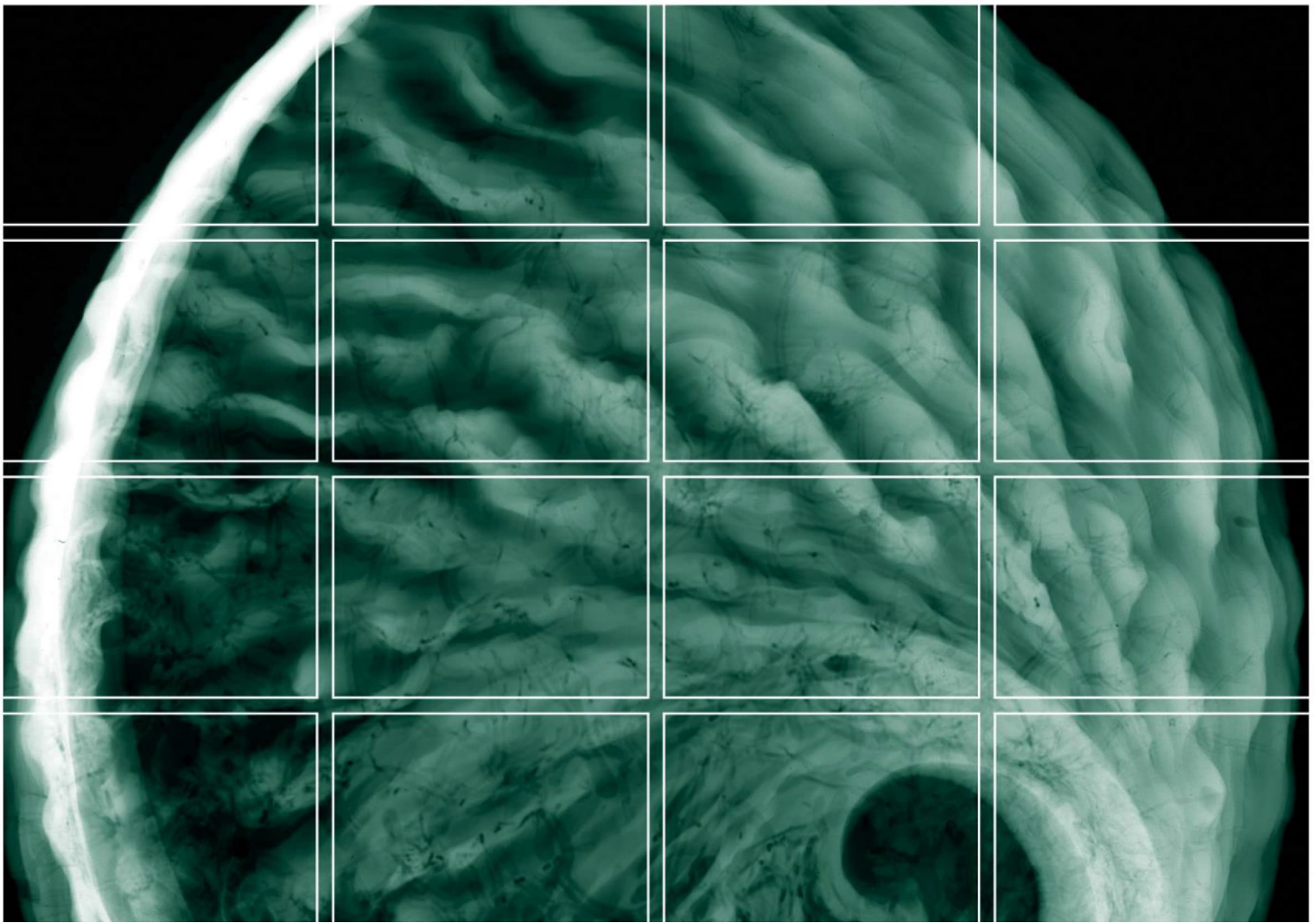


DOCUMENT APPROVAL

	Prepared By	Reviewed By	Approved By
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Position:	Contamination Consultant	Environment Manager	Environment Manager
Date:	27/06/2022	27/06/2022	27/06/2022

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00	29/03/22	All	ERM	For Site Auditor review
01	27/06/2022	All	ERM	For Site Auditor endorsement and submission to Sydney Metro



Acciona Construction Pty Ltd &
Ferrovia Construction Pty Ltd Joint
Venture.

Detailed Site Investigation Addendum – Outside Station Box

The Bays Construction Site, Sydney Metro
West, Central Tunneling Package

27 June 2022

Project No.: 0577577_R04

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Signature Page

27 June 2022

Detailed Site Investigation Addendum – Outside Station Box

The Bays Construction Site, Sydney Metro West, Central Tunneling
Package



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1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by Acciona Construction Pty Ltd and Ferrovial Construction Pty Ltd (together “AFJV”) to complete a Detailed Site Investigation (DSI) Addendum for the Bays Construction Site (the Site) focused on the areas outside the station box. The Site comprises land that will form The Bays Metro station, as well as land used for construction support which will be redeveloped in future stages of the White Bay Power Station precinct redevelopment. The Metro station construction on the Site includes creation of a Station Box excavation (excavated from surface) and tunnel sections entering and leaving the Station Box (bored tunnel). Refer to **Attachment A Figure 1** for Site Location and Layout.

ERM completed a DSI (ERM 2022) that identified two locations with soil reported concentrations of benzene and/or total recoverable hydrocarbons (TRH C₆ – C₁₀ less benzene, toluene, ethylbenzene, and xylenes (BTEX)) above the adopted health screening levels (HSLs) protective of indoor commercial workers, presented in **Attachment A Figure 2** and **Attachment B Table 1**. The identified impacted locations are as follows:

- E25 (2 – 2.1 mBGL):
 - benzene reported at a concentration of <0.1 – 4.6 mg/kg, above HSL of 3mg/kg.
- S31 (1.8 – 2.2 mBGL):
 - benzene reported at a concentration of 2.9 – 3.4 mg/kg, above the HSL of 3mg/kg; and
 - TRH (C₆ – C₁₀ less BTEX) reported a concentration of 463 mg/kg, above the HSL of 370 mg/kg.

This addendum is focused on further assessment of the potential vapour intrusion risks from the residual soil impact to future potential indoor commercial workers. The proposed future land use for the land is commercial / industrial, however, further details of the specific land use (e.g. location and types of buildings) is unknown at this stage. The risk assessment used the methodology consistent with the development of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (ASC NEPM) Health Screening Levels (HSLs) by Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE; Friebe and Nadebaum 2011). The CRC CARE model guidance and model is directly relevant to the vapour intrusion exposure pathways identified for the Site and are the most recent Australian guidance on the risk assessment of petroleum hydrocarbons.

2. RISK ASSESSMENT INPUTS

The risk assessment used the CRC CARE quantitative excel based model (Friebel and Nadebaum 2011). The CRC CARE (Friebel and Nadebaum 2011) default physicochemical and toxicity chemical inputs and exposure inputs for commercial land use (HSL D) was applied in the model. The site-specific data used/consider for inputs to the model are detailed below:

- Source concentrations and thickness;
- Lithology;
- Commercial / Industrial with slab-on-grade building Parameters;
- Toxicity criteria; and
- Degradation.

The input data are presented in **Attachment C Table 1**.

2.1 Source

The impacted locations are not considered the primary source, however since they are isolated occurrences they are considered the source for the purpose of this assessment. Based on the nature of the petroleum impact in the subject locations consisting of BTEX and the volatile TRH fractions, the primary source is presumed to be a historical petroleum fuel source and the CRC CARE (Friebel and Nadebaum 2011) default chemicals of potential concern (COPCs) TRH fractions and percent makeup were applied. The COPCs assessed were:

- benzene; and
- TRH C6-C10 (minus BTEX); consisting of TPH >C6-C8 aliphatic, TPH >C8-C10 aliphatic, and TPH >C8-C10 aromatic

Vertical delineation of both locations indicate that the impact is localised to a depth range of approximately 2m. Based on the vertical delineation a finite source of impact was assumed with a thickness source of 200cm. Based on the depths of soil impacts, the depth of source was at 2 mbgl

2.2 Lithology

The model's inputs were based on one fill soil layer overlying the impacted soil layer, between the ground surface and the depth of the identified contamination. Given the heterogeneity of the fill material the most conservative CRC CARE (Friebel and Nadebaum 2011) default sand soil properties were applied.

2.3 Commercial / Industrial with slab-on-grade building Parameters

2.3.1 Advective Transport (Q_{soil})

The risk assessment assumes that advective transport of vapours (represented by the parameter Q_{soil} in the model) is a relevant transport mechanism and directly linked to the building ventilation rate ($Q_{building}$) as is the CRC Care default approach for assessing enclosed (Friebel and Nadebaum, 2011). Using the default CRC Care approach, the Q_{soil} parameter is calculated based on the ratio of Q_{soil} to $Q_{building}$ ($Q_{soil}/Q_{building}$). A higher ratio results in higher modelled volatilisation from the sub-surface into indoor air and subsequently higher calculated risks. A $Q_{soil}/Q_{building}$ value of 0.001 was used based on the ODEQ (2010) default for commercial/industrial buildings. This value is lower than the CRC CARE (Friebel and Nadebaum 2011) commercial/industrial default value, which CRC CARE conservatively selected based on data from studies on residential buildings. The ODEQ is based on evaluation of commercial data, which is considered more relevant for this site.

2.3.2 Air Exchange Rate

Based on the guidance provided within CRC Care Technical Report no 10, the air exchange rate for commercial buildings was adopted, 0.83 h^{-1} .

2.4 Toxicity Criteria

The model for vapour intrusion is based on the depletion time of source of contaminants which is an estimate of exposure duration to the contaminants. The US EPA (1989) categorise the exposure duration to compound to chronic, sub-chronic and acute exposure. The chronic exposure duration is exposure to contaminants between seven years and a lifetime, exposure time between fourteen days and seven years is considered as sub-chronic and less than fourteen days are categorised in acute exposure. There are different toxicity threshold values (reference concentration, RfC) for chronic, sub-chronic and acute exposure. For COPCs where the depletion time was less than seven years (7) the toxicity criteria was adjusted to be representative of sub-chronic toxicity.

The depletion time for aliphatic C6-C8 and aliphatic > C8-C10 at the site was less than 7 years which represent sub-chronic exposure. The RfC value for aliphatic C6-C8 is the same for both chronic and sub-chronic exposure (Friebel and Nadebaum, 2011) and no change was required for the model. Aliphatic > C8-C10 RfC value for chronic is 1000 and was adjusted to 10000 $\mu\text{g}/\text{m}^3$ representing the change in toxicity to represent sub-chronic exposure (Friebel and Nadebaum, 2011).

2.5 Petroleum Hydrocarbon Degradation

Given the nature of petroleum hydrocarbons to undergo biodegradation and attenuate over time in soils, it reasonable to consider there will be a reduction on the source concentrations over time. However, site-specific conditions post development that would be supportive of biodegradation cannot be assumed, therefore, the risk assessment conservatively assumed no biodegradation of source concentrations or aerobic vapour phase biodegradation would occur.

Further, the risk assessment modelling used the current soil data as the source input. So the quantitative modelling does not account for any reductions in current conditions to when actual exposure would occur. The commercial development of land outside the station box which is not expected for at least another two years, which would be seven years and three years respectively after the soil samples from E25 and S31 were collected.

3. RISK CHARACTERISATION

Risk characterisation is the process of estimating the magnitude and probability of adverse effects on exposed populations. The purpose of this step in the risk assessment is to provide land managers with the information necessary to allow risk management decisions be made.

In the quantitative risk characterisation process, the results of the human health exposure assessment and hazard assessment sections will be combined to provide numerical estimates of the potential risks to the identified receptors.

Risks associated with non-carcinogenic (threshold) contaminants will be characterised by Hazard Quotients (HQs). The HQs for multiple exposure pathways and a combination of chemicals will be summed to calculate an overall risk level, or Hazard Index (HI). The threshold HI approach is based on the toxicological principal that there is a level of exposure below which it is unlikely for sensitive populations to experience health effects. If the HI does not exceed 1, then it is reasonable to conclude that no adverse health effects are likely to be realised. If the HI is greater than 1 then further consideration is necessary (ASC NEPM). An HI greater than 1 does not automatically imply that an unacceptable risk is present but does indicate that further action(s) (investigation or risk management) is warranted. (ASC NEPM).

Risks associated with carcinogenic (non-threshold) contaminants will be characterised by Incremental Lifetime Cancer Risk (ILCRs). The ILCR for multiple exposure pathways and a combination of chemicals will be summed to calculate an overall risk level, or ILCR. The ILCR approach for carcinogens is based on the toxicological approach to assessing carcinogenic chemicals that if there is exposure then probability for a cancer risk also exists. Establishing a “negligible risk” or “acceptable risk” is a complex policy issue. The ASC NEPM has recommended an acceptable ILCR arising from exposure to single or multiple carcinogens of 1 in 100,000 (1×10^{-5}) or less.

The risk characterisation results are summarised in **Table 1** below.

Table 1: Vapour Intrusion Risk Results

COPC	Commercial / Industrial with slab-on-ground		
	Cancer Risk	Hazard Index Vapour limited	Volatilisation Depletion Time (Years)
Benzene	1E-05	NA	<u>15.4</u>
TPH >C ₆ -C ₈ aliphatic	NA	0.12	<u>1.9</u>
TPH >C ₈ -C ₁₀ aliphatic	NA	0.16	<u>5.7</u>
TPH >C ₈ -C ₁₀ aromatic	NA	0.25	63
Sum	1E-05	0.54	

Underlined results indicate complete depletion of source within the vapour model concentration averaging time; seven (7) years for non-cancer Hazard Index and within 30 years for cancer risk.

With HIs ≤ 1.0 and ILCRs $\leq 1 \times 10^{-5}$, the results indicate potential non-carcinogenic risks are unlikely and carcinogenic risks are within acceptable levels for future occupants under commercial / industrial slab-on-grade scenario.

Table 1 also provides the model estimated time for source depletion to occur based on volatilization only. Based on the source depletion times, several key COPCs benzene (for potential cancer risks) and, TPH $>C_6-C_8$ aliphatic, and TPH $>C_8-C_{10}$ aliphatic (for potential non-cancer risks) were fully depleted via volatilization during the modelled worker exposure duration. The depletion results indicate the source mass is limited such that the risk assessment results are effectively based on the full amount of the residual impact of those COPCs volatilisation into one indoor space without any further losses (vapour degradation, losses to atmosphere) does not present a potential unacceptable risk. This is the most conservative scenario and also indicates the changes to the volatilisation model inputs cannot result in higher risks. Also, given the site is not yet developed, the depletion times also indicate that volatilisation would result in reduction of risks prior to commercial building occupation, which would likely take on the scale of year(s) to occur.

4. CONCLUSION

This addendum provides a risk assessment of the potential vapour intrusion risks from the residual soil impact to future potential indoor workers within future premises. The proposed land use is commercial / industrial outside the station box development following the completion of the Sydney Metro construction works.

The results indicate potential non-carcinogenic risks and carcinogenic risks are unlikely for future commercial / industrial users. The results support that no further remediation or management of the soil impacts are warranted relative to future potential exposures from the volatilisation of the residual impacts identified in the DSI (ERM 2022).

5. REFERENCES

CRC Care (2013). *Petroleum hydrocarbon vapour intrusion assessment: Australian guidance*. CRC CARE Technical Report no. 23, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.

ERM (2022). *Detailed Site Investigation – Outside Station Box, The Bays Construction Site*. Final Version 3. January 14.

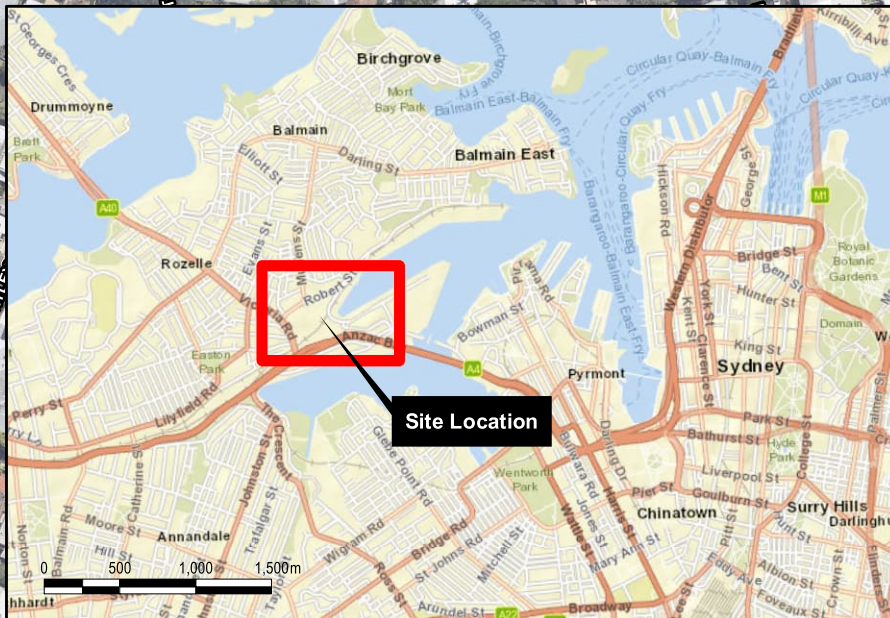
Friebel & Nadebaum (2011). *Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater*, CRC CARE Technical Report no. 10. CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.

National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM); as updated 2013.

United States Environmental Protection Agency (US EPA) (1989). *Risk Assessment Guidance for Superfund. Volume 1 Human Health Evaluation Manual*.

US EPA (2009) *Regional Screening Levels, Chemical Specific Parameters Table*

APPENDIX A FIGURES

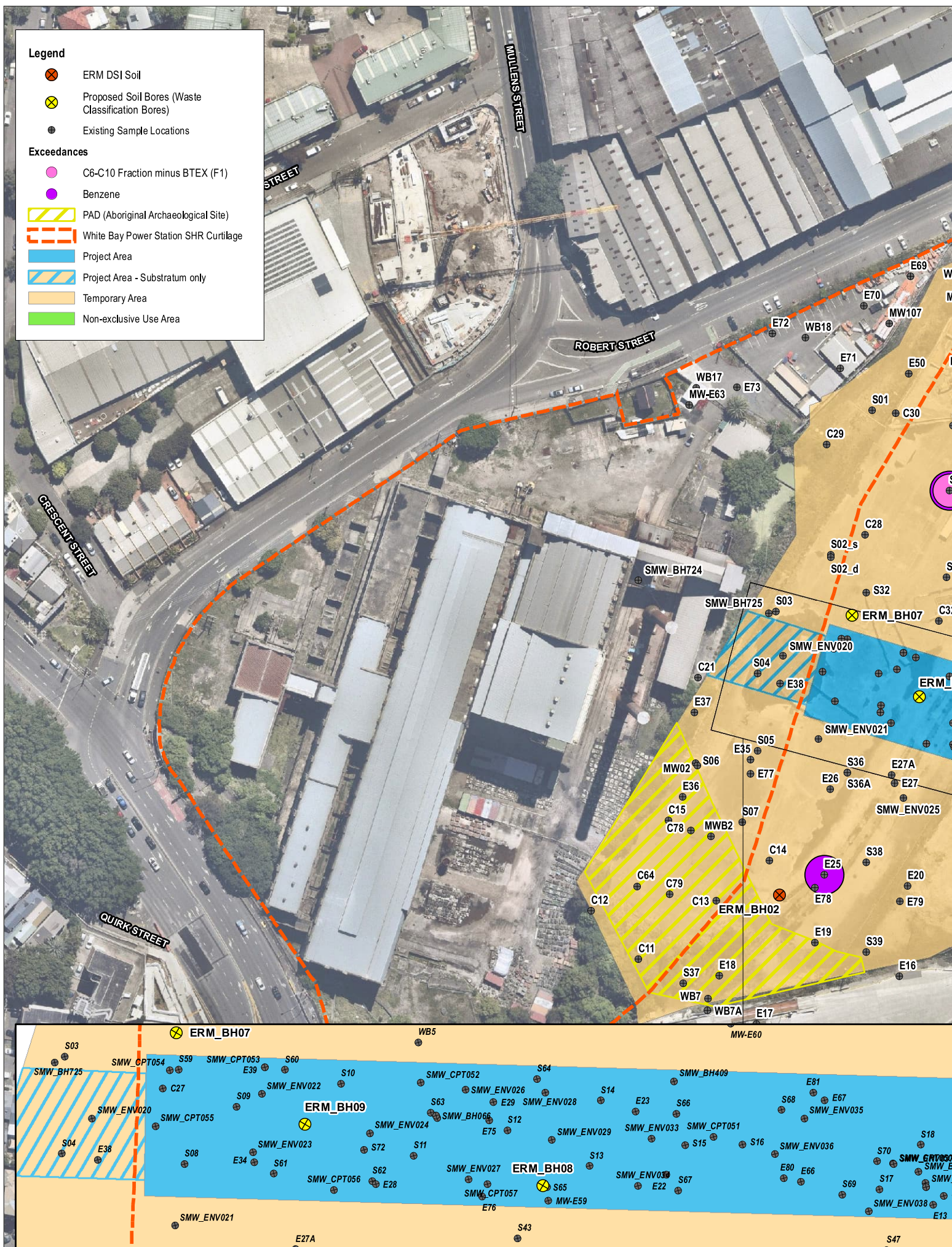


Legend

-  Railway (existing)
-  Study Area

Data Sources:

Design and Overlays : Commercial in Confidence
Imagery : Neamap Oct 2021



APPENDIX B TABLES



Table 1 - Soil Summary (Previous)

	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons								
	C10-C36 Fraction (Sum)	C29-C36 Fraction	C15-C28 Fraction	C10-C14 Fraction	C6-C9 Fraction	>C16-C34 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C10-C16 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	C6-C10 Fraction minus BTEX (F1)	C6-C10 Fraction		
													mg/kg	
EQL	3	5	3	3	3	100	50	50	100	50	10	10	0.1	
CRC Care (2017) Ecological guideline - Commercial and industrial														
NEPM (1999) EIL - Commercial/Industrial														
NEPM (1999) ESL - Commercial/Industrial (coarse)						1700		170	3300		215		75	
NEPM (1999) ESL - Commercial/Industrial (fine)						2500			6600				95	
NEPM (1999) HIL D - Commercial/Industrial														
CRC Care (2011) Direct Contact HSL D - Comm/Ind						27000	20000		38000		26000		430	
NEPM (1999) HSL D Comm/Indust - VI Sand 0 to <1 m							NL				260		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 1 to <2 m							NL				370		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 2 to <4 m							NL				630		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 4 m+							NL				NL		3	
CRC Care (2011) Direct Contact Intrusive Maint. Worker						85000	62000		120000		82000		1100	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 0 to <2 m													77	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 2 to <4 m													160	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 4 m+													NL	
NEPM (1999) Management Limits - Commercial/Industrial (coarse)						3500		1000	10000			700		
NEPM (1999) Management Limits - Commercial/Industrial (fine)						5000		1000	10000			800		

LocCode	Sample_Depth_Range	Field_ID	Sampled_Date													
C11	0-0.1	C11 0-0.1	15/02/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
C11	0.5-0.6	C11 0.5-0.6	15/02/2017	194	54	140	<20	<20	190	<50	<50	<100	-	<20	<20	-
C12	0.5-0.6	C12 0.5-0.6	15/02/2017	160	71	69	20	<20	130	<50	<50	<100	-	<20	<20	<0.1
C13	0.1-0.2	C13 0.1-0.2	20/02/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
C13	1-1.1	C13 1.0-1.1	20/02/2017	204	64	140	<20	<20	180	<50	<50	<100	-	<20	<20	<0.1
C14	0.1-0.2	C14_0.1-0.2	1/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
C14	1-1.1	C14_1.0-1.1	1/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	-
C15	0.4-0.5	C15_0.4-0.5	1/03/2017	401	310	67	24	<20	180	<50	<50	420	-	<20	<20	<0.1
C15	1-1.1	C15_1.0-1.1	1/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
C21	0-0.1	C21 (0.0-0.1)	15/02/2017	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
C21	0-0.1	C21 0-0.1	15/02/2017	262	81	160	21	<20	240	<50	<50	<100	-	<20	<20	<0.1
C21	0.5-0.6	C21 0.5-0.6	15/02/2017	95	<50	95	<20	<20	130	<50	<50	<100	-	<20	<20	-
C29	0-0.1	C29 0-0.1	15/02/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
C30	0.5-0.6	C30 (0.5-0.6)	17/02/2017	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
C30	0.5-0.6	C30_0.5-0.6	17/02/2017	218	58	160	<20	<20	230	<50	<50	<100	-	<20	<20	<0.1
C30	1.5-1.6	C30 (1.5-1.6)	17/02/2017	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
C30	1.5-1.6	C30_1.5-1.6	17/02/2017	493	170	300	23	<20	490	<50	<50	<100	-	<20	<20	-
C32	0.5-0.6	C32_0.5-0.6	16/02/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
C32	1.5-1.6	C32 (1.5-1.6)	16/02/2017	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
C32	1.5-1.6	C32_1.5-1.6	16/02/2017	1364	370	970	24	<20	1300	54	54	<100	-	<20	<20	-
C32	2.5-2.6	C32 (2.5-2.6)	16/02/2017	-	-	-	-	-	-	-	-	-	-	-	-	-
C64	0.4-0.5	C64-0.4-0.5	22/02/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
C64	1.4-1.5	C64-1.4-1.5	22/02/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
C64	2-2.1	C64-2.0-2.1	22/02/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E03	0-0.1	E03_0.0-0.1	15/03/2017	360	230	110	20	<20	250	<50	<50	110	-	<20	<20	<0.1
E04	0-0.1	E04_0-0.1	13/03/2017	557	320	200	37	<20	400	<50	<50	200	-	<20	<20	<0.1
E15	0.1-0.15	E15 0.10-0.15	3/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E15	0.5-0.6	E15 0.5-0.6	3/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	-
E15	2.5-2.6	E15 2.5-2.6	3/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	-
E18	0-0.1	E18_0-0.1	9/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E18	1-1.1	E18_1.0-1.1	9/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E18	2-2.1	E18_2.0-2.1	9/03/2017	114	55	59	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E19	0.1-0.2	E19 0.1-0.2	3/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E19	1.2-1.3	E19 1.2-1.3	3/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E19	4.1-4.2	E19 4.1-4.2	3/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E20	0.3	E20-0.2-0.3	6/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	-
E20	1.9	E20-1.8-1.9	6/03/2017	6479	1700	4700	79	<20	6100	310	310	410	-	<20	<20	<0.1
E21	0.6	E21-0.5-0.6	6/03/2017	<50	<50	<50	<20	<20	<100	<50	-	<100	-	<20	<20	<0.1
E21	1.6	E21-1.5-1.6	6/03/2017	132	58	74	<20	<20	120	<50	<50	<100	-	<20	<20	-
E24	1.1	E24-1.0-1.1	6/03/2017	408	140	230	38	<20	310	59	59	<100	-	<20	<20	<0.1
E24	2.6	E24-2.5-2.6	6/03/2017	54	<50	54	<20	<20	<100	<50	<50	<100	-	<20	<20	-
E25	0-0.1	E25_0-0.1	2/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1



Table 1 - Soil Summary (Previous)

	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons								
	C10-C36 Fraction (Sum)	C29-C36 Fraction	C15-C28 Fraction	C10-C14 Fraction	C6-C9 Fraction	>C16-C34 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C10-C16 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	C6-C10 Fraction minus BTEX (F1)	C6-C10 Fraction		
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		
EQL	3	5	3	3	3	100	50	50	100	50	10	10	0.1	
CRC Care (2017) Ecological guideline - Commercial and industrial														
NEPM (1999) EIL - Commercial/Industrial														
NEPM (1999) ESL - Commercial/Industrial (coarse)						1700		170	3300		215		75	
NEPM (1999) ESL - Commercial/Industrial (fine)						2500			6600				95	
NEPM (1999) HIL D - Commercial/Industrial														
CRC Care (2011) Direct Contact HSL D - Comm/Ind						27000	20000		38000		26000		430	
NEPM (1999) HSL D Comm/Indust - VI Sand 0 to <1 m							NL				260		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 1 to <2 m							NL				370		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 2 to <4 m							NL				630		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 4 m+							NL				NL		3	
CRC Care (2011) Direct Contact Intrusive Maint. Worker						85000	62000		120000		82000		1100	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 0 to <2 m													77	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 2 to <4 m													160	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 4 m+													NL	
NEPM (1999) Management Limits - Commercial/Industrial (coarse)						3500		1000	10000			700		
NEPM (1999) Management Limits - Commercial/Industrial (fine)						5000		1000	10000			800		

LocCode	Sample_Depth_Range	Field_ID	Sampled_Date													
E35	0.5	E35:0.4-0.5	6/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E35	1.9	E35:1.8-1.9	6/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	-
E35	2.7	E35:2.6-2.7	6/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E36	0.4	E36:0.3-0.4	6/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E36	0.9	E36:0.8-0.9	6/03/2017	310	130	180	<20	<20	270	<50	<50	<100	-	<20	<20	<0.1
E37	0.1-0.2	E37_0.1-0.2	9/03/2017	110	110	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E37	0.4-0.5	E37_0.4-0.5	9/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E37	1.4-1.5	E37_1.4-1.5	9/03/2017	270	130	140	<20	<20	200	<50	<50	<100	-	<20	<20	<0.1
E37	2.4-2.5	E37_2.4-2.5	9/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E38	0.4-0.5	E38_0.4-0.5	8/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	-
E38	1.4-1.5	E38_1.4-1.5	8/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E38	3.4-3.5	E38_3.4-3.5	8/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E41	0-0.1	E41_0.0-0.1	9/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E41	0.3-0.4	E41_0.3-0.4	9/03/2017	67	<50	67	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E42	0-0.1	E42_0.0-0.1	9/03/2017	68	<50	68	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E43	0-0.1	E43_0.0-0.1	9/03/2017	210	210	<50	<20	<20	160	<50	<50	370	-	<20	<20	<0.1
E44	0-0.1	E44_0.0-0.1	9/03/2017	406	85	290	31	<20	330	53	53	<100	-	<20	<20	<0.1
E44	1-1.1	E44_1.0-1.1	9/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E45	0-0.1	E45_0.0-0.1	9/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	-
E45	0.4-0.5	E45_0.4-0.5	9/03/2017	94	94	<50	<20	<20	<100	<50	<50	160	-	<20	<20	<0.1
E48	0-0.1	E48_0.0-0.1	9/03/2017	151	<50	130	21	<20	140	<50	<50	<100	-	<20	<20	<0.1
E48	0.3-0.4	E48_0.3-0.4	9/03/2017	<50	<50	<50	-	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E49	0.4-0.5	E49_0.4-0.5	9/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E49	0.5-0.6	E49_0.5-0.6	9/03/2017	250	90	160	<20	<20	220	<50	<50	<100	-	<20	<20	<0.1
E50	0-1	E50_0-01	9/03/2017	162	56	86	20	<20	120	<50	<50	<100	-	<20	<20	<0.1
E51	0.9-1	E51_0.9-1.0	8/03/2017	206	76	130	<20	<20	190	<50	<50	<100	-	<20	<20	<0.1
E51	2-2.1	E51_2.0-2.1	8/03/2017	290	<50	290	<20	<20	300	<50	<50	<100	-	<20	<20	<0.1
E51	2.5-2.6	E51_2.5-2.6	8/03/2017	-	-	-	-	-	-	-	-	-	-	-	-	-
E51	3.5-3.6	E51_3.5-3.6	8/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E52	0.1-0.2	E52_0.1-0.2	8/03/2017	320	190	130	<20	<20	260	<50	<50	290	-	<20	<20	<0.1
E52	1.4-1.5	E52_1.4-1.5	8/03/2017	124	71	53	<20	<20	110	<50	<50	<100	-	<20	<20	<0.1
E53	0.4-0.5	E53_0.4-0.5	9/03/2017	390	200	190	<20	<20	280	<50	<50	110	-	<20	<20	<0.1
E53	1.6-1.7	E53_1.6-1.7	9/03/2017	173	81	92	<20	<20	140	<50	<50	<100	-	<20	<20	<0.1
E54	0-0.1	E54_0.0-01	9/03/2017	290	110	180	<20	<20	250	<50	<50	<100	-	<20	<20	<0.1
E54	0.3-0.4	E54_0.3-0.4	9/03/2017	224	64	160	<20	<20	190	<50	<50	<100	-	<20	<20	<0.1
E54	0.4-0.5	E54_0.4-0.5	3/03/2017	135	62	73	<20	<20	130	<50	<50	<100	-	<20	<20	<0.1
E54	1.4-1.5	E54_1.4-1.5	3/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
E54A	0-0.1	E54A_0.0-01	9/03/2017	290	110	180	<20	<20	250	<50	<50	<100	-	<20	<20	<0.1
E54A	0.3-0.4	E54A_0.3-0.4	9/03/2017	224	64	160	<20	<20	190	<50	<50	<100	-	<20	<20	<0.1
E55	0-0.1	E55_0.0-0.1	9/03/2017	204	120	84	<20	<20	120	<50	<50	<100	-	<20	<20	<0.1
E55	1.3-1.4	E55_1.3-1.4	9/03/2017	131	63	68	<20	<20	100	<50	<50	<100	-	<20	<20	-
EE	2.2-1	E55_2.0-2.1	8/03/2017	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1



Table 1 - Soil Summary (Previous)

	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons								
	C10-C36 Fraction (Sum)	C29-C36 Fraction	C15-C28 Fraction	C10-C14 Fraction	C6-C9 Fraction	>C16-C34 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C10-C16 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	C6-C10 Fraction minus BTEX (F1)	C6-C10 Fraction		
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
EQL	3	5	3	3	3	100	50	50	100	50	10	10	0.1	
CRC Care (2017) Ecological guideline - Commercial and industrial														
NEPM (1999) EIL - Commercial/Industrial														
NEPM (1999) ESL - Commercial/Industrial (coarse)						1700		170	3300		215		75	
NEPM (1999) ESL - Commercial/Industrial (fine)						2500			6600				95	
NEPM (1999) HIL D - Commercial/Industrial														
CRC Care (2011) Direct Contact HSL D - Comm/Ind						27000	20000		38000		26000		430	
NEPM (1999) HSL D Comm/Indust - VI Sand 0 to <1 m							NL				260		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 1 to <2 m							NL				370		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 2 to <4 m							NL				630		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 4 m+							NL				NL		3	
CRC Care (2011) Direct Contact Intrusive Maint. Worker						85000	62000		120000		82000		1100	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 0 to <2 m													77	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 2 to <4 m													160	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 4 m+													NL	
NEPM (1999) Management Limits - Commercial/Industrial (coarse)						3500		1000	10000			700		
NEPM (1999) Management Limits - Commercial/Industrial (fine)						5000		1000	10000			800		

LocCode	Sample_Depth_Range	Field_ID	Sampled_Date													
E65	2-2.1	E65_2.0-2.1	2/03/2017	110	110	<50	<20	<20	110	<50	<50	380	-	<20	<20	<0.1
E65	2.6-2.9	E65_2.6-2.9	2/03/2017	130	130	<50	<20	<20	<100	<50	<50	360	-	<20	<20	<0.1
E68	0-0.1	E68 0-0.1	3/03/2017	337	270	67	<20	<20	280	<50	<50	190	-	<20	<20	<0.1
E68	0.4-0.5	E68 0.4-0.5	3/03/2017	120	120	<50	<20	<20	140	<50	<50	120	-	<20	<20	<0.1
E68	2.4-2.5	E68 2.4-2.5	3/03/2017	620	240	380	<20	<20	620	<50	<50	<100	-	<20	<20	<0.1
ENV020	0.2	ENV020_0.2	4/12/2018	450	340	110	<50	<10	320	<50	<50	480	800	<10	<10	<0.2
ENV020	1	ENV020_1.0	4/12/2018	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ENV020	2	ENV020_2.0	11/12/2018	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ENV020	2	SMW_ENV020_2.0	11/12/2018	<50	<100	<100	<50	<10	-	-	-	-	-	-	-	-
ENV020	8	ENV020_8.0	11/12/2018	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ENV020	8	SMW_ENV020_8.0	11/12/2018	<50	<100	<100	<50	<10	-	-	-	-	-	-	-	-
ENV020	12	SMW_ENV020_12.0	12/12/2018	<50	<100	<100	<50	<10	-	-	-	-	-	-	-	-
ENV020	16	MW_ENV020_16.0	12/12/2018	<50	<100	<100	<50	<10	-	-	-	-	-	-	-	-
ENV021	0.5	ENV021_0.5	4/12/2018	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ENV021	1.5	ENV021_1.5	4/12/2018	1000	360	640	<50	<10	910	<50	<50	220	1130	<10	<10	<0.2
ENV021	9	ENV021_9.0	6/12/2018	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ENV021	14	ENV021_14.0	6/12/2018	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ENV025	0.5	ENV025_0.5	4/12/2018	520	210	310	<50	<10	460	<50	<50	110	570	<10	<10	<0.2
ENV025	1	ENV025_1.0	4/12/2018	-	-	-	-	-	-	-	-	-	-	-	-	-
ENV025	3	ENV025_3.0	4/12/2018	1120	470	650	<50	<10	970	<50	<50	350	1320	<10	<10	<0.2
ENV025	10	ENV025_10.0	5/12/2018	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ENV025	14	ENV025_14.0	5/12/2018	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH02	0.2	ERM_BH02_0.2	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH02	0.5	ERM_BH02_0.5	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH02	0.8	ERM_BH02_0.8	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH02	1.6	ERM_BH02_1.6	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH02	3	ERM_BH02_3.0	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH03	0.4	ERM_BH03_0.4	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH03	1.8	DUP01_211117	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH03	1.8	ERM_BH03_1.8	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH03	1.8	TRIP01_211117	17/11/2021	<50	<50	<50	<20	<20	<100	<50	<50	<100	<100	<20	<20	<0.1
ERM_BH03	1.8	TRIP01_211117	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH03	3.5	ERM_BH03_3.5	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH04	0.6	ERM_BH04_0.6	18/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH05	0.3	ERM_BH05_0.3	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH05	0.5	ERM_BH05_0.5	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH05	0.8	ERM_BH05_0.8	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH05	1.7	ERM_BH05_1.7	17/11/2021	1820	910	910	<50	<10	1550	<50	<50	500	2050	<10	<10	<0.2
ERM_BH05	3	ERM_BH05_3.0	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
ERM_BH06	0.3	ERM_BH06_0.3	18/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
MWB2	2.5	MWB2_2.5	1/01/2003	<0.2	2040	<50	1300	740	-	-	-	-	-	-	-	<1
MWB2	4	MWB2_4	1/01/2003	<0.2	<50	<50	<50	<10	-	-	-	-	-	-	-	<1



Table 1 - Soil Summary (Previous)

	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons								
	C10-C36 Fraction (Sum)	C29-C36 Fraction	C15-C28 Fraction	C10-C14 Fraction	C6-C9 Fraction	>C16-C34 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C10-C16 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	C6-C10 Fraction minus BTEX (F1)	C6-C10 Fraction		
													Benzene	
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
EQL	3	5	3	3	3	100	50	50	100	50	10	10	0.1	
CRC Care (2017) Ecological guideline - Commercial and industrial														
NEPM (1999) EIL - Commercial/Industrial														
NEPM (1999) ESL - Commercial/Industrial (coarse)						1700		170	3300		215		75	
NEPM (1999) ESL - Commercial/Industrial (fine)						2500			6600				95	
NEPM (1999) HIL D - Commercial/Industrial														
CRC Care (2011) Direct Contact HSL D - Comm/Ind						27000	20000		38000		26000		430	
NEPM (1999) HSL D Comm/Indust - VI Sand 0 to <1 m							NL				260		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 1 to <2 m							NL				370		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 2 to <4 m							NL				630		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 4 m+							NL				NL		3	
CRC Care (2011) Direct Contact Intrusive Maint. Worker						85000	62000		120000		82000		1100	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 0 to <2 m													77	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 2 to <4 m													160	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 4 m+													NL	
NEPM (1999) Management Limits - Commercial/Industrial (coarse)						3500		1000	10000			700		
NEPM (1999) Management Limits - Commercial/Industrial (fine)						5000		1000	10000			800		

LocCode	Sample_Depth_Range	Field_ID	Sampled_Date													
S04	1.4-1.5	QC102	11/03/2021	110	<100	110	<50	<10	170	<50	<50	<100	170	<10	<10	<0.2
S04	1.4-1.5	S04_1.4-1.5	11/03/2021	<50	<100	<100	<50	<10	130	<50	<50	<100	130	<10	<10	<0.2
S04	3.2-3.5	S04_3.2-3.5	11/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S05	1-1.1	S05_1.0-1.1	10/03/2021	600	210	390	<50	<10	530	<50	<50	<100	530	<10	<10	<0.2
S05	1.5-1.8	QC100	10/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S05	1.5-1.8	S05_1.5-1.8	10/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S05	2.2-2.6	S05_2.2-2.6	12/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S06	0.1-0.15	S06_0.1-0.15	12/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S06	1.1-1.3	S06_1.1-1.3	20/04/2021	<50	<100	<100	<50	<10	130	<50	<50	<100	130	<10	<10	<0.2
S06	3-3.2	S06_3.0-3.2	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S06	4-4.2	S06_4.0-4.2	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S06	5-8-6	S06_5.8-6.0	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S07	0.5-0.6	S07_0.5-0.6	9/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S07	1-1.1	S07_1.0-1.1	9/03/2021	110	<100	110	<50	<10	170	<50	<50	<100	170	<10	<10	<0.2
S07	2.2-2.5	S07_2.2-2.5	12/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S07	4-4.4	S07_4.0-4.4	12/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S24	0.15-0.25	S24_0.15-0.25	12/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S24	2.1-2.2	S24_2.1-2.2	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S24	4-4.2	S24_4.0-4.2	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S24	7-7.2	S24_7.0-7.2	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S25	0.9-1.1	S25_0.9-1.1	13/04/2021	260	110	150	<50	<10	220	<50	<50	<100	220	<10	<10	<0.2
S25	1.5-1.8	S25_1.5-1.8	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S25	3-3.3	S25_3.0-3.3	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S25	7-7.3	S25_7.0-7.3	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S26	0-0.1	QC116	13/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S26	0-0.1	S26_0.0-0.1	13/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S26	0.9-1	S26_0.9-1.0	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S27	0.4-0.5	S27_0.4-0.5	13/04/2021	780	230	490	60	<10	650	120	120	100	870	<10	<10	<0.2
S27	0.9-1	S27_0.9-1.0	15/04/2021	550	220	330	<50	<10	510	<50	<50	<100	510	<10	<10	<0.2
S28	0.4-0.5	S28_0.4-0.5	13/04/2021	330	190	140	<50	<10	320	<50	<50	110	430	<10	<10	<0.2
S28	1.1-1.2	S28_1.1-1.2	13/04/2021	320	140	180	<50	<10	270	<50	<50	<100	270	<10	<10	<0.2
S29	0.17-0.2	S29_0.17-0.2	13/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S29	1.8-2.2	QC216	13/04/2021	-	250	820	240	<25	860	390	390	140	1400	<25	<25	<0.2
S29	1.8-2.2	S29_1.8-2.2	13/04/2021	720	340	380	<50	<10	600	<50	<50	230	830	<10	<10	<0.2
S29	2.8-3.2	S29_2.8-3.2	13/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S29	5.8-6.2	S29_5.8-6.2	13/04/2021	440	160	280	<50	<10	380	<50	<50	<100	380	<10	<10	<0.2
S30	0.15-0.25	QC115	13/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S30	0.15-0.25	QC215	13/04/2021	-	<100	<100	<50	<25	<100	<50	<50	<100	<50	<25	<25	<0.2
S30	0.15-0.25	S30_0.15-0.25	13/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S30	0.9-1	S30_0.9-1.0	13/04/2021	750	290	460	<50	<10	640	<50	<50	180	820	<10	<10	<0.2
S31	0.4-0.5	S31_0.4-0.5	13/04/2021	1110	540	570	<50	<10	1080	<50	<50	270	1350	<10	<10	<0.2
S31	1.8-2.2	S31_1.8-2.2	13/04/2021	1040	420	620	<50	<10	1000	<50	<50	260	1260	463	477	2.0



Table 1 - Soil Summary (Previous)

	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons								
	C10-C36 Fraction (Sum)	C29-C36 Fraction	C15-C28 Fraction	C10-C14 Fraction	C6-C9 Fraction	>C16-C34 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C10-C16 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	C6-C10 Fraction minus BTEX (F1)	C6-C10 Fraction		
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
EQL	3	5	3	3	3	100	50	50	100	50	10	10	0.1	
CRC Care (2017) Ecological guideline - Commercial and industrial														
NEPM (1999) EIL - Commercial/Industrial														
NEPM (1999) ESL - Commercial/Industrial (coarse)						1700		170	3300		215		75	
NEPM (1999) ESL - Commercial/Industrial (fine)						2500			6600				95	
NEPM (1999) HIL D - Commercial/Industrial														
CRC Care (2011) Direct Contact HSL D - Comm/Ind						27000	20000		38000		26000		430	
NEPM (1999) HSL D Comm/Indust - VI Sand 0 to <1 m							NL				260		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 1 to <2 m							NL				370		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 2 to <4 m							NL				630		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 4 m+							NL				NL		3	
CRC Care (2011) Direct Contact Intrusive Maint. Worker						85000	62000		120000		82000		1100	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 0 to <2 m													77	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 2 to <4 m													160	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 4 m+													NL	
NEPM (1999) Management Limits - Commercial/Industrial (coarse)						3500		1000	10000			700		
NEPM (1999) Management Limits - Commercial/Industrial (fine)						5000		1000	10000			800		

LocCode	Sample_Depth_Range	Field_ID	Sampled_Date													
S38	1-1.1	S38_1.0-1.1	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S38	2-2.2	S38_2.0-2.2	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S38	4-4.2	S38_4.0-4.2	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S38	7-7.2	S38_7.0-7.2	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S39	0-0.15	S39_0.0-0.15	15/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S39	1-1.15	S39_1.0-1.15	15/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S41	0.5-0.6	S41_0.5-0.6	15/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S42	0.4-0.5	QC117	15/04/2021	110	<100	110	<50	<10	140	<50	<50	<100	140	<10	<10	<0.2
S42	0.4-0.5	S42_0.4-0.5	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S42	0.9-1	S42_0.9-1.0	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S42	2-2.3	S42_2.0-2.3	20/04/2021	820	340	480	<50	<10	780	<50	<50	170	950	<10	<10	<0.2
S42	4.7-5.1	S42_4.7-5.1	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S43	0.4-0.5	S43_0.4-0.5	15/04/2021	270	120	150	<50	<10	220	<50	<50	110	330	<10	<10	<0.2
S43	1.4-1.5	S43_1.4-1.5	20/04/2021	<50	<100	<100	<50	<10	100	<50	<50	<100	100	<10	<10	<0.2
S43	2.8-3.4	S43_2.8-3.4	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S43	5.8-6.2	S43_5.8-6.2	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S44	0-0.1	S44_0.0-0.1	17/03/2021	<50	<100	<100	<50	<10	130	<50	<50	100	230	<10	<10	<0.2
S44	1-1.1	S44_1.0-1.1	17/03/2021	<50	<100	<100	<50	<10	110	<50	<50	<100	110	<10	<10	<0.2
S45	0.4-0.5	S45_0.4-0.5	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S45	1.4-1.5	S45_1.4-1.5	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S45	2.8-3.2	S45_2.8-3.2	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S45	4.8-5.2	S45_4.8-5.2	20/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S46	0.4-0.5	S46_0.4-0.5	16/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S46	0.7-0.8	S46_0.7-0.8	16/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S47	0.1-0.2	S47_0.1-0.2	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S47	0.4-0.5	S47_0.4-0.5	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S47	0.95-1.25	S47_0.95-1.25	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S47	1.9-2	S47_1.9-2.0	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S48	0-0.1	S48_0.0-0.1	16/03/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S48	0.4-0.5	S48_0.4-0.5	16/03/2021	920	410	450	60	<10	680	100	100	280	1060	<10	<10	<0.2
S49	0-0.15	S49_0.0-0.15	16/04/2021	110	110	<100	<50	<10	140	<50	<50	<100	140	<10	<10	<0.2
S50	0.5-0.6	S50_0.5-0.6	14/04/2021	210	<100	210	<50	17	240	<50	<50	<100	240	15	17	<0.2
S50	1-1.2	S50_1.0-1.2	15/04/2021	<50	<100	<100	<50	<10	120	<50	<50	<100	120	<10	<10	<0.2
S50	3-3.2	S50_3.0-3.2	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S50	5-5.2	S50_5.0-5.2	15/04/2021	110	<100	110	<50	<10	180	<50	<50	<100	180	<10	<10	<0.2
S51	0.3-0.4	S51_0.3-0.4	14/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S51	1.4-1.5	S51_1.4-1.5	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S51	2.8-3.2	S51_2.8-3.2	16/04/2021	130	<100	130	<50	<10	200	<50	<50	<100	200	<10	<10	<0.2
S51	4.8-5.2	S51_4.8-5.2	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S52	0.3-0.4	S52_0.3-0.4	14/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S52	1-1.1	S52_1.0-1.1	14/04/2021	1220	250	840	130	<10	940	220	220	100	1260	<10	<10	<0.2
S52	2-2.2	S52_2.0-2.2	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2



Table 1 - Soil Summary (Previous)

	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons								
	C10-C36 Fraction (Sum)	C29-C36 Fraction	C15-C28 Fraction	C10-C14 Fraction	C6-C9 Fraction	>C16-C34 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C10-C16 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	C6-C10 Fraction minus BTEX (F1)	C6-C10 Fraction		
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
EQL	3	5	3	3	3	100	50	50	100	50	10	10	0.1	
CRC Care (2017) Ecological guideline - Commercial and industrial														
NEPM (1999) EIL - Commercial/Industrial														
NEPM (1999) ESL - Commercial/Industrial (coarse)						1700		170	3300		215		75	
NEPM (1999) ESL - Commercial/Industrial (fine)						2500			6600				95	
NEPM (1999) HIL D - Commercial/Industrial														
CRC Care (2011) Direct Contact HSL D - Comm/Ind						27000	20000		38000		26000		430	
NEPM (1999) HSL D Comm/Indust - VI Sand 0 to <1 m							NL				260		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 1 to <2 m							NL				370		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 2 to <4 m							NL				630		3	
NEPM (1999) HSL D Comm/Indust - VI Sand 4 m+							NL				NL		3	
CRC Care (2011) Direct Contact Intrusive Maint. Worker						85000	62000		120000		82000		1100	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 0 to <2 m													77	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 2 to <4 m													160	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 4 m+													NL	
NEPM (1999) Management Limits - Commercial/Industrial (coarse)						3500		1000	10000			700		
NEPM (1999) Management Limits - Commercial/Industrial (fine)						5000		1000	10000			800		

LocCode	Sample_Depth_Range	Field_ID	Sampled_Date													
S55	2.8-3.2	S55_2.8-3.2	19/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S55	6-6.1	S55_6.0-6.1	19/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S56	0.07-0.1	S56_0.07-0.1	15/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S56	0.8-1	S56_0.8-1.0	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S57	0.5-0.7	S57_0.5-0.7	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S57	0.8-1	S57_0.8-1.0	16/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S58	0.3-0.4	S58_0.3-0.4	26/04/2021	200	200	<100	<50	<10	200	<50	<50	330	530	<10	<10	<0.2
S58	0.5-0.6	S58_0.5-0.6	26/04/2021	670	560	110	<50	<10	390	<50	<50	890	1280	<10	<10	<0.2
S58	2-2.2	QC120	26/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S58	2-2.2	QC219	26/04/2021	-	<100	<100	<50	<25	<100	<50	<50	<100	<50	<25	<25	<0.2
S58	2-2.2	S58_2.0-2.2	26/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S58	4-4.2	S58_4.0-4.2	26/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
S58	5.8-6	S58_5.8-6.0	26/04/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
SMW_BH403	0.35	SMW_BH403/0.35	15/03/2020	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
SMW_BH403	0.8	SMW_BH403/0.80	15/03/2020	320	210	110	<50	<10	260	<50	<50	150	410	<10	<10	<0.2
SMW_BH405	0.3	SMW_BH405/0.3	10/03/2020	110	110	<100	<50	<10	150	<50	<50	<100	150	<10	<10	<0.2
SMW_BH405	1.5	SMW_BH405/1.5	10/03/2020	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
SMW_BH406	0.2	SMW_BH406/0.2	6/03/2020	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
SMW_BH406	1.5	SMW_BH406/1.5	6/03/2020	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
SMW_BH407	0.4	SMW_BH407/0.4	9/03/2020	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
SMW_BH415	0.5	SMW_BH415/0.5	15/03/2020	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
SMW_BH415	1	SMW_BH415/1.0	15/03/2020	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2
WB24	1	WB24_1	1/01/2003	420	100	320	<10	<2	-	-	-	-	-	-	-	<0.2
WB24	3	WB24_3	1/01/2003	250	90	160	<10	<2	-	-	-	-	-	-	-	<0.2
WB4	0.3	WB4_0.3	1/01/2003	<0.2	90	<50	90	<10	-	-	-	-	-	-	-	<1
WB4	0.5-0.6	WB4_0.5-0.6	23/06/2015	820	510	310	<20	<20	880	<50	<50	860	-	<20	<20	<0.1
WB4	1.9-2	WB4_1.9-2.0	23/06/2015	390	230	160	<20	25	340	<50	<50	170	-	31	31	<0.1
WB4	2.4	WB4_2.4	1/01/2003	<0.2	-	<50	<50	<10	-	-	-	-	-	-	-	<1
WB5	0.5	WB5_0.5	1/01/2003	<0.2	10,500	3500	7000	<100	-	-	-	-	-	-	-	<1
WB7	0.1-0.2	WB7_0.1-0.2	23/06/2015	240	110	130	<20	<20	210	<50	<50	<100	-	<20	<20	<0.1
WB7	0.6	WB7_0.6	1/01/2003	<0.2	1240	140	1100	<10	-	-	-	-	-	-	-	<1
WB7	1.9-2	WB7_1.9-2.0	23/06/2015	57	57	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1
WB7	3.9-4	WB7_3.9-4.0	23/06/2015	<50	<50	<50	<20	<20	<100	<50	<50	<100	-	<20	<20	<0.1

Statistical Summary

Number of Results	315	318	320	318	320	308	308	307	308	184	308	308	304
Number of Detects	122	107	111	28	5	116	18	18	51	56	5	5	2
Minimum Concentration	<0.2	<50	<50	<10	<2	<100	<50	<50	<100	<50	<10	<10	<0.1
Maximum Concentration	6479	10500	4700	7000	740	6100	390	390	1200	2050	463	477	4.6
Average Concentration	202	146	148	52	11	201	32	32	89	196	8.8	9	0.11
Standard Deviation	482	616	374	402	47	441	35	35	124	376	26	27	0.23
Number of Guideline Exceedances	0	0	0	0	0	1	0	0	0	0	0	0	0

	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons								Benzene	Total Hydrocarbons
	C10-C36 Fraction (Sum)	C29-C36 Fraction	C15-C28 Fraction	C10-C14 Fraction	C6-C9 Fraction	>C16-C34 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C10-C16 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	C6-C10 Fraction minus BTEX (F1)	C6-C10 Fraction			
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		
EQL	50	50	50	20	10	100	50	50	100	50	10	10	0.1	0	
CRC Care (2017) Ecological guideline - Commercial and industrial															
NEPM (1999) EIL - Commercial/Industrial															
NEPM (1999) ESL - Commercial/Industrial (coarse)						1700		170	3300		215		75	13	
NEPM (1999) ESL - Commercial/Industrial (fine)						2500			6600				95	13	
CRC Care (2011) Direct Contact HSL D - Comm/Ind						27000	20000		38000		26000		430	990	
NEPM (1999) HIL D - Commercial/Industrial															
NEPM (1999) HSL D Comm/Indust - VI Sand 0 to <1 m							NL				260		3	N	
NEPM (1999) HSL D Comm/Indust - VI Sand 1 to <2 m							NL				370		3	N	
NEPM (1999) HSL D Comm/Indust - VI Sand 2 to <4 m							NL				630		3	N	
NEPM (1999) HSL D Comm/Indust - VI Sand 4 m+							NL				NL		3	N	
CRC Care (2011) Direct Contact Intrusive Maint. Worker						85000	62000		120000		82000		1100	1200	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 0 to <2 m													77	N	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 2 to <4 m													160	N	
CRC Care (2011) Intrusive Maint. Worker - VI Sand 4 m+													NL	N	
NEPM (1999) Management Limits - Commercial/Industrial (coarse)						3500		1000	10000			700			
NEPM (1999) Management Limits - Commercial/Industrial (fine)						5000		1000	10000			800			

LocCode	Sample_Depth_Range	Field_ID	Sampled_Date	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH02	0.2	ERM_BH02_0.2	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH02	0.5	ERM_BH02_0.5	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH02	0.8	ERM_BH02_0.8	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH02	1.6	ERM_BH02_1.6	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH02	3	ERM_BH02_3.0	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH03	0.4	ERM_BH03_0.4	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH03	1.8	DUP01_211117	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH03	1.8	ERM_BH03_1.8	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH03	1.8	TRIP01_211117	17/11/2021	<50	<50	<50	<20	<20	<100	<50	<50	<100	<100	<20	<20	<0.1	<0
ERM_BH03	1.8	TRIP01_211117	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH03	3.5	ERM_BH03_3.5	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH04	0.6	ERM_BH04_0.6	18/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH05	0.3	ERM_BH05_0.3	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH05	0.5	ERM_BH05_0.5	16/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH05	0.8	ERM_BH05_0.8	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH05	1.7	ERM_BH05_1.7	17/11/2021	1820	910	910	<50	<10	1550	<50	<50	500	2050	<10	<10	<0.2	<0
ERM_BH05	3	ERM_BH05_3.0	17/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0
ERM_BH06	0.3	ERM_BH06_0.3	18/11/2021	<50	<100	<100	<50	<10	<100	<50	<50	<100	<50	<10	<10	<0.2	<0

APPENDIX C RISK CALC



RISK / HEALTH-BASED CRITERIA MODEL SOIL SOURCE

INPUT SCREEN

Enter number of simulation columns (1-20)

4

SIMULATION NO.

CALCULATION TYPE

0-Forward risk, 1-Health-based criteria

Select default scenario parameters

Select default chemical parameters

COPC

Soil source concentration (mg/kg)

CHEMICAL DATA

PHYSICAL PROPERTIES

Molecular weight (g/mol)

Diffusivity in air (cm²/s)

Diffusivity in water (cm²/s)

Henry's Law Constant at Ref Temp (atm-m³/mol)

Reference temperature (°C)

Organic carbon partition coefficient (Koc) (cm³/g)

Pure component solubility in water (mg/L)

Solubility Adjustment for Mixtures

0-Mass fraction, 1-Mole fraction calculation

Mass or mole fraction

Fuel/TPH average molecular weight (g/mol)

Henry's Law Temperature Adjustment

Enthalpy of vaporization at the normal boiling point (cal/mol)

Normal boiling point (°K)

Critical temperature (°K)

TOXICOLOGICAL / EXPOSURE PROPERTIES

0-Cancer endpoint, 1-Non-cancer endpoint

Inhalation cancer unit risk (µg/m³)⁻¹

Inhalation reference concentration (µg/m³)

Fraction of RfC to background exposure

VAPOUR EMISSION SCENARIO PARAMETERS

Override default vapour model averaging time (yr)

Vapour model averaging time (yr)

Average temperature of soil (°C)

Table 1a - HSL Model Input Sheet

	1	2	3
SIMULATION NO.	1	2	3
CALCULATION TYPE	0	0	0
0-Forward risk, 1-Health-based criteria	HSL-D	HSL-D	HSL-D
Select default scenario parameters	Benzene	TPH >C6-C8 aliphatic	TPH >C8-C10
Select default chemical parameters	Benzene	TPH >C6-C8 aliphatic	TPH >C8-C10
COPC	4.6	107.0	290.0
Soil source concentration (mg/kg)			
CHEMICAL DATA			
PHYSICAL PROPERTIES			
Molecular weight (g/mol)	78.11	110	132.17
Diffusivity in air (cm ² /s)	0.088	0.07	0.06
Diffusivity in water (cm ² /s)	9.80E-06	1.00E-05	8.00E-06
Henry's Law Constant at Ref Temp (atm-m ³ /mol)	5.537E-03	1.878E+00	3.902E+00
Reference temperature (°C)	25	25	25
Organic carbon partition coefficient (Koc) (cm ³ /g)	1.66E+02	3.16E+03	3.16E+03
Pure component solubility in water (mg/L)	1.75E+03	1.60E+01	6.90E+00
Solubility Adjustment for Mixtures			
0-Mass fraction, 1-Mole fraction calculation	1	1	1
Mass or mole fraction	0.0336	0.13104	0.2
Fuel/TPH average molecular weight (g/mol)			
Henry's Law Temperature Adjustment			
Enthalpy of vaporization at the normal boiling point (cal/mol)	7342	6895.15	8100
Normal boiling point (°K)	353.24	341.7	390
Critical temperature (°K)	562.16	508	560
TOXICOLOGICAL / EXPOSURE PROPERTIES			
0-Cancer endpoint, 1-Non-cancer endpoint	0	1	1
Inhalation cancer unit risk (µg/m ³) ⁻¹	6.00E-06		
Inhalation reference concentration (µg/m ³)	90	18400	10000
Fraction of RfC to background exposure	0.2	0.1	0.1
VAPOUR EMISSION SCENARIO PARAMETERS			
Override default vapour model averaging time (yr)			
Vapour model averaging time (yr)	30	7	7
Average temperature of soil (°C)	25	25	25



Table 1a - HSL Model Input Sheet

RISK / HEALTH-BASED CRITERIA MODEL SOIL SOURCE

INPUT SCREEN

Enter number of simulation columns (1-20)

4

SIMULATION NO.

CALCULATION TYPE

0-Forward risk, 1-Health-based criteria

Select default scenario parameters

Select default chemical parameters

COPC

Stratus B Properties

Default soil properties

Soil dry bulk density (g/cm³)

Soil air porosity (unitless)

Soil water porosity (unitless)

Fraction organic carbon content

Stratus C Properties

Default soil properties

Soil dry bulk density (g/cm³)

Soil air porosity (unitless)

Soil water porosity (unitless)

Fraction organic carbon content

Dirt in Cracks Properties

Default soil properties

Soil dry bulk density (g/cm³)

Soil air porosity (unitless)

Soil water porosity (unitless)

Building

Floor length (cm)

Floor width (cm)

Foundation thickness (cm)

Enclosed space height (cm)

Air exchange rate (h⁻¹)

Aerial crack fraction

Advective Transport

0-Qs/Qb, 1-Specify Qs, 2-Pressure Diff calculate

Qsoil/Qbuilding

Average vapour flowrate into building (Qsoil) (L/min)

Soil-building pressure differential (g/cm/s²)Soil-vapour permeability in upper soil profile (kv) (cm²)

1

2

3

0

0

0

HSL-D

HSL-D

HSL-D

Benzene

TPH >C6-C8 aliphatic

TPH >C8-C10

Benzene

TPH >C6-C8 aliphatic

TPH >C8-C10

disabled

disabled

disabled

disabled

disabled

disabled

disabled

disabled

disabled

disabled

disabled

disabled

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disabled

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disabled

disabled

disabled

disabled

disabled

disabled

disabled

disabled

SAND

SAND

SAND

1.625

1.625

1.625

0.257

0.257

0.257

0.13

0.13

0.13

2000

2000

2000

2000

2000

2000

15

15

15

300

300

300

0.83

0.83

0.83

0.001

0.001

0.001

0

0

0

0.001

0.001

0.001

6.0E-08

6.0E-08

6.0E-08



RISK / HEALTH BASED CRITERIA MODEL SOIL SOURCE

RESULTS SCREEN

SIMULATION NO.

VOLATILISATION FACTOR (noncapped) (ug/m3)/(mg/kg)

SOURCE DEPLETION TIME (yrs)

ADJUSTED MODEL AVERAGING TIME (yrs)

Notes

SATURATION CONCENTRATION (mg/kg)

THEORETICAL MAXIMUM AIR CONCENTRATION (ug/m3)

THEORETICAL MAXIMUM AIR CONCENTRATION WITH ATTENUATION (ug/m3)

SOIL CONCENTRATION (mg/kg)

BREATHABLE AIR CONCENTRATION - vapour non-limited (ug/m3)

BREATHABLE AIR CONCENTRATION - vapour limited (ug/m3)

SOURCE FULLY DEPLETED

CANCER RISK - vapour non-limited

CANCER RISK - vapour limited

Health Based Criteria - vapour non-limited (mg/kg)

Health Based Criteria - vapour limited (mg/kg)

NONCANCER HAZARD INDEX - vapour non-limited

NONCANCER HAZARD INDEX - vapour limited

Health Based Criteria - vapour non-limited (mg/kg)

Health Based Criteria - vapour limited (mg/kg)

Table1C - Summary of Risk Results for Soil

COPC	Effective Solubility Limit (mg/kg) ¹	Fraction W Percent of Carbon Ra
Benzene	360	-
Toluene	560	-
Ethylbenzene	64	-
Xylenes	300	-
Naphthalene	9	-
TPH >C6-C8 aliphatic	456	0.23
TPH >C8-C10 aliphatic	232	0.64
TPH >C8-C10 aromatic	261	0.13
TRH C6-C10	950	1.0
TPH >C10-C12 aliphatic	106	0.21
TPH >C12-C16 aliphatic	25	0.60
TPH >C10-C12 aromatic	145	0.04
TPH >C12-C16 aromatic	285	0.15
TRH >C10-C16	560	1.0
Sum		

1. Default TPH fractions percents from CRC CARE (2011).

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