

19 June 2018

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Cc: Emmanuel Ernest, Geoquitards Environmental

Risk Assessment: Sandringham Golf Driving Range, 20 Wangara Road Sandringham

1.0 Background

Environmental Risk Sciences Pty Ltd (enRiskS) has been commissioned by Bayside City Council to conduct a human health and ecological risk assessment (HHERA) in relation to the presence of contamination in surface soil at the property located at 20 Wangara Road in Sandringham, Victoria ("the site").

Investigations undertaken at the site have identified the presence of elevated concentrations of metals (lead, copper, zinc and tin) and total recoverable hydrocarbons (TRH >C16-C34). In addition, a range of odours were also identified in the subsurface.

The site is understood to have been formerly used as a landfill (up to 1968) and has subsequently been used as a rifle range and golf driving range.

The site is proposed to remain as open space; however it is to be redeveloped to include a number of netball courts.

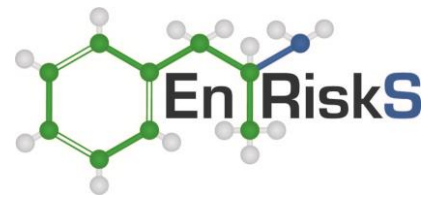
2.0 Objectives

The objectives of the HHERA provided in this letter are:

- To quantify potential risks to human health associated with the presence of contamination that remains in surface soil on the site;
- To review and evaluate potential risks to the terrestrial environment, associated with the presence of contamination that remains in surface soil on the site;
- On the basis of the HHERA, identify any additional risk management measures that may be required to protect public health.

The HHERA has addressed human health and environmental risk issues associated with the proposed use of the site for recreational purposes, with netball courts to be constructed. The HHERA has only considered the proposed recreational development only. The HHERA has not addressed any other uses of the site or any off-site risks. It is also noted that the HHERA has only addressed risks posed by contamination identified in surface soil on the site.

No assessment of landfill gas has been undertaken as no data or other information is available.



3.0 Methodology

The methodology adopted for the conduct of this HHERA is in accordance with the relevant National protocols/ guidelines including:

- enHealth (enHealth 2012a) Environmental Health Risk Assessment, Guidelines for Assessing Human Health Risks from Environmental Hazards;
- enHealth (enHealth 2012b) Australian Exposure Factor Guide;
- ASC NEPM National Environmental Protection Measure – Assessment of Site Contamination including:
 - Schedule B1 Investigation Levels for Soil and Groundwater (NEPC 1999 amended 2013a)
 - Schedule B4 Guideline on Site-Specific Health Risk Assessment Methodology (NEPC 1999 amended 2013b)
 - Schedule B5 Guideline on Ecological Risk Assessment (NEPC 1999 amended 2013c)
 - Schedule B7 Guideline on Derivation of Health-Based Investigation Levels (NEPC 1999 amended 2013d) and
 - Toolbox Note – Key principles for the remediation and management of contaminated sites.

Where required, additional guidance has been obtained from relevant Australian and International guidance consistent with current industry best practice, such as that available from the USEPA and the World Health Organisation (WHO).

4.0 Review of available soil data and conceptual site model

4.1 Available data

Information relevant to the site and nature and extent of soil contamination on the site is available from the following:

- Geoaquitarads 2017, Environmental Due Diligence Assessment, Sandringham Golf Driving Range, 20 Wangara Road, Sandringham VIC 3191. Report prepared for Bayside City Council, dated 24 July 2017. Laboratory reports relevant to this data have also been provided for this data.

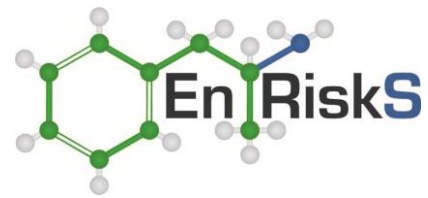
4.2 Site description

The site, which is approximately 6.6 hectares in size, is located at 20 Wangara Road in Sandringham, which is approximately 17 kilometres to the south-east of Melbourne. The site is currently owned by Bayside City Council and is zoned Public Park and Recreation Zone (PPRZ). The zoning is not proposed to change.

The site is currently used as a golf driving range and is largely covered with grass. A club house is situated at the north of the site, and a gravel/concrete car park located in the north western part of the site. The perimeter of the site includes a soil embankment and trees. The site is surrounded by a cemetery (to the east), residential homes (to the west) and commercial/industrial premises (to the north and south).

The site was formerly used as a municipal landfill until 1968, with a former Pacific Dunlop Battery factory was to the west of the site. The site has been used for a golf driving range since 1986.

The site is proposed to be redeveloped as a netball facility. No specific development plans for the site have been provided, however information available on the Bayside City Council website indicates the site will include 12 outdoor courts and 2 indoor courts (likely to be developed at a later stage), with room to expand to include 1 additional indoor and 3 outdoor courts.



Geology

Investigations undertaken by Geoquitarads (2017) indicates that the site comprises of fill materials to a depth of at least 3 m (the extent of intrusive investigations), described as sandy clay and silty clay with crushed rock, bricks, landfill rubbish, plastic, glass pieces.

Landfill odours were identified during intrusive works at depth of approximately 1m and deeper.

In areas away from the former landfill the natural soil is described as silty sand and clayey sand.

Potential exposures

In relation to the proposed use of the site, much of the site will be covered with concrete/netball court surface, with an indoor facility (presumable constructed on a concrete slab) proposed to be constructed at a later date. The presence of any surface cover will limit the potential for recreational users of the site to come into direct contact with surface soil. There may, however be the potential for recreational users (children and adults) to have some minor direct contact with surface soil on the site, where it remains accessible. The presence of good surface cover will prevent or minimise the potential for dust to be generated and hence the dust inhalation pathway is not considered to be of significance for future site users

Workers involved in the development of the site, or future intrusive maintenance works may come into direct contact with soil at the site. This may result in incidental ingestion and dermal contact with soil. These works may also result in the generation of dust, and hence the inhalation of dust is a potentially important pathway.

If any volatile chemicals are present, recreational users of the part and workers may be exposed via vapour inhalation.

In relation to the terrestrial environment, where the site is largely covered with concrete/netball court surface, there are no terrestrial environments that warrant protection. Where there are some other landscaped areas, these need to have soil quality that supports a suitable terrestrial environment to ensure plants can be grown and maintained. These are likely to be small areas. It is noted that the site cannot be considered to be a sensitive terrestrial environment that provides nesting and significant food sources to birds or mammals. Hence the key terrestrial environment that requires consideration relates to plants and soil invertebrates.

4.3 Soil investigations

Investigations conducted in 2017 involved the collection of soil samples from 11 locations in February 2017 (following a large grid type approach) and an additional 74 locations in July 2017 (following a tighter grid approach). **Figure 1** shows the locations of all the soil samples collected across the site. The number of soil samples collected across the site (85) complies with the minimum requirements of AS4482.1, in terms of the number of sample locations.

Soil samples were collected from a range of depths including 0.15, 0.5, 1.0, 1.5, 2.0, 2.5 and 3.0 m below ground level (mbgl). Soil samples were analysed for metals with selected samples also analysed for total recoverable hydrocarbons (TRH), benzene toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), phenols, organochlorine pesticides (OCPs), acid herbicides, PCBs, volatile organic compounds (VOCs) and asbestos. Aesthetic issues were also logged and identified.

Geoquitarads (2017) provides an assessment of quality assurance and quality control (QA/QC), which concludes the data is representative and hence has been relied on in this assessment.



Figure 1: Soil sampling locations

4.4 Review of soil concentrations

Table 1 presents a summary of the maximum concentrations reported in soil (where detected in at least one sample). The maximum concentrations reported have been screened against both current human health risk based investigation guidelines relevant to potential exposures that may occur on the site, as follows:

- For recreational users of the site the following guidelines have been adopted:
 - NEPM Health Investigation Levels (HILs) and health Screening Levels (HSLs) relevant to recreational exposures (HIL/HSL-C) (NEPC 1999 amended 2013a). These criteria address incidental ingestion, dermal contact and dust inhalation by children and adults during recreational use. HSLs also address vapour inhalation exposures.
 - Where criteria are not available from the NEPM, residential soil criteria available from the USEPA and presented as Regional Screening Levels (RSLs) (USEPA 2017). These criteria are protective of exposure by children and adults via ingestion, dermal contact, dust inhalation and vapour inhalation outdoors. While these criteria relate to residential use, they are conservative for the assessment of recreational exposures.

It should be noted that the above exposures relate to surface soil, hence the screening assessment has applied these criteria to the data relevant to surface soil, i.e. soil to 0.15 and most 0.5 m bgl. This is of particular relevance to soil that sits above the existing landfill. It is not expected that deeper soil from within the landfill will be excavated and moved on the site, due to the presence of municipal rubbish and landfill odours. The landfill materials are expected to remain at depth.

- For workers involved in construction, maintenance of subsurface services and gardening activities (where soil may be accessible) the following guidelines are relevant:
 - NEPM HILs and HSLs (or equivalent international guidelines) relevant to commercial/industrial workers (HIL/HSL-D) (NEPC 1999 amended 2013a) are considered to be adequately protective. These criteria address incidental ingestion, dermal contact and dust inhalation by adults in the workplace. HSLs also available from CRC CARE (CRC CARE 2011) that specifically address direct contact and vapour inhalation exposures for petroleum hydrocarbons. As all exposures will be outdoors (i.e. not inside a commercial/industrial building) the open space HSLs are adopted. These have been utilised where available.
 - Where HILs/HSLs are not available industrial soil RSLs (USEPA 2017) will be adopted. These criteria are protective of exposure by adults via ingestion, dermal contact, dust inhalation and vapour inhalation outdoors in the workplace.

It should be noted that the above exposures relate to soil that can be encountered during intrusive works, which is typically to 1.5 m bgl. For this assessment all the soil data available (to 3 m bgl) has been considered.

- In relation to terrestrial environments, where these are relevant to the site, i.e. in landscaped areas, Ecological Investigation Levels and Ecological Screening Levels (EILs/ESLs) available from the NEPM (NEPC 1999 amended 2013a) are applicable. Where EILs/ESLs are not available from the NEPM, RIVM Intervention Values for soil have been adopted. These are criteria that are protective of 50% of species and would be applicable for a site where no sensitive plant species are expected to be present.

For the assessment of ecological risks, fill materials in the top 0.5m may be relevant (refer to note above in relation to the removal of soil from the landfill) and from the natural materials to 2 m depth (where trees may be planted). There are no terrestrial values relevant to soil within the landfill.

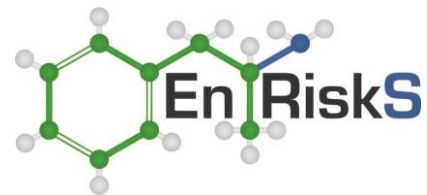
All the available soil data is included in **Attachment A** for reference.

Table 1: Summary and review of soil data

Analyte detected	Maximum concentration in soil (mg/kg)			Screening Level Guideline (mg/kg)		
	Surface soil (to 0.5 m bgl) – fill and natural	All depths		Recreational exposures (compare with surface soil data)	Workers conducting intrusive works (compare with all depths)	Terrestrial environments (compare with surface soil and natural materials)
		Fill	Natural materials			
Arsenic	110	110	5.4	300 ^N	3000 ^N	100 ^{NE}
Cadmium	0.8	14	0.4	90 ^N	900 ^N	12 ^R
Chromium	52	110	27	300 ^N	3600 ^N	410 + B ^{NE}
Copper	360	170000	17	17000 ^N	240000 ^N	220 + B ^{NE}
Lead	1000	7200	38	600 ^N	1500 ^N	1100 ^{NE}
Manganese	--	100	--	19000 ^N	60000 ^N	NA
Mercury	5.7	6.6	0.2	80 ^N	730 ^N	No criteria available
Molybdenum	--	4	--	390 ^U	5800 ^U	NA
Nickel	46	300	16	1200 ^N	6000 ^N	220 + B ^{NE}
Selenium	--	3.5	--	700 ^N	10000 ^N	NA
Silver	0.5	111	--	390 ^U	5800 ^U	15 ^R
Tin	270	790	--	47000 ^U	700000 ^U	260 ^R
Zinc	6100	120000	450	30000 ^N	400000 ^N	730 + B ^{NE}
Carcinogenic PAHs as Benzo(a)pyrene TEQ	--	2	--	3 ^N	40 ^N	NA
Naphthalene	--	0.6	--	1900 ^C	11000 ^C	NA
Total PAH	--	12.8	--	300 ^N	4000 ^N	NA
Benzene	--	0.1	--	120 ^C	77 ^C	NA
Xylenes	--	2	--	15000 ^C	130000 ^C	NA
TRH >C10-C16 (F2)	--	98	--	3800 ^C	62000 ^C	NA
TRH >C16-C34	--	970	--	5300 ^C	85000 ^C	NA
TRH >C34-C40	--	240	--	7400 ^C	120000 ^C	NA
Hexachlorobenzene	--	0.1	--	10 ^N	80 ^N	NA

Notes:

- = chemical not detected above the analytical limit of reporting (LOR) in any of the soil samples analysed.
- N = NEPM (2013) HIL/HSL "C" relevant to public open spaces and HIL/HSL "D" relevant to direct contact exposures during short term intrusive works. Where an HSL relevant to the vapour inhalation pathway is adopted the criteria is based on shallow soil impacts (0 to <1m depth) in sand.
- C = CRC CARE Health Screening Levels (HSLs) for (CRC CARE 2011) for direct contact exposures (as this is the only relevant exposure pathway and/or the vapour criteria outlined in the NEPM are not limiting).
- U = based on residential (adopted for public open space) and industrial soil guidelines available from USEPA (USEPA 2017).
- R = RIVM soil intervention values, protective of serious risks to terrestrial environments (RIVM 2001, 2012).
- NE = NEPM EILs for public open space. It is noted that some of the criteria from the NEPM are added concentration limits – i.e. additional concentrations above background (B). Background levels for these metals is not known for this area and has not been included in the criteria adopted for screening.
- NA = no guideline is applicable as there are no detections of these chemicals in soil where the protection of terrestrial environments would be of importance. These chemicals have only been detected in the fill materials within the landfill where no terrestrial environments are present or would be expected to be of importance for the proposed development.



On the basis of the above screening level review only lead requires further consideration in relation to potential risks to human health. Arsenic, copper, tin and zinc also require further consideration in relation to potential ecological risks. These issues are further discussed in **Sections 5 and 6**.

5.0 Further assessment of potential human health risk issues

This section specifically relates to potential risk issues that may be relevant to the presence of lead in surface soil and in fill at depth.

Recreational exposures

In relation to potential recreational use of the site, lead that is present in surface soil is of relevance. It is not known which areas of the site are to be covered with netball courts and which areas will have accessible soil, hence this review has considered all the surface soil as potentially accessible post development.

The maximum lead concentration reported in surface soil was 1000 mg/kg. This was reported at 0.5 m in the fill materials at location 26. The lead concentration reported at location 26 at 0.15 m depth, which is considered more relevant to recreational exposures was 27 mg/kg, well below the recreational guideline of 600 mg/kg. All other lead concentrations were below the adopted screening criteria of 600 mg/kg relevant to recreational use of the site.

Hence, where surface materials are not significantly disturbed during development, future recreational exposures to lead are not considered to be of concern.

However, where some surface works occur, soil in the top 0.5 m may be moved and be placed near the surface where exposure may occur. Where all soil in the top 0.5 m are considered, the statistics for lead contamination meet the requirements outlined in the NEPM, as follows:

- 95% upper confidence limit (UCL) = 94.4 mg/kg, less than the recreational criteria of 600 mg/kg
- Maximum = 1000 mg/kg, less than 250% of the criteria
- Standard deviation = 101.4 mg/kg, less than 50% of the criteria

On this basis, there are no risk issues of concern in relation to the presence of lead in surface soil on the site, where recreational exposure may occur.

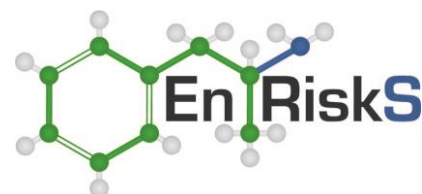
Exposures during intrusive works

Where workers may undertake construction or excavation works, lead concentrations reported in surface soil and in the natural soil on the site are below the relevant screening criteria of 1500 mg/kg. These are areas where excavation works are more likely to occur.

The maximum concentration of lead, 7200 mg/kg was reported at depth (3 m bgl) in the landfill fill materials at location 48. Lead in soil at all other depths at location 48 are well below the adopted screening criteria. In addition, all other lead concentrations reported within the landfill materials are below the screening criteria. Hence the detection at 3 m depth is considered an outlier and given the depth within the landfill, it is considered highly unlikely that excavations would occur to 3m depth in these areas. Hence there is little to no potential for any exposure to occur and risks are therefore considered negligible.

Should deep excavation occur within the landfill materials, an environmental management plan will be required to address the excavation and management of waste materials excavated and odours from the waste material. Such a management plan should also include the use of personal protective equipment such as gloves, long pants and long sleeves, to minimise exposure to the waste materials. These measures will also prevent or minimise any direct contact exposures with any lead that may be present at depth within the landfill.

On the basis of the above, there are no risk issues of concern in relation to the presence of lead in soil at the site, where exposure may occur during construction or intrusive maintenance works.



6.0 Further discussion of potential ecological risk issues

This section specifically relates to potential risk issues that may be relevant to the presence of arsenic, copper, tin and zinc in surface soil.

Arsenic

The maximum concentration of arsenic in surface soil, in the fill areas (110 mg/kg), only just exceeds the EIL relevant to open space (100 mg/kg). Only 1 sample has an arsenic concentration that exceeds the adopted criteria, with all other concentrations well below the EIL of 100 mg/kg. The average (5.9 mg/kg), which is more relevant to the evaluation of ecological effects and 95% UCL (10.1 mg/kg) (a more conservative value) are both well below the EIL and hence the potential for adverse ecological risk issues of concern is considered to be negligible.

Tin

The maximum concentration of tin in surface soil, in the fill areas (270 mg/kg), only just exceeds the adopted screening criteria of 260 mg/kg from RIVM (RIVM 2001, 2012). Only 1 sample has a tin concentration that exceeds the adopted criteria, at location 25 at 0.5m depth. The tin concentration in the more shallow soil sample at location 25 (0.15 m bgl) was much lower at 15 mg/kg. All other concentrations were either reported as not detected (i.e. <10 mg/kg) or at a concentration that is well below the adopted screening criteria. The average (12.6 mg/kg), which is more relevant to the evaluation of ecological effects and 95% UCL (16.2 mg/kg) (a more conservative value) are both well below the adopted screening criteria. The average and 95% UCL are also below the RIVM benchmark value of 19 mg/kg relevant to the protection of more sensitive species. Hence the potential for adverse ecological risk issues of concern is considered to be negligible.

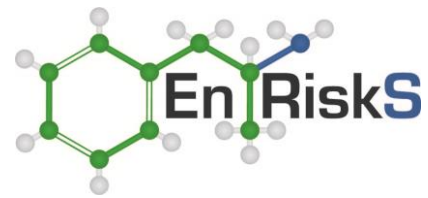
Copper

The maximum concentration of copper in surface soil, in the fill areas (360 mg/kg), exceeds the EIL of 220 mg/kg (assuming negligible contribution from background soil). Only 1 sample has a copper concentration that exceeds the adopted criteria, at location 17 at 0.5m depth. The copper concentration in the more shallow soil sample at location 17 (0.15 m bgl) was much lower at 15 mg/kg. All other concentrations are well below the EIL for recreational areas. The average (16.8 mg/kg), which is more relevant to the evaluation of ecological effects and 95% UCL (30.9 mg/kg) (a more conservative value) are both well below the EIL. Hence the potential for adverse ecological risk issues of concern is considered to be negligible.

Zinc

The maximum concentration of zinc in surface soil, infill areas (6100 mg/kg) is significantly higher than the EIL of 730 mg/kg (assuming negligible contribution from background soil). There are 3 soil samples where the EIL is exceeded, location 49 (6100 mg/kg at 0.15 m and 960 mg/kg at 0.5 m) and location 25 (1300 mg/kg at 0.5 m). Location 25 is in the fill embankment along the site boundary with Wangara Road, while location 49 is located above the landfill area. All other concentrations of copper are well below the EIL. This indicates that the elevated zinc concentrations in surface soil are not widespread. As there are only discrete areas of elevated concentrations, consistent with heterogeneous fill, this is not expected to be of significance to the terrestrial environment as plant roots will move around areas of higher toxicity and soil invertebrates may not dwell in these discrete areas.

For zinc to be of concern to plants and soil invertebrates, it needs to be bioavailable to be able to be taken up into these species. Testing of leachability of zinc in soil at the site was undertaken on the soil sample with the maximum concentration of zinc (location 48 at 3 m depth, where zinc was reported at 120000 mg/kg). ASLP testing reported zinc in solution at 2.1 mg/L. This results in a soil-water partitioning coefficient of 57142.8 (L/kg), or $\log K_d = 4.76$. This indicates that the zinc will not leach significantly, however it also indicates that very little zinc will be able to move into soil solution and be available for uptake into plants and soil invertebrates.



On this basis the potential for adverse effects on the terrestrial ecosystem that may be present on the site, post development is considered low. It is likely that the areas of elevated zinc will be beneath the proposed netball courts where there are no terrestrial environments that require protection.

Where landscaped areas are established on the site, it is unlikely there will be any issues in relation to the terrestrial environment. Any risks would be lower where clean topsoil or mulch were used to establish the garden areas. The use of organic rich topsoil would be expected for the site as the fill materials have low organic carbon content (0.2 to 1.4%).

7.0 Conclusions

Investigations conducted at the site have identified the presence of elevated concentrations of metals in surface soil and in fill materials at depth within the former landfill area.

Further review of the concentrations reported in soil on the site has indicated that the site is suitable for the proposed use for a number of outdoor and (potentially) indoor netball courts. Specifically, this assessment has concluded the following:

- The concentrations reported in surface soil, that may remain accessible to future recreational users of the site, are of no concern in relation to risks to human health;
- The concentrations reported in soil, that may be disturbed or exceed during the proposed development or during future intrusive works, are not of concern in relation to risks to the health of workers. It should be noted that any excavations that are required to extend into the landfill waste materials would require an environmental management plan to address the excavation and management of waste, generation of odours and minimise direct contact exposures by workers.
- The concentrations reported in soil, that may be of relevance to future terrestrial environments on the site are not considered to be of concern to ecological health. Imported topsoil and/or organic matter is expected to be required for landscape areas as the natural fill materials have very low organic content. The use of such materials will lower the risks further.

8.0 Limitations

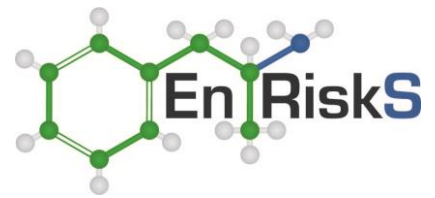
enRiskS has prepared this report for the use of Bayside City Council in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report.

It is prepared in accordance with the scope of work and for the purpose outlined in the **Section 2** and data provided for the purpose of this evaluation.

The methodology adopted and sources of information used are outlined in this report. enRiskS has made no independent verification of this information beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions. No indications were found that information contained in the report provided by Geoaquitards was false.

This report was prepared in May and June 2018 and is based on the information provided and reviewed at that time. enRiskS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners

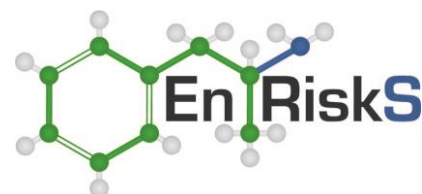


If you require any additional information or if you wish to discuss any aspect of this assessment please do not hesitate to contact Jackie on (02) 9614 0297 or 0425 206 295.

Yours sincerely,

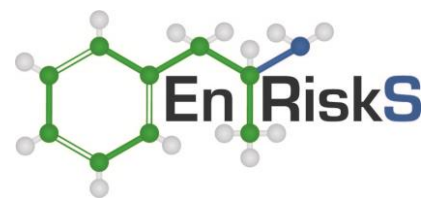
A handwritten signature in black ink, appearing to read 'Jackie Wright', is positioned below the 'Yours sincerely,' text.

Dr Jackie Wright (Fellow ACTRA)
Principal/Director
Environmental Risk Sciences Pty Ltd



References

- CRC CARE 2011, *Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document*, CRC for Contamination Assessment and Remediation of the Environment, CRC CARE Technical Report no. 10. Adelaide. <<http://www.crccare.com/products-and-services/health-screening-levels>>.
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<[http://www.health.gov.au/internet/main/publishing.nsf/content/804F8795BABFB1C7CA256F1900045479/\\$File/DoHA-EHRA-120910.pdf](http://www.health.gov.au/internet/main/publishing.nsf/content/804F8795BABFB1C7CA256F1900045479/$File/DoHA-EHRA-120910.pdf)>.
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- RIVM 2001, *Risk assessment of historical soil contamination with cyanides; origin, potential human exposure and evaluation of Intervention Values*.
- RIVM 2012, *Proposal for Intervention Values, Soil and groundwater for the 2nd, 3rd and 4th series of compounds*, National Institute for Public Health and the Environment.
- USEPA 2017, *Regional Screening Levels - November 2017*, United States Environmental Protection Agency. <<https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-november-2017>>.



Attachment A: Soil Data

Our Report No. RM406-M.1
MGT Report No. 535906-S,552701-S
ALS Report No. EM1708657

Our Report No. RM406-M.1
MGT Report No. 535906-S,552701-S
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MGT Report No. 535906-S,552701-S
ALS Report No. EM1708657

Geoaquitards Environmental							Solvents							TPH							VOCs	
							PCBs (Sum of total)	Methyl Ethyl Ketone	4-Methyl-2-pentanone	Acetone	Allyl chloride	Carbon disulfide	1 minus BTEX (C6-C10)	P-Naphth (C10-C16)	C6 - C9	C10 - C14	C15 - C28	C29-C36	C10 - C36 (Sum of total)	C6-C10	Trihalomethanes	
							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	mg/kg	mg/kg	
EQI							0.1	0.5	0.5	0.5	0.5	0.5	20	50	20	20	50	50	50	50	20	
NEPM 2013 Table 1A(1) HILs Rec C Soil							1														5100	
CRC Care Table 4 Soil Direct Contact - HSL-C Recreational / Open Space																						
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Sand																						
0-1m													NL	NL								
1-2m													NL	NL								
2-4m													NL	NL								
Csat													950	560								
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Silt																						
0-1m													NL	NL								
1-2m													NL	NL								
2-4m													NL	NL								
Csat													910	570								
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Clay																						
0-1m													NL	NL								
1-2m													NL	NL								
2-4m													NL	NL								
Csat													850	560								
NEPM 2013 Ecological Investigation Level Urban Residence/Public Open Space																						
US EPA ECO-SSL																						
ANZECC Residential/Parkland Use							1.3															
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil													180	120								
0-2m																						
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil													180	120								
0-2m																						
Field ID	Sampled Date	SampleCode	Lab Report Number	Sampling Depth	Lithological Description	Sampling Rounds																
1 AT 0.50M	27/02/2017	M17-Fe28348	535906	0.50 M	FILL, SAND	Round 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1 AT 1.50M	27/02/2017	M17-Fe28349	535906	1.50 M	FILL, sandy CLAY		<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<2	
1 AT 2.0M	27/02/2017	M17-Fe28350	535906	2.00 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1 AT 3.0M	27/02/2017	M17-Fe28351	535906	3.00 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1 AT 3.50M	27/02/2017	M17-Fe28352	535906	3.50 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10 AT 0.15M	27/02/2017	M17-Fe28369	535906	0.15 M	FILL, silty SAND		<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<2	
10 AT 0.50M	27/02/2017	M17-Fe28370	535906	0.50 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10 AT 1.0M	27/02/2017	M17-Fe28371	535906	1.00 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11 AT 0.15M	27/02/2017	M17-Fe28372	535906	0.15 M	FILL, silty SAND		<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<2	
11 AT 1.0M	27/02/2017	M17-Fe28373	535906	1.00 M	FILL, sandy CLAY		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11 AT 1.50M	27/02/2017	M17-Fe28374	535906	1.50 M	FILL, sandy CLAY		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2 AT 1.0M	27/02/2017	M17-Fe28353	535906	1.00 M	FILL, sandy CLAY		<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	95	110	205	<20	<2	
2 AT 1.50M	27/02/2017	M17-Fe28354	535906	1.50 M	FILL, sandy CLAY		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3 AT 0.50M	27/02/2017	M17-Fe28356	535906	0.50 M	FILL, SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4 AT 0.15M	27/02/2017	M17-Fe28357	535906	0.15 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
5 AT 1.50M	27/02/2017	M17-Fe28359	535906	1.50 M	FILL, silty SAND		<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	22	160	<50	182	<20	<2	
6 AT 1.0M	27/02/2017	M17-Fe28361	535906	1.00 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
7 AT 0.50M	27/02/2017	M17-Fe28363	535906	0.50 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
7 AT 1.0M	27/02/2017	M17-Fe28364	535906	1.00 M	FILL, silty SAND		<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<2	
8 AT 0.50M	27/02/2017	M17-Fe28365	535906	0.50 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8 AT 1.50M	27/02/2017	M17-Fe28366	535906	1.50 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
9 AT 0.15M	27/02/2017	M17-Fe28367	535906	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-					

Geoaquitards Environmental							Solvents							TPH							VOCs	
							PCBs (Sum of total)	Methyl Ethyl Ketone	4-Methyl-2-pentanone	Acetone	Allyl chloride	Carbon disulfide	1 minus BTEX (C6-C10)	P-Naphth (C10-Cl8)	C6- C9	C10- C14	C15- C28	C29-C36	C10- C36 (Sum of total)	C6-C10	Trihalomethanes	
							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	mg/kg	mg/kg	
EQCL							0.1	0.5	0.5	0.5	0.5	0.5	20	50	20	20	50	50	50	50	20	
NEPM 2013 Table 1A(1) HILs Rec C Soil							1														5100	
CRC Care Table 4 Soil Direct Contact - HSL-C Recreational / Open Space																						
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Sand																						
0-1m													NL	NL								
1-2m													NL	NL								
2-4m													NL	NL								
Csat													950	560								
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Silt																						
0-1m																						
1-2m													NL	NL								
2-4m													NL	NL								
Csat													910	570								
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Clay																						
0-1m													NL	NL								
1-2m													NL	NL								
2-4m													NL	NL								
Csat													850	560								
NEPM 2013 Ecological Investigation Level Urban Residence/Public Open Space																						
US EPA ECO-SSL																						
CSOG Residential/Parkland Use							1.3															
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil													180	120								
0-2m																						
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil													180	120								
0-2m																						
Field ID	Sampled Date	SampleCode	Lab Report Number	Sampling Depth	Lithological Description	Sampling Rounds																
38 @ 0.50M	3/07/2017	M17-J02228	552701	0.50 M	FILL, sandy CLAY	Round 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
39 @ 0.15M	3/07/2017	M17-J02239	552701	0.15 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
39 @ 0.50M	3/07/2017	M17-J02240	552701	0.50 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
39 @ 1.00M	3/07/2017	M17-J02241	552701	1.00 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
39 @ 2.50M	3/07/2017	M17-J02243	552701	2.50 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
40 @ 0.15M	3/07/2017	M17-J02253	552701	0.15 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
40 @ 1.50M	3/07/2017	M17-J02254	552701	1.50 M	FILL, silty SAND, Rubbish		<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
40 @ 3.00M	3/07/2017	M17-J02255	552701	3.00 M	FILL, silty SAND, Rubbish		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
41 @ 0.15M	3/07/2017	M17-J02354	552701	0.15 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
41 @ 0.50M	3/07/2017	M17-J02355	552701	0.50 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
41 @ 1.00M	3/07/2017	M17-J02356	552701	1.00 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
42 @ 0.15M	3/07/2017	M17-J02360	552701	0.15 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
42 @ 2.50M	3/07/2017	M17-J02361	552701	2.50 M	FILL, silty SAND, Rubbish		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
42 @ 3.00M	3/07/2017	M17-J02362	552701	3.00 M	FILL, silty SAND, Rubbish		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
43 @ 1.50M	3/07/2017	M17-J02319	552701	1.50 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
45 @ 0.15M	3/07/2017	M17-J02264	552701	0.15 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
45 @ 0.50M	3/07/2017	M17-J02265	552701	0.50 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
45 @ 3.00M	3/07/2017	M17-J02266	552701	3.00 M	FILL, silty SAND, Rubbish		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
46 @ 0.15M	3/07/2017	M17-J02223	552701	0.15 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
46 @ 1.00M	3/07/2017	M17-J02224	552701	1.00 M	FILL, sandy CLAY		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
46 @ 3.00M	3/07/2017	M17-J02226	552701	3.00 M	FILL, sandy CLAY, Rubbish		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
47 @ 0.15M	3/07/2017	M17-J02219	552701	0.15 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
47 @ 1.50M	3/07/2017	M17-J02220	552701	1.50 M	FILL, silty SAND		-	-	-	-	-	-	<20	97	<20	73	520	430	1023	<20	-	
47 @ 3.00M	3/07/2017	M17-J02222	552701	3.00 M	FILL, silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
48 @ 0.15M	3/07/2017	M17-J02310	552701	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
48 @ 1.50M	3/07/2017	M17-J02311	552701	1.50 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
48 @ 2.00M	3/07/2017	M17-J02312	552701	2.00 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
48 @ 3.00M	3/07/2017	M17-J02314	552701	3.00 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
49 @ 0.15M	3/07/2017	M17-J02357	552701	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
49 @ 0.50M	3/07/2017	M17-J02358	552701	0.50 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
49 @ 2.00M	3/07/2017	M17-J02359	552701	2.00 M	FILL, silty SAND, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
51 @ 1.50M	3/07/2017	M17-J02323	552701	1.50 M	FILL, sandy CLAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
51 @ 2.50M	3/07/2017	M17-J02324	552701	2.50 M	FILL, clayey SAND, Rubbish	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<2		
51 @ 3.00M	3/07/2017	M17-J02325	552701	3.00 M	FILL, clayey SAND, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
52 @ 0.15M	3/07/2017	M17-J02274	552701	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
52 @ 0.50M	3/07/2017	M17-J02275	552701	0.50 M	FILL, sandy CLAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
52 @ 1.00M	3/07/2017	M17-J02276	552701	1.00 M	FILL, sandy CLAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
52 @ 2.50M	3/07/2017	M17-J02277	552701	2.50 M	FILL, sandy CLAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
52 @ 3.00M	3/07/2017	M17-J02278	552701	3.00 M	FILL, sandy CLAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
53 @ 0.15M	3/07/2017	M17-J02261	552701	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
53 @ 0.50M	3/07/2017	M17-J02262	552701	0.50 M	FILL, sandy CLAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
53 @ 1.00M	3/07/2017	M17-J02263	552701	1.00 M	FILL, sandy CLAY, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
54 @ 0.15M	3/07/2017	M17-J02200	552701	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
54 @ 0.50M	3/07/2017	M17-J02201	552701	0.50 M	FILL, sandy CLAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
54 @ 1.00M	3/07/2017	M17-J02202	552701	1.00 M	FILL, sandy CLAY, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
54 @ 2.50M	3/07/2017	M17-J02203	552701	2.50 M	FILL, sandy CLAY, Rubbish	-	-	-	-	-	-	<20	<50	<20	<20	670	300	970	<20	-		
54 @ 3.00M	3/07/2017	M17-J02204	552701	3.00 M	FILL, sandy CLAY, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
55 @ 0.50M	3/07/2017	M17-J02215	552701	0.50 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
55 @ 2.50M	3/07/2017	M17-J02217	552701	2.50 M	FILL, silty SAND, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
55 @ 3.00M	3/07/2017	M17-J02218	552701	3.00 M	FILL, silty SAND, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
56 @ 0.15M	3/07/2017	M17-J02306	552701	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
56 @ 0.50M	3/07/2017	M17-J02307	552701	0.50 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
56 @ 2.00M	3/07/2017	M17-J02308	552701	2.00 M	FILL, silty SAND, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
56 @ 3.00M	3/07/2017	M17-J02309	552701	3.00 M	FILL, silty SAND, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
57 @ 0.15M	3/07/2017	M17-J02281	552701	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
57 @ 0.50M	3/07/2017	M17-J02282	552701	0.50 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
57 @ 1.00M	3/07/2017	M17-J02283	552701	1.00 M	FILL, silty SAND, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
57 @ 2.50M	3/07/2017	M17-J02284	552701	2.50 M	FILL, silty SAND, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
58 @ 0.15M	3/07/2017	M17-J02366	552701	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
58 @ 0.50M	3/07/2017	M17-J02367	552701	0.50 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
58 @ 1.00M	3/07/2017	M17-J02368	552701	1.00 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
59 @ 0.15M	3/07/2017	M17-J02326	552701	0.15 M	FILL, silty SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
59 @ 2.50M	3/07/2017	M17-J02327	552701	2.50 M	FILL, silty SAND, Rubbish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
60 @ 0.15M	3/07/2017	M17-J02																				

[illegible]

Geoaquitards Environmental							Solvents							TPH							VOCs	
							PCBt (sum of total)	Methyl Ethyl ketone	4-Methyl-2-pentanone	Acetone	Allyl chloride	Carbon disulfide	P1 minus BTEX (C6-C10)	P2-Naphth (C10-C16)	C5 - C9	C10 - C14	C15 - C28	C29-C36	C10 - C36 (Sum of total)	C6-C10	Trihalomethanes	
							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	mg/kg	mg/kg	mg/kg
EQL							0.1	0.5	0.5	0.5	0.5	0.5	20	50	20	20	50	50	50	50	20	
NEPM 2013 Table 1A(1) HILs Rec C Soil							1															
CRC Care Table 4 Soil Direct Contact - HSL-C Recreational / Open Space																					5100	
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Sand																						
0-1m													NL	NL								
1-2m													NL	NL								
2-4m													NL	NL								
Csat													950	560								
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Silt																						
0-1m													NL	NL								
1-2m													NL	NL								
2-4m													NL	NL								
Csat													910	570								
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Clay																						
0-1m													NL	NL								
1-2m													NL	NL								
2-4m													NL	NL								
Csat													850	560								
NEPM 2013 Ecological Investigation Level Urban Residence/Public Open Space																						
BNZECC 1992																						
US EPA ECO-SSL																						
CSQG Residential/Parkland Use							1.3															
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil													180	120								
0-2m																						
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil													180	120								
0-2m																						
Field ID	Sampled Date	SampleCode	Lab Report Number	Sampling Depth	Lithological Description	Sampling Rounds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SPLIT 8	3/07/2017	EM1708657008	EM1708657	0.50 M	FILL, silty SAND																	
Statistical Summary																						
Number of Results							10	8	8	8	8	8	15	15	15	15	15	15	15	15	15	8
Minimum Concentration							<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<20	<2
Maximum Concentration							<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	97	<20	73	670	430	1023	<20	<2	
Average Concentration							0.05	0.25	0.25	0.25	0.25	0.25	10	30	10	15	147	94	232	10	10	1
Median Concentration							0.05	0.25	0.25	0.25	0.25	0.25	10	25	10	10	25	25	25	10	10	1
Standard Deviation							0	0	0	0	0	0	0	19	0	16	200	123	335	0	0	
Geometric Standard Deviation																						
95% ProUCL																						
95% Chebyshev (Mean, Sd) UCL																						
95% Student's-t UCL																						

Note:
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MGT Report No. 535906-S,552701-S
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Geoaquitards Environmental							enyls		Solvents					TPH										VOCs
							Arochlor 1254	Arochlor 1260	PCBs (sum of total)	Methyl Ethyl Ketone	4-Methyl-2-pentanone	Acetone	Allyl chloride	Carbon disulfide	F1 minus BTEX (C6-C10)	F2-Naphth (C10-C16)	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10- C36 (sum of total)	C6-C10	Trihalomethanes	
							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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL							0.1	0.1	0.1	0.5	0.5	0.5	0.5	0.5	20	50	20	20	50	50	50	20		
NEPM 2013 Table 1A(1) HILs Rec C Soil									1															
CRC Care Table 4 Soil Direct Contact - HSL-C Recreational / Open Space																						5100		
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Sand																								
0-1m															NL	NL								
1-2m															NL	NL								
2-4m															NL	NL								
Csat															950	560								
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Silt																								
0-1m															NL	NL								
1-2m															NL	NL								
2-4m															NL	NL								
Csat															910	570								
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Clay																								
0-1m															NL	NL								
1-2m															NL	NL								
2-4m															NL	NL								
Csat															850	560								
NEPM 2013 Ecological Investigation Level Urban Residence/Public Open Space																								
ANZECC 1992																								
US EPA ECO-SSL																								
CSQG Residential/Parkland Use									1.3															
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil															180	120								
0-2m																								
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil																								
0-2m															180	120								
Field ID	Sampled Date	SampleCode	Lab Report Number	Sampling Depth	Lithological Description	Sampling Rounds																		
4 AT 1.50M	27/02/2017	M17-Fe28358	535906	1.50 M	silty CLAY	Round 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
13 @ 2.00M	3/07/2017	M17-JI02381	552701	2.00 M	silty SAND	Round 2	-	-	-	-	-	-	-	-	<20	<50	<20	<20	<50	<50	<50	<20	-	
13 @ 3.00M	3/07/2017	M17-JI02382	552701	3.00 M	clayey SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
16 @ 2.50M	3/07/2017	M17-JI02424	552701	2.50 M	clayey SAND		<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<2	
16 @ 3.00M	3/07/2017	M17-JI02425	552701	3.00 M	clayey SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
18 @ 0.15M	3/07/2017	M17-JI02407	552701	0.15 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
18 @ 0.50M	3/07/2017	M17-JI02408	552701	0.50 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
19 @ 0.15M	3/07/2017	M17-JI02405	552701	0.15 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
19 @ 0.50M	3/07/2017	M17-JI02406	552701	0.50 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
21 @ 2.50M	3/07/2017	M17-JI02384	552701	2.50 M	clayey SAND		-	-	-	-	-	-	-	-	<20	<50	<20	<20	<50	<50	<50	<20	-	
22 @ 3.00M	3/07/2017	M17-JI02387	552701	3.00 M	clayey SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
23 @ 0.15M	3/07/2017	M17-JI02419	552701	0.15 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
23 @ 0.50M	3/07/2017	M17-JI02420	552701	0.50 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
23 @ 2.50M	3/07/2017	M17-JI02421	552701	2.50 M	sandy CLAY		-	-	-	-	-	-	-	-	<20	<50	<20	<20	<50	<50	<50	<20	-	
28 @ 2.50M	3/07/2017	M17-JI02340	552701	2.50 M	clayey SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
35 @ 1.50M	3/07/2017	M17-JI02349	552701	1.50 M	silty SAND		-	-	-	-	-	-	-	-	<20	<50	<20	<20	<50	<50	<50	<20	-	
35 @ 2.00M	3/07/2017	M17-JI02350	552701	2.00 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
35 @ 2.50M	3/07/2017	M17-JI02351	552701	2.50 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
35 @ 3.00M	3/07/2017	M17-JI02352	552701	3.00 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
36 @ 2.00M	3/07/2017	M17-JI02343	552701	2.00 M	sily SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
36 @ 2.50M	3/07/2017	M17-JI02344	552701	2.50 M	clayey SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
36 @ 3.00M	3/07/2017	M17-JI02345	552701	3.00 M	sandy CLAY		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
43 @ 2.00M	3/07/2017	M17-JI02320	552701	2.00 M	clayey SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
43 @ 3.00M	3/07/2017	M17-JI02321	552701	3.00 M	sandy CLAY		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
50 @ 1.00M	3/07/2017	M17-JI02363	552701	1.00 M	silty SAND		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
50 @ 2.50M	3/07/2017	M17-JI02364	552701	2.50 M	sandy CLAY		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
50 @ 3.00M	3/07/2017	M17-JI02365	552701	3.00 M	sandy CLAY		-	-	-	-	-	-	-	-	<20	<50	<20	<20	<50	<50	<50	<20	-	
58 @ 2.50M	3/07/2017	M17-JI02369	552701	2.50 M	silty SAND		<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<2	
Statistical Summary																								
Number of Results							2	2	2	2	2	2	2	2	7	7	7	7	7	7	7	7	2	
Minimum Concentration							<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<2	
Maximum Concentration							<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<20	<50	<50	<50	<20	<2	
Average Concentration															10	25	10	10	25	25	25	10		
Median Concentration							0.05	0.05	0.05	0.25	0.25	0.25	0.25	0.25	10	25	10	10	25	25	25	10	1	
Standard Deviation															0	0	0	0	0	0	0	0		
Geometric Standard Deviation																								

Note:
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