A9 DUALLING
PERTH TO INVERNESS

Appendix A10.4

Contaminated Land Assessment

TRANSPORT SCOTLAND
CÒMHDHAIL ALBA

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Chapter Pages

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1. Introduction

1.1. Objective

1.1.1. This report is a Technical Appendix to the Tomatin to Moy Stage 3 Environmental Statement Chapter 10: Geology, Soils and Groundwater.

1.1.2. This report provides an assessment of contaminated land associated with the Proposed Scheme. It summarises background environmental data in relation to contamination, including the preliminary risk assessment and preliminary conceptual site model, and then further develops the conceptual site model using data gathered from the Preliminary Stage 3 Ground Investigation.

1.2. Legislative Context

1.2.1. Section 57 of the Environment Act 1995[i], adds Part IIA (ss. 78A – 18YC) to the Environmental Protection Act 1990[ii] and contains the legislative framework for identifying and dealing with contaminated land. It is aimed at addressing land which has been historically contaminated and which poses unacceptable risks to human health or the wider environment in the context of the current land use.

1.2.2. The structure and main provisions of the regime are contained within the primary legislation and the operation of the regime is subject to regulations and statutory guidance, as listed below.

- Environmental Protection Act 1990: Part IIA Contaminated Land – Statutory Guidance: Edition 2 May 2006
- The Contaminated Land (Scotland) Regulations 2000 (SSI 2000 No. 178)[iii]
- The Contaminated Land (Scotland) Regulations 2005 (SSI 2005/658)[iv]
- Statutory Guidance to Support the Radioactive Contaminated Land (Scotland) Regulations 2007[v]
- The Radioactive Contaminated Land (Scotland) Regulations 2007 (SSI 2007/3240)[vi]
- The Radioactive Contaminated Land (Scotland) Amendment Regulations 2009 (SI 2009/202)[vii]

1.2.3. Where development is undertaken on land which may be affected by contamination, specific guidance has been published in Planning Advice Note 33[viii] (PAN 33). This approach to dealing with contamination is risk based, and utilises the same terms and definitions as the Part IIA process.

1.2.4. The presence of contaminants which may pose a risk to human health or the environment is a material planning consideration and it remains the responsibility of the developer to ensure safe development. For planning it should be considered whether the level of contamination is low relative to the level of risk and the concern is for the site's proposed use not its current use. This differs from Part IIA which considers high levels and the current use of the site.

1.3. Previous Studies

1.3.1. A Preliminary Risk Assessment[ix] was undertaken at DMRB Stage 2 and was summarised within the Stage 2 reporting.

1.3.2. The objective of the Preliminary Risk Assessment was to assess the potential environmental risks and liabilities associated with the Proposed Scheme by undertaking a review of the relevant environmental data and historical mapping.

2. Environmental Setting

2.1.1. The Phase 1 Preliminary Risk Assessment Report[ix] provides a full description of the site environmental setting. The pertinent points are summarised in the section below.

2.2. Site Setting and Description

2.2.1. The area adjacent to the A9 mainly consists of farmland currently used as pasture with vegetation cover typically of grass. Large areas woodland are also present adjacent to the A9. Some of the existing A9 embankment and cutting slopes are covered with grass and others have a thick covering of small and medium sized trees. There are pockets of peat present adjacent to the southern half of the site with peat being present more extensively in the north.

2.2.2. The Highland Main Line railway runs in close proximity to the western side of the A9. Just to the south of Moy, the railway line passes underneath the A9 and continues along the eastern side of the road. At Moy, the A9 veers towards the west as the railway line continues northwards.

2.3. Summary of Ground Model

2.3.1. The Proposed Scheme is set within a landscape of agricultural / forestry land interspersed by some development, namely at Tomatin and Moy.

2.3.2. There have been several land uses both current and historical that may have resulted in the presence of potentially contaminated ground. These include a former fuel filling station, a railway, numerous quarries and sand / gravel pits (some infilled) as well as farms and associated buildings and features such as sheep dips.

2.3.3. Made ground is likely to be present in these areas as well as being associated with the construction of the existing A9. The Made Ground has the potential to contain contaminants as well as to generate ground gas / vapours.

2.3.4. The superficial deposits in the study area are classified as weakly to moderately permeable with the underlying bedrock considered to be impermeable.

2.3.5. There are several watercourses in the study area that cross beneath the route of the A9 or flow in the general vicinity. The main watercourse is the River Findhorn, with Loch Moy being another notable water feature located to the north of Moy.

3. Preliminary Conceptual Site Model / Risk Evaluation

3.1. Methodology

3.1.1. For contaminated land, the Scottish Government considers the ‘suitable for use’ approach as the most appropriate to deal with historical land contamination.

3.1.2. The aims of the preliminary risk assessment are to identify sites of potential historic contamination within the Proposed Scheme study area and assess the potential risks posed to human health and the wider environment in the context of the proposed land use, in line with the requirements of PAN 33 and CLR11[x].

3.1.3. The risk assessment methodology involved the development of a Conceptual Site Model (CSM) for the site. The CSM represents a network of relationships between potential sources of contamination and different receptors via various potential pollution pathways. Where a source, pathway and receptor combination exists, this is referred to as a complete pollutant linkage. As part of the Phase 1 Preliminary Risk Assessment, a generic qualitative risk assessment was undertaken in accordance with CIRIA C552[xi].

3.1.4. The risk is evaluated based on the probability or likelihood of risk being realised as shown in Table A3.1 and the consequence of risk being realised as shown in Table A3.2. The risk evaluation is then derived from the matrix shown in Table A3.3.

Table A3.1: Probability / Likelihood of Risk Being Realised

Likelihood	Description
High likelihood	There is a complete pollution linkage and an event that either appears very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.
Likely	There is a complete pollution linkage and all the elements are present and available, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over a long-term.
Low likelihood	There is a complete pollution linkage and the circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such an event would take place, and is less likely in the shorter term.
Unlikely	There is a complete pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Table A3.2: Consequence of Risk Being Realised

Consequence	Description
Severe	Short-term (acute) damage to human health (significant harm). Pollution of sensitive water resources as a result of short-term exposure. Damage to a particular ecosystem as a result of acute exposure. Catastrophic damage to buildings/property/ Scheduled Ancient Monument (SAM).
Medium	Long-term (chronic) damage to human health (significant harm). Pollution of sensitive water resources as a result of chronic exposure. A significant change in a particular ecosystem, or organism forming part of such an ecosystem. Substantial damage to buildings/property/ SAM.
Mild	No appreciable impact on human health based on the potential effects on the critical human health receptor Pollution of non-sensitive water resources. Damage to ecological systems with no significant impairment. Significant damage to sensitive buildings/structures/SAM/services or the environment.

Consequence	Description
Minor	Harm (not necessarily significant), which may result in financial loss or require expenditure to resolve. Non-permanent health effects to human health. No appreciable pollution Easily repairable effects or damage to ecological systems Easily reparable damage to buildings, structures, SAM and services.

Table A3.3: Potential Pollutant Linkage Risk Evaluation Matrix

Consequence	Likelihood			
	High likelihood	Likely	Low likelihood	Unlikely
Severe	Very high	High	Moderate	Moderate/Low
Medium	High	Moderate	Moderate/Low	Low
Mild	Moderate	Moderate/Low	Low	Very Low
Minor	Moderate/Low	Low	Very Low	Very low

3.2. Potential Contamination Sources

3.2.1. Potential sources of contamination were identified as made ground associated with the construction of the A9 as well as potential contamination from a former fuel station, railway, infilled pits and quarries, and farm activities.

Table A3.4: Potential Contamination Sources

Reference	Primary Source	Expected Distribution	Likely Contaminants
S1	Potentially contaminated ground / waters located within the Proposed Scheme footprint – railway, infilled pits / quarries, agricultural use, former timber treatment yard.	Across all areas where potentially contaminative uses have been identified	Heavy metals, asbestos, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), acidic / alkali pH.
		Additional contaminants associated with farms	Pesticides, herbicides, insecticides, phenols
		Additional contaminants associated with railways	Herbicides, polychlorinated biphenyls (PCBs)
		Additional contaminants associated with infilled quarries / pits	Phenols, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs)
S2	Potentially contaminated ground / waters located within 250m of the Proposed Scheme footprint (including within the CPO Boundary) – railway, infilled pits / quarries, agricultural use, former fuel station.	As detailed above	As detailed above

3.3. Potential Contamination Receptors

3.3.1. Potential contamination receptors can include people, i.e. local residents, vehicle travellers and non-motorised users (NMUs), construction workers, the water environment, statutory designated ecological systems (such as Sites of Special Scientific Interest (SSSIs) and Special Protection Areas (SPAs)), property such as buildings/structures, crops, livestock and domestic pets.

Table A3.5: Potential Contamination Receptors

Reference	Receptor	Description
R1	Aquifer – Superficial Deposits	The following underlying superficial deposits are classified as moderate to high productivity intergranular flow aquifers (glaciofluvial sheet deposits, glaciofluvial ice contact deposits, river terrace deposits and alluvial deposits) and are likely to be in hydraulic continuity with the surrounding burns and rivers.
R2	Surface Water – Loch Moy, rivers, burns	There are several watercourses present adjacent to and that flow under the A9 as well as Loch Moy to the north of the A9. All these surface waters are considered to have Good Status under the Water Framework Directive (WFD).
R3	Drivers & NMUs	Drivers of vehicles using the existing/proposed route, pedestrians and NMU using the existing/proposed footpaths and cycle paths
R4	Local Residents	Residents located in properties present at isolated off-site locations along the route corridor
R5	Property (buildings and crops)	There are several residential properties and agricultural buildings and limited agricultural fields for arable farming present at isolated locations within the study area
R6	Property (livestock, Pets, wildlife)	Sheep farming is prevalent throughout the study area. There are likely to be pets associated within various residential properties and wildlife subject to shooting and fishing rights in the study area.
R7	Site Infrastructure	Buried services, culverts and structure foundations associated with the A9 corridor

3.3.2. Construction and maintenance workers are potential receptors to contamination but are not considered in this CSM. The UK framework for contaminated land assessment is based on potential adverse health effects resulting from long-term exposure to soil contamination. This is because, in the majority of cases, chronic exposure to contamination is more significant than acute exposure, and because the occupational risks are already required to be addressed by the Health and Safety at Work Act 1974 and related legislation.

3.4. Pollutant Pathways

3.4.1. Potential pollutant pathways may include: direct contact with contaminated soils; ingestion/inhalation of soil, dust, vapour or gas; and the leaching and migration of contaminants, including gas through the ground.

Table A3.6: Potential Contamination Pathways

Reference	Pathway	Description
P1	Direct contact with soil / soil dust	Soil contaminants could come into direct contact with the site users, property (including crops via plant uptake) and site infrastructure.
P2	Ingestion of soil / soil dust / fibres	Soil derived contaminants could be ingested by site users and livestock / pets / wildlife.
P3	Inhalation of fugitive soil dust	During dry, dusty conditions, contaminated soil dust could be inhaled by site users and livestock / pets / wildlife.
P4	Inhalation of vapour / soil gas	Site users and livestock / pets / wildlife may inhale vapours and / or soil gas that may be present.
P5	Leaching and vertical / lateral migration of contaminants	Contaminants could leach and migrate into the underlying superficial aquifer and adjacent watercourses / bodies, affecting dependant water supplies, ecosystems and livestock. Contaminated surface and groundwater could come into contact with property foundations and site infrastructure. Contaminated groundwater could discharge into surface waters. Contaminants present in offsite sources could migrate onto the proposed footprint. Contaminated surface water could run off into adjacent watercourses. There could also be migration via preferential pathways such as soakaways and underground services.
P6	Vertical and lateral migration of soil gas	There is the potential that made ground present in the study area could generate soil gas. This gas could potentially migrate into buildings and site infrastructure.

3.5. Risk Evaluation

3.5.1. The outcome of the generic preliminary risk assessment as reported in the Phase 1 Preliminary Risk Assessment Report was that potential **Very Low** to **Moderate** environmental liabilities exist relating to the possible presence of contamination and its likely impact on the environment.

3.5.2. As such, intrusive investigation and chemical testing of the soils to quantify the contamination status of the site, and to assess the presence or absence of the identified potential pollutant linkages, has been undertaken.

4. Ground Investigation

4.1. Design Rationale and Scope

4.1.1. The potential sources of contamination were targeted for chemical analysis during the Preliminary Stage 3 Ground Investigation. Further sampling was undertaken to provide general coverage across the Proposed Scheme.

4.1.2. Chemical contamination testing of the soils carried out is reported in the A9 Dualling Northern Section: Tomatin to Moy Ground Investigation Report[xii]. However, only a limited amount of contamination testing was undertaken and not all the potential pollutant linkages were investigated.

4.1.3. It is anticipated that further ground investigation works will be undertaken for the Proposed Scheme prior to construction, including further assessment of potential contamination.

4.2. Ground Conditions

4.2.1. Where Made Ground was encountered during the Preliminary Stage 3 Ground Investigation, it generally comprised a gravelly sand with brick, granite, plastic, Psammite, metal, ceramic, ash and concrete.

4.2.2. No areas of gross visual or olfactory contamination were noted.

4.3. Chemical Sampling and Analysis

4.3.1. Table A4.1 below provides details of the exploratory holes where contamination testing was undertaken including a description of the ground conditions encountered and any visual or olfactory evidence of contamination. Figure A10.4.1a-k presented as part of this report shows the location of the exploratory holes.

Table A4.1: Chemical Contamination Testing

Exploratory Hole Reference	Reason for Contamination Testing	Testing Suite	Ground Conditions Encountered / Signs of Contamination
TPTM3001 (Figure A10.4.1d)	General coverage	Heavy metals, pH, cyanide, petroleum hydrocarbons (TPH), polyaromatic hydrocarbons (PAH)	Natural ground – silty gravelly sand
BHTM3016 (Figure A10.4.1d)	General coverage	Heavy metals, pH, cyanide, TPH, PAH.	Natural ground - peat
TPTM3272 (Figure A10.4.1d)	Former fuel station	Heavy metals, pH, cyanide, TPH, PAH, asbestos, semi volatile organic compounds (SVOC), volatile organic compounds (VOC). Limited soil leachate.	Made ground – gravelly sand with brick
TPTM3273 (Figure A10.4.1d)	Former fuel station	Heavy metals, pH, cyanide, asbestos, TPH, PAH, SVOC, VOC, polychlorinated biphenyls (PCB). Limited soil leachate.	Natural ground with hydrocarbon odour noted in the sandy gravel.
TPTM3031 (Figure A10.4.1d)	Adjacent to land plot containing former fuel station / inn	Heavy metals, pH, cyanide, asbestos, TPH, PAH, SVOC, VOC, PCB.	Made ground including brick
TPTM3040 (Figure A10.4.1e)	Made ground noted during ground investigation	Heavy metals, pH, cyanide, asbestos, TPH, PAH	Made ground – gravelly sand with plastic, buttons and fabric.
TPTM3049 (Figure A10.4.1e)	General coverage	Heavy metals, pH, cyanide, TPH, PAH.	Natural ground – silty sand and gravel
BHTM3048 (Figure A10.4.1f)	Former gravel pit	Heavy metals, pH, cyanide, TPH, PAH.	Natural ground – silty gravelly sand

Exploratory Hole Reference	Reason for Contamination Testing	Testing Suite	Ground Conditions Encountered / Signs of Contamination
TPTM3087 (Figure A10.4.1f)	Made ground noted during ground investigation	Heavy metals, pH, cyanide, asbestos, TPH, PAH.	Made ground – gravelly sand with wood and metal
TPTM3115 (Figure A10.4.1g)	Made ground noted during ground investigation	Heavy metals, pH, cyanide, asbestos, TPH, PAH.	Made ground – sandy gravel with granite
TPTM3119 (Figure A10.4.1g)	Made ground noted during ground investigation	Heavy metals, pH, cyanide, asbestos, TPH, PAH.	Made ground – gravelly sand with pottery and concrete
TPTM3127A (Figure A10.4.1h)	General coverage	Heavy metals, pH, cyanide, asbestos, TPH, PAH.	Made ground – gravelly sand with metal and plastic
BHTM3225 (Figure A10.4.1h)	Possible made ground noted during ground investigation	Heavy metals, pH, cyanide, asbestos, TPH, PAH.	Possible made ground – peat mixed with sand and gravels
TPTM3147 (Figure A10.4.1i)	General coverage	Heavy metals, pH, cyanide, TPH, PAH.	Natural ground – sand and gravel
TPTM3177 (Figure A10.4.1i)	Made ground noted during ground investigation	Heavy metals, pH, cyanide, TPH, PAH, SVOC, VOC.	Made ground – sandy gravel with wood. Slight to strong hydrocarbon odour and oily sheen on groundwater
TPTM3182 (Figure A10.4.1i)	General coverage	Heavy metals, pH, cyanide, TPH, PAH.	Natural ground – silty sandy gravel
TPTM3199 (Figure A10.4.1j)	General coverage	Heavy metals, pH, cyanide, TPH, PAH.	Made ground – gravelly sand with brick
TPTM3207 (Figure A10.4.1k)	General coverage	Heavy metals, pH, cyanide, asbestos, TPH, PAH.	Made ground – gravel sand with gravel of mixed lithologies

4.3.2. Only limited soil leachate testing was carried out as part of the ground investigation within the vicinity of the former fuel station located at the Freeburn Hotel (now demolished).

4.3.3. No ground gas monitoring was undertaken in any of areas of Made Ground or within any of the potentially contaminated sites as part of the Preliminary Stage 3 Ground Investigation.

5. Risk Assessment

5.1.1. The results of the contamination testing were screened and assessed against relevant standards as detailed in the sections below.

5.2. Human Health Risk Assessment

5.2.1. Based on the Preliminary Risk Assessment and ground model, a Generic Quantitative Risk Assessment for human health has been undertaken in accordance with CLR11[x] and SR (SC050021 Series) DEFRA guidance.

5.2.2. The source of the screening values used includes:

- Land Quality Management (LQM) / Chartered Institute of Environmental Health (CIEH) Generic Assessment Criteria (GAC)[xiii]
- EIC / AGS / CL:AIRE GAC[xiv]
- derived GAC using Soil Guideline Value (SGV) or LQM/CIEH GAC
- derived GAC

5.2.3. The soil testing results have been screened for a commercial / industrial end use at 1% soil organic matter (SOM) as a conservative screen as no site specific SOM testing was carried out as part of the Preliminary Stage 3 Ground Investigation. The GAC that have been applied were derived for a sandy loam soil type. The ground conditions encountered comprised made ground of gravelly sand / sandy gravel as well as natural deposits of silty gravelly sand / silty sandy gravel.

5.2.4. As the soil samples have been obtained from isolated locations along the (linear) Proposed Scheme, the results have been screened as individual samples.

5.2.5. The human health risk assessment has identified isolated acidic and alkaline pH readings in general coverage areas as well as within the former petrol station area.

5.2.6. A single exceedance for TPH Aliphatic C_{12}-C_{16} fraction (35mg/kg compared to a GAC of 24mgkg) was present within the Made Ground in TPTM3177 located to the west of Allt Creag Bheithin where a hydrocarbon odour and sheen was noted during the Ground Investigation. However, the LQM / CIEH GAC is based on the lower saturation value. The calculated screening value that is protective of human health is much higher (61,000mg/kg) and the concentration within TPTM3177 does not exceed this value.

5.2.7. As such, no areas of significant contamination with regard to human health were encountered during the Preliminary Stage 3 Ground Investigation.

5.2.8. The spreadsheet detailing the human health risk assessment is included as part of this Technical Appendix as Annex A.

5.3. Water Environment Risk Assessment

5.3.1. Based on the Preliminary Risk Assessment and ground model, the water environment risk assessment has been undertaken in general accordance with the SEPA guidance document, WAT-PS-10-01: Assigning Groundwater Assessment Criteria for Pollutant Inputs[xv].

5.3.2. Only limited soil leachate testing was carried out. Samples taken from the former fuel station area were analysed and screened against relevant standards: Environmental Quality Standards (EQS) with regard to the risk to aquatic life and Resource Protection Values (RPV) with regard to human health, i.e. drinking water.

5.3.3. The water environment risk assessment identified marginal cadmium, copper, selenium, zinc and alkaline pH exceedances of the EQS within the former fuel station area. There were no exceedances of the RPV noted.

5.3.4. As such, given that the exceedences appear to be marginal and associated with localised made ground, there is not considered to be a significant risk to the water environment from the former fuel station area. It should also be noted that this material will not be excavated as part of the Proposed Scheme so there is no risk from reuse of this material closer to sensitive water receptors.

5.3.5. No other areas within the Proposed Scheme footprint have been tested and assessed for their risk to the water environment.

5.3.6. The spreadsheet detailing the water environment risk assessment is included as part of this Technical Appendix as Annex B. The EQS screening spreadsheet is presented in Annex B.1 and the RPV screening spreadsheet in Annex B.2.

5.4. Phytotoxicity Risk Assessment

5.4.1. The soil results were also screened with regard to phytotoxic risk. The screening values used were based on the pH value of each individual soil sample. The sources of the screening values were the MAFF Code of Practice[xvi], Statutory Instrument SI 1263[xvii] and ICRCL 59/83 Table 3 Group B[xviii].

5.4.2. Isolated acidic and alkaline pH exceedances were present in general coverage areas as well as within the former petrol station area. Lead and zinc exceedances were also present within the former petrol station area. However, this material will not be disturbed or excavated as part of the Proposed Scheme so there is no risk of this material being reused in landscaping areas.

5.4.3. As such, no significant phytotoxic risk was identified from the Preliminary Stage 3 Ground Investigation.

5.4.4. The spreadsheet detailing the phytotoxic risk assessment is included as part of this Technical Appendix as Annex C.

6. Risk Evaluation

6.1.1. The following sections outline the updated CSM and evaluation of risks based on the Proposed Scheme at baseline and construction stages.

6.1.2. The contaminated land assessment has been carried out using a consequence/ likelihood risk based methodology as per the accepted industry practice referenced above. This approach does not easily translate into the sensitivity/magnitude significance approach of EIA. However a methodology has been devised to assign significance to the identified levels of risk and is detailed in Table A6.1 below.

Table A6.1: Significance Criteria for Contamination Impacts

Significance Criteria	Definition
Major adverse effect	An increase in contamination risk from the existing baseline conditions of 4 or 5 risk levels in the risk matrix e.g. land that has a very low contamination risk in the baseline becomes a high or very high risk.

Significance Criteria	Definition
	Land that does not meet the statutory definition of Contaminated Land in the existing baseline becomes capable of being determined under Part IIA.
Moderate adverse effect	An increase in contamination risk from the existing baseline conditions of 2 or 3 risk levels in the risk matrix e.g. land that has a low contamination risk in the baseline becomes a moderate or high risk. Land that does not meet the statutory definition of Contaminated Land in the existing baseline becomes capable of being determined under Part IIA.
Minor adverse effect	Limited risk of pollution to an aquifer. An increase in contamination risk from the existing baseline conditions of 1 risk level in the risk matrix e.g. land that has a low contamination risk in the baseline becoming a moderate / low risk.
Neutral effect	No measurable risk of pollution to an aquifer. No change in contaminated land risks.
Minor beneficial effect	Reduction in existing risks to an aquifer and increased water quality. A reduction in contamination risk from the existing baseline conditions of 1 risk level in the risk matrix e.g. land that has a moderate / low contamination risk in the baseline becomes a low risk.
Moderate beneficial effect	Reduction in existing risks to an aquifer and increased water quality. A reduction in contamination risk from the existing baseline conditions of 2 or 3 risk levels in the risk matrix e.g. land that has a high contamination risk in the baseline becomes a moderate / low or low risk. Land that meets the statutory definition of Contaminated Land in the existing baseline is no longer capable of being determined under Part IIA.
Major beneficial effect	Recharge of an aquifer and significant reduction of impact to groundwater quality. A reduction in contamination risk from the existing baseline conditions of 4 or 5 risk levels in the risk matrix e.g. land that has a very high contamination risk in the baseline becomes low or very low risk. Land that meets the statutory definition of Contaminated Land in the existing baseline is no longer capable of being determined under Part IIA.

6.1.3. The assessment of impact significance has been undertaken by comparing the current baseline risks with the construction / operation (with and without mitigation) phase risks and assessing any change in risk.

6.2. Baseline Risk Evaluation

6.2.1. Each plausible pollutant linkage in the baseline situation is identified in Table A6.2 below. An evaluation of the risk that each pollutant linkage poses, based on the current desk based and ground investigation data, has been undertaken in general accordance with CIRIA guidance document C552, 2001[xi].

Table A6.2: Risk Evaluation of Plausible Pollutant Linkages – Baseline

Hazard identification	Hazard assessment		Risk estimation		Risk evaluation
Contaminant source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Classification
S1 Potentially contaminated ground / waters located within Proposed Footprint – Railway, infilled pits / quarries, agricultural use, former timber treatment yard.	P1 – Direct Contact with soil / soil dust	R3 - Drivers & NMUs	Medium	Unlikely	Low
		R4 – Local Residents	Medium	Unlikely	Low
		R5 – Buildings & Crops	Mild	Unlikely	Very Low
		R6 – Livestock, Pets & Wildlife	Mild	Unlikely	Very Low
		R7 – Site Infrastructure	Mild	Low	Low
	P2 – Ingestion of soil / soil dust	R3 – Drivers & NMUs	Medium	Unlikely	Low
		R4 – Local Residents	Medium	Unlikely	Low
		R6 – Livestock, Pets & Wildlife	Mild	Unlikely	Very Low
	P3 – Inhalation of fugitive soil dust	R3 – Drivers & NMUs	Medium	Unlikely	Low
		R4 – Local Residents	Medium	Unlikely	Low
		R6 – Livestock, Pets & Wildlife	Mild	Unlikely	Very Low
	P4 – Inhalation of vapours / soil gas	R3 – Drivers & NMUs	Medium	Unlikely	Low
		R4 – Local Residents	Medium	Unlikely	Low
		R6 – Livestock, Pets & Wildlife	Mild	Unlikely	Very Low
	P5 – Leaching and vertical / lateral migration of contaminants	R1 - Aquifer	Medium	Low	Moderate / Low
		R2 – Surface Water	Medium	Low	Moderate / Low
	P6 – Vertical and lateral migration of soil gas	R4 – Local Residents	Severe	Unlikely	Moderate / Low
		R5 – Buildings & Crops	Severe	Unlikely	Moderate / Low

Hazard identification	Hazard assessment		Risk estimation		Risk evaluation
Contaminant source	**Pathway**	**Receptor**	**Consequence of risk being realised**	**Probability of risk being realised**	**Classification**
		R7 – Site Infrastructure	Severe	Unlikely	Moderate / Low
S2 Potentially Contaminated Ground / waters located within 250m of Proposed Footprint (including within the LMA boundary) – Railway, infilled pits / quarries, agricultural use, former fuel station.	P5 – Leaching and vertical / lateral migration of contaminants	R1 - Aquifer	Medium	Low	Moderate / Low
		R2 – Surface Water	Medium	Low	Moderate / Low
	P6 – Vertical and lateral migration of soil gas	R4 – Local Residents	Severe	Unlikely	Moderate / Low
		R8 – Site Infrastructure	Severe	Unlikely	Moderate / Low

6.3. Construction Risk Evaluation (Without Mitigation)

6.3.1. The potential pollutant linkages identified in the baseline have been assessed for the construction phase, without mitigation, and a comparison of the risk outcomes at each stage has been made to give an indication of the effect significance as shown in Table A6.3 below.

Table A6.3: Risk Evaluation of Plausible Pollutant Linkages – Construction Phase (Without Mitigation)

Hazard identification	Hazard assessment		Baseline Risk Evaluation	Construction Risk Estimation (without mitigation)		Construction Risk Evaluation (without mitigation)	Impact Significance
Contaminant source	Pathway	Receptor		Consequence of risk being realised	Probability of risk being realised		
S1 Potentially contaminated ground / waters located within Proposed Footprint – Railway, infilled pits / quarries, agricultural use, former timber treatment yard.	P1 – Direct Contact with soil / soil dust	R3 - Drivers & NMUs	Low	Medium	Unlikely	Low	Neutral
		R4 – Local Residents	Low	Medium	Low	Moderate / Low	Minor adverse
		R5 – Buildings & Crops	Very Low	Mild	Low	Low	Minor adverse
		R6 – Livestock, Pets & Wildlife	Very Low	Mild	Low	Low	Minor adverse
		R7 – Site Infrastructure	Low	Mild	Low	Low	Neutral
	P2 – Ingestion of soil / soil dust	R3 – Drivers & NMUs	Low	Medium	Low	Moderate / Low	Minor adverse
		R4 – Local Residents	Low	Medium	Low	Moderate / Low	Minor adverse
		R6 – Livestock, Pets & Wildlife	Very Low	Mild	Low	Low	Minor adverse
	P3 – Inhalation of fugitive soil dust	R3 – Drivers & NMUs	Low	Medium	Low	Moderate / Low	Minor adverse
		R4 – Local Residents	Low	Medium	Low	Moderate / Low	Minor adverse
		R6 – Livestock, Pets & Wildlife	Very Low	Mild	Low	Low	Minor adverse
	P4 – Inhalation of vapours / soil gas	R3 – Drivers & NMUs	Low	Medium	Unlikely	Low	Neutral
		R4 – Local Residents	Low	Medium	Low	Moderate / Low	Minor adverse
		R6 – Livestock, Pets & Wildlife	Very Low	Mild	Low	Low	Minor adverse
	P5 – Leaching and vertical / lateral migration of contaminants	R1 - Aquifer	Moderate / Low	Medium	Low	Moderate / Low	Neutral
		R2 – Surface Water	Moderate / Low	Medium	Low	Moderate / Low	Neutral
	P6 – Vertical and lateral	R4 – Local Residents	Moderate / Low	Severe	Low	Moderate	Minor adverse
		R5 – Buildings & Crops	Moderate / Low	Severe	Low	Moderate	Minor adverse

Hazard identification	Hazard assessment		Baseline Risk Evaluation	Construction Risk Estimation (without mitigation)		Construction Risk Evaluation (without mitigation)	Impact Significance
Contaminant source	Pathway	Receptor		Consequence of risk being realised	Probability of risk being realised		
	migration of soil gas	R7 – Site Infrastructure	Moderate / Low	Severe	Low	Moderate	Minor adverse
S2 Potentially Contaminated Ground / waters located within 250m of Proposed Footprint (including within the CPO Boundary) – Railway, infilled pits / quarries, agricultural use, former fuel station	P5 – Leaching and vertical / lateral migration of contaminants	R1 - Aquifer	Moderate / Low	Medium	Low	Moderate / Low	Neutral
		R2 – Surface Water	Moderate / Low	Medium	Low	Moderate / Low	Neutral
	P6 – Vertical and lateral migration of soil gas	R4 – Local Residents	Moderate / Low	Severe	Low	Moderate	Minor adverse
		R8 – Site Infrastructure	Moderate / Low	Severe	Low	Moderate	Minor adverse

6.4. Construction Risk Evaluation (With Mitigation)

6.4.1. Potential mitigation measures with regard to potential contamination are discussed in Chapter 10, in Volume 1 of the ES, and are summarised below.

- Further ground investigation to sufficiently determine the extent and type of contaminants to allow identification of appropriate construction methods and any additional mitigation that may be required.
- Use of appropriate health and safety, and waste management procedures for working with potentially contaminated ground / waters.
- Carry out a ground gas monitoring programme to allow development of appropriate working methods.
- Any remedial action should be carried out under appropriate remediation licensing.
- Completion of a soil reuse assessment prior to reuse of any excavated soils on site.
- The storage of excavated materials on site to be minimised both spatially and in terms of duration.
- Any piling works will adhere to appropriate guidance to prevent cross contamination.
- Excavated soils that require offsite disposal will be assessed in line with WM3 Technical Guidance[xix] prior to disposal.

6.4.2. The potential pollutant linkages identified in the baseline have been assessed for the construction phase incorporating proposed mitigation and a comparison of the risk outcomes at each stage has been made to give an indication of the significance of effect as shown in Table A6.4 below.

Table A6.4: Risk Evaluation of Plausible Pollutant Linkages – Construction Phase (With Mitigation)

Hazard identification	Hazard assessment		Risk estimation – Construction with mitigation		Risk evaluation – Construction with mitigation	Baseline Risk Evaluation	Impact Significance
Contaminant source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Classification		
S1 Potentially contaminated ground / waters located within Proposed Footprint – Railway, infilled pits / quarries, agricultural use, former timber treatment yard.	P1 – Direct Contact with soil / soil dust	R3 - Drivers & NMUs	Medium	Unlikely	Low	Low	Neutral effect
		R4 – Local Residents	Medium	Unlikely	Low	Low	Neutral effect
		R5 – Buildings & Crops	Mild	Unlikely	Very Low	Very Low	Neutral effect
		R6 – Livestock, Pets & Wildlife	Mild	Unlikely	Very Low	Very Low	Neutral effect
		R7 – Site Infrastructure	Mild	Low	Low	Low	Neutral effect
	P2 – Ingestion of soil / soil dust	R3 – Drivers & NMUs	Medium	Unlikely	Low	Low	Neutral effect
		R4 – Local Residents	Medium	Unlikely	Low	Low	Neutral effect
		R6 – Livestock, Pets & Wildlife	Mild	Unlikely	Very Low	Very Low	Neutral effect
	P3 – Inhalation of fugitive soil dust	R3 – Drivers & NMUs	Medium	Unlikely	Low	Low	Neutral effect
		R4 – Local Residents	Medium	Unlikely	Low	Low	Neutral effect
		R6 – Livestock, Pets & Wildlife	Mild	Unlikely	Very Low	Very Low	Neutral effect
	P4 – Inhalation of vapours / soil gas	R3 – Drivers & NMUs	Medium	Unlikely	Low	Low	Neutral effect
		R4 – Local Residents	Medium	Unlikely	Low	Low	Neutral effect
		R6 – Livestock, Pets & Wildlife	Mild	Unlikely	Very Low	Very Low	Neutral effect

Hazard identification	Hazard assessment		Risk estimation – Construction with mitigation		Risk evaluation – Construction with mitigation	Baseline Risk Evaluation	Impact Significance
Contaminant source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Classification		
	P5 – Leaching and vertical / lateral migration of contaminants	R1 - Aquifer	Medium	Unlikely	Low	Moderate / Low	Minor beneficial effect
		R2 – Surface Water	Medium	Unlikely	Low	Moderate / Low	Minor beneficial effect
	P6 – Vertical and lateral migration of soil gas	R4 – Local Residents	Severe	Unlikely	Moderate / Low	Moderate / Low	Neutral effect
		R5 – Buildings & Crops	Severe	Unlikely	Moderate / Low	Moderate / Low	Neutral effect
		R7 – Site Infrastructure	Severe	Unlikely	Moderate / Low	Moderate / Low	Neutral effect
S2 Potentially Contaminated Ground / waters located within 250m of Proposed Footprint (including within the CPO Boundary) – Railway, infilled pits / quarries, agricultural use, former fuel station	P5 – Leaching and vertical / lateral migration of contaminants	R1 - Aquifer	Medium	Low	Moderate / Low	Moderate / Low	Neutral effect
		R2 – Surface Water	Medium	Low	Moderate / Low	Moderate / Low	Neutral effect
	P6 – Vertical and lateral migration of soil gas	R4 – Local Residents	Severe	Unlikely	Moderate / Low	Moderate / Low	Neutral effect
		R8 – Site Infrastructure	Severe	Unlikely	Moderate / Low	Moderate / Low	Neutral effect

7. Recommendations

7.1.1. The risk evaluation to date has not highlighted any significant effects related to potentially contamination.

7.1.2. It is recommended that further investigation and assessment of all the potential pollutant linkages is carried out as part of the further ground investigation work by the Construction Contractor prior to construction of the Proposed Scheme.

8. References

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Annex A. Human Health Risk Assessment

A9 Tomatin to Moy - Soil Screening - Human Health Risk																
							Purpose of exploratory hole	General	General	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station	adj to petrol station
Concentration exceeds the screening value								597079 001	594778 002	596040 001	596040 002	596039 001	596364 001	596039 002	596364 002	589245 001
Limit of detection exceeds the screening value								TPTM3001 ES3 0.5m	BHTM3016 ES3 0.30M	TPTM3272 ES3 0.50M	TPTM3272 ES9 1.50M	TPTM3273 ES2 0.30M	TPTM3273 ES5 0.50m	TPTM3273 ES9 1.50M	TPTM3273 ES12 2.00m	TPTM3031 ES1 0.30M
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	25-Aug-16	15-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	19-Jul-16
Determinand	Method	Test Sample	LOD	Units												
Arsenic	T82	AR	2	mg/kg	640	Mouchel Derived GAC Using SGV (oral ID)	<2	<2	13	6	<2	<2	8	<2	3
Boron (water-soluble)	T82	A40	1	mg/kg	192000	LQM / CIEH GAC					<1	<1	<1	<1	<1
Cadmium	T82	AR	1	mg/kg	230	Mouchel Derived GAC Using SGV	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	T82	AR	1	mg/kg	8840	LQM / CIEH GAC	8	8	18	16	<1	2	22	5	12
Chromium (hexavalent)	T82	A40	1	mg/kg	35	LQM / CIEH GAC	<1	<2	<1	<1	<1	<1	<1	<1	<1
Copper	T82	AR	1	mg/kg	71700	LQM / CIEH GAC	8	3	67	12	4	3	16	6	13
Lead	T82	AR	3	mg/kg	740	Mouchel Derived GAC	7	5	330	12	7	4	20	4	26
Mercury	T82	AR	1	mg/kg	3600	Mouchel Derived GAC Using SGV	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	T82	AR	1	mg/kg	1800	Mouchel Derived GAC Using EFSA, 2015 (inhalation TDI)	7	3	17	9	3	4	9	7	5
Selenium	T82	AR	3	mg/kg	13000	Mouchel Derived GAC Using SGV	<3	<3	<3	<3	<3	<3	<3	<3	<3
Zinc	T82	AR	1	mg/kg	665000	LQM / CIEH GAC	30	6	350	46	22	26	39	29	30
pH acidic	T7	A40			<5.5	Professional Judgement	6.6	4.1	7.9	7.9	5	5.7	9.6	8.4	5.8
pH alkaline	T7	A40			>9.5	Professional Judgement	6.6	4.1	7.9	7.9	5	5.7	9.6	8.4	5.8
Cyanide(Total)	T4	AR	1	mg/kg	16000	Mouchel Derived GAC Using CLEAv1.06	<1	<1	<1	<1	<1		<1		<1
Cyanide(free)	T4	AR	1	mg/kg	16000	Mouchel Derived GAC Using CLEAv1.06									<1
Cyanide (Complex) by Calcul	T85	AR	1	mg/kg	16000	Mouchel Derived GAC Using CLEAv1.06									<1
Total Phenols	T149	AR	0.01	mg/kg	3200	Mouchel Derived GAC Using SGV									<0.01
Asbestos ID	T27	AR			n/a	Presence				N.D.	N.D.		N.D.		N.D.
TPH (C5-C6 aliphatic)	T54	AR	10	ug/kg	304000	LQM / CIEH GAC (lwr saturation value)	<10	<50	<10	<10	<50	<10	<10	<10	<10
TPH (C6-C8 aliphatic)	T54	AR	10	ug/kg	144000	LQM / CIEH GAC (lwr saturation value)	<10	<50	<10	<10	<50	<10	<10	<10	<10
TPH (C8-C10 aliphatic)	T54	AR	10	ug/kg	78000	LQM / CIEH GAC (lwr saturation value)	12	<50	<10	<10	<50	<10	<10	<10	<10
TPH (C10-C12 aliphatic)	T8	AR	1	mg/kg	48	LQM / CIEH GAC (lwr saturation value)	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (C12-C16 aliphatic)	T8	AR	1	mg/kg	24	LQM / CIEH GAC (lwr saturation value)	<1	1	<1	<1	<1	<1	<1	<1	<1
TPH (C16-C21 aliphatic)	T8	AR	1	mg/kg	1600000	LQM / CIEH GAC	<1	<1	<1	<1	2	<1	1	<1	<1
TPH (C21-C35 aliphatic)	T8	AR	1	mg/kg			<1	7	5	<1	62	<1	2	<1	10
TPH (C6-C7 aromatic)	T54	AR	10	ug/kg	1220000	LQM / CIEH GAC (lwr saturation value)	<10	<50	<10	<10	<50	<10	<10	<10	<10
TPH (C7-C8 aromatic)	T54	AR	10	ug/kg	869000	LQM / CIEH GAC (lwr saturation value)	<10	<50	<10	<10	<50	<10	<10	<10	<10
TPH (C8-C10 aromatic)	T54	AR	10	ug/kg	613000	LQM / CIEH GAC (lwr saturation value)	<10	<50	<10	<10	<50	<10	<10	38	<10
TPH (C10-C12 aromatic)	T8	AR	1	mg/kg	364	LQM / CIEH GAC (lwr saturation value)	<1	<1	<1	<1	<1	<1	2	<1	<1
TPH (C12-C16 aromatic)	T8	AR	1	mg/kg	169	LQM / CIEH GAC (lwr saturation value)	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (C16-C21 aromatic)	T8	AR	1	mg/kg	28000	LQM / CIEH GAC	<1	<1	1	<1	<1	<1	<1	<1	<1
TPH (C21-C35 aromatic)	T8	AR	1	mg/kg	28000	LQM / CIEH GAC	<1	35	3	<1	<1	<1	<1	<1	<1
Naphthalene	T149	AR	0.01	mg/kg	76	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	0.02	<0.01	0.05	0.26	<0.01	0.21	<0.01
Acenaphthylene	T149	AR	0.01	mg/kg	86	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	T149	AR	0.01	mg/kg	57	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.01	<0.01
Fluorene	T149	AR	0.01	mg/kg	31	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	T149	AR	0.01	mg/kg	22000	LQM / CIEH GAC	<0.01	0.01	0.11	<0.01	0.01	0.01	<0.01	0.01	0.01
Anthracene	T149	AR	0.01	mg/kg	530000	LQM / CIEH GAC	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	T149	AR	0.01	mg/kg	23000	LQM / CIEH GAC	<0.01	0.01	0.25	<0.01	0.01	<0.01	<0.01	<0.01	0.05
Pyrene	T149	AR	0.01	mg/kg	54000	LQM / CIEH GAC	<0.01	0.01	0.25	<0.01	0.01	<0.01	<0.01	<0.01	0.05
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	90	LQM / CIEH GAC	<0.01	0.01	0.11	<0.01	0.01	0.01	<0.01	<0.01	0.03
Chrysene	T149	AR	0.01	mg/kg	140	LQM / CIEH GAC	<0.01	<0.01	0.11	<0.01	0.01	<0.01	<0.01	<0.01	0.03
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	100	LQM / CIEH GAC	0.01	<0.01	0.14	<0.01	0.02	<0.01	<0.01	<0.01	0.04
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	140	LQM / CIEH GAC	0.01	<0.01	0.05	<0.01	0.01	<0.01	<0.01	<0.01	0.04
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	14	LQM / CIEH GAC	0.01	<0.01	0.11	<0.01	0.01	<0.01	<0.01	<0.01	0.03
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	60	LQM / CIEH GAC	0.02	<0.01	0.06	<0.01	0.02	<0.01	<0.01	<0.01	0.02
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	13	LQM / CIEH GAC	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	650	LQM / CIEH GAC	0.02	<0.01	0.08	<0.01	0.02	<0.01	<0.01	<0.01	0.02
PAH(total)	T149	AR	0.01	mg/kg	.	.	0.08	0.04	1.4	<0.01	0.19	0.3	<0.01	0.23	0.32

A9 Tomatin to Moy - Soil Screening - Human Health Risk																
						Purpose of exploratory hole	General	General	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station	adj to petrol station
Concentration exceeds the screening value							597079 001	594778 002	596040 001	596040 002	596039 001	596364 001	596039 002	596364 002	589245 001
Limit of detection exceeds the screening value							TPTM3001 ES3 0.5m	BHTM3016 ES3 0.30M	TPTM3272 ES3 0.50M	TPTM3272 ES9 1.50M	TPTM3273 ES2 0.30M	TPTM3273 ES5 0.50m	TPTM3273 ES9 1.50M	TPTM3273 ES12 2.00m	TPTM3031 ES1 0.30M
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	25-Aug-16	15-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	19-Jul-16
Determinand	Method	Test Sample	LOD	Units											
PCB BZ#77	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#81	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#105	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#114	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#118	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#123	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#126	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#156	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#157	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#167	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#169	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
PCB BZ#189	T1	AR	0.05	ug/kg	.	.					<0.05		<0.05		<0.05
Total PCBs (WHO12)				ug/kg	33	Mouchel Derived GAC Using CLEAv1.06									
Phenol	T16	AR	0.1	mg/kg	3200	Mouchel Derived GAC Using SGV			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Bis (2-chloroethyl) ether	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2-Chlorophenol	T16	AR	0.1	mg/kg	3600	Mouchel Derived GAC using LQM / CIEH GAC			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
1,3-Dichlorobenzene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
1,4-Dichlorobenzene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
1,2-Dichlorobenzene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Bis (2-chloroisopropyl) ether	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2-methyl phenol	T16	AR	0.1	mg/kg	15000	Mouchel Derived GAC Using CLEAv1.06 (lwr saturation value)			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
3/4-Methylphenol	T16	AR	0.1	mg/kg	12000	Mouchel Derived GAC Using CLEAv1.06			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Hexachloroethane	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Nitrobenzene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Isophorone	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2,4-Dimethylphenol	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Bis (2-chloroethoxy) methan	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenol	T16	AR	0.1	mg/kg	3500	Mouchel Derived GAC using LQM / CIEH GAC			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
1,2,4-Trichlorobenzene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Naphthalene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		0.3	<0.1	0.3	<0.1
4-Chloroaniline	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Hexachlorobutadiene	T16	AR	0.1	mg/kg	32	LQM / CIEH GAC			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
4-Chloro-3-methylphenol	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Hexachlorocyclopentadiene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2,4,6-Trichlorophenol	T16	AR	0.1	mg/kg	879	Mouchel Derived GAC using LQM / CIEH GAC (lwr saturation value)			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2,4,5-Trichlorophenol	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2-Chloronaphthalene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2-Nitroaniline	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Dimethyl phthalate	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2,6-Dinitrotoluene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
3-Nitroaniline	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Dibenzofuran	T16	AR	0.1	mg/kg	12	Mouchel Derived GAC Using CLEAv1.06			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2,4-Dinitrotoluene	T16	AR	0.1	mg/kg	3700	EIC / AGS / CL:AIRE			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2-Nitrophenol	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Diethyl phthalate	T16	AR	0.1	mg/kg	14	EIC / AGS / CL:AIRE (lwr saturation value)			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1

A9 Tomatin to Moy - Soil Screening - Human Health Risk																
						Purpose of exploratory hole	General	General	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station	adj to petrol station
Concentration exceeds the screening value							597079 001	594778 002	596040 001	596040 002	596039 001	596364 001	596039 002	596364 002	589245 001
Limit of detection exceeds the screening value							TPTM3001 ES3 0.5m	BHTM3016 ES3 0.30M	TPTM3272 ES3 0.50M	TPTM3272 ES9 1.50M	TPTM3273 ES2 0.30M	TPTM3273 ES5 0.50m	TPTM3273 ES9 1.50M	TPTM3273 ES12 2.00m	TPTM3031 ES1 0.30M
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	25-Aug-16	15-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	19-Jul-16
Determinand	Method	Test Sample	LOD	Units											
4-Chlorophenyl phenylether	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
4-Nitroaniline	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Azobenzene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
4-Bromophenyl phenylether	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene	T16	AR	0.1	mg/kg	0.2	LQM / CIEH GAC (lwr saturation value)			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Pentachlorophenol	T16	AR	0.1	mg/kg	1200	LQM / CIEH GAC			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	.	.			0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Anthracene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Carbazole	T16	AR	0.1	mg/kg	0.0023	Mouchel Derived GAC Using CLEA v1.06 (lwr saturation value)			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Di-n-butylphthalate	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Fluoranthene	T16	AR	0.1	mg/kg	.	.			0.4	<0.1		<0.1	<0.1	<0.1	<0.1
Pyrene	T16	AR	0.1	mg/kg	.	.			0.4	<0.1		<0.1	<0.1	<0.1	<0.1
Butyl benzylphthalate	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Chrysene	T16	AR	0.1	mg/kg	.	.			0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Bis (2-ethylhexyl)phthalate	T16	AR	0.1	mg/kg	85000	EIC / AGS / CL:AIRE			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Di-n-octylphthalate	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	.	.			0.2	<0.1		<0.1	<0.1	<0.1	<0.1
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	.	.			0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
2,4-Dinitrophenol	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
4-Nitrophenol	T16	AR	0.1	mg/kg	.	.			<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Chloromethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Vinyl chloride	T54	AR	5	ug/kg	63	LQM / CIEH GAC			<5	<5		<5	<5	<5	<5
Bromomethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Chloroethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Trichlorofluoromethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,1-Dichloroethylene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Dichloromethane	T54	AR	50	ug/kg	.	.			<50	<50		<50	<50	<50	<50
Trans-1,2-Dichloroethene	T54	AR	5	ug/kg	22000	EIC / AGS / CL:AIRE			<5	<5		<5	<5	<5	<5
1,1-Dichloroethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Cis-1,2-Dichloroethylene	T54	AR	5	ug/kg	14000	EIC / AGS / CL:AIRE			<5	<5		<5	<5	<5	<5
2,2-Dichloropropane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Chloroform	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Bromochloromethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,1,1-Trichloroethane	T54	AR	5	ug/kg	700000	LQM / CIEH GAC			<5	<5		<5	<5	<5	<5
1,1-Dichloropropene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Carbon tetrachloride	T54	AR	5	ug/kg	3000	LQM / CIEH GAC			<5	<5		<5	<5	<5	<5
1,2-Dichloroethane	T54	AR	5	ug/kg	710	LQM / CIEH GAC			<5	<5		<5	<5	<5	<5
Benzene	T54	AR	1	ug/kg	.	.			<1	<1		<1	<1	<1	<1
1,2-Dichloropropane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,1,2-Trichloroethylene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Bromodichloromethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Dibromomethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Cis-1,3-Dichloropropene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5

A9 Tomatin to Moy - Soil Screening - Human Health Risk

						Purpose of exploratory hole	General	General	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station	adj to petrol station
Concentration exceeds the screening value							597079 001	594778 002	596040 001	596040 002	596039 001	596364 001	596039 002	596364 002	589245 001
Limit of detection exceeds the screening value							TPTM3001 ES3 0.5m	BHTM3016 ES3 0.30M	TPTM3272 ES3 0.50M	TPTM3272 ES9 1.50M	TPTM3273 ES2 0.30M	TPTM3273 ES5 0.50m	TPTM3273 ES9 1.50M	TPTM3273 ES12 2.00m	TPTM3031 ES1 0.30M
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	25-Aug-16	15-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	19-Jul-16
Determinand	Method	Test Sample	LOD	Units											
Toluene	T54	AR	1	ug/kg	.	.			5	<1		<1	<1	<1	<1
Trans-1,3-Dichloropropene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,1,2-Trichloroethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,3-Dichloropropane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Tetrachloroethene	T54	AR	5	ug/kg	130000	LQM / CIEH GAC			<5	<5		<5	<5	<5	<5
Chlorodibromomethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,2-dibromoethane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Chlorobenzene	T54	AR	5	ug/kg	59000	LQM / CIEH GAC			<5	<5		<5	<5	<5	<5
1,1,1,2-Tetrachloroethane	T54	AR	5	ug/kg	120000	LQM / CIEH GAC			<5	<5		<5	<5	<5	<5
EthylBenzene	T54	AR	1	ug/kg	.	.			<1	<1		<1	<1	1	<1
M/P Xylene	T54	AR	1	ug/kg	.	.			<1	<1		<1	<1	2	<1
O Xylene	T54	AR	1	ug/kg	.	.			<1	<1		<1	<1	3	<1
Styrene	T54	AR	5	ug/kg	626000	EIC / AGS / CL:AIRE (lwr saturation value)			<5	<5		<5	<5	<5	<5
Bromoform	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Isopropyl benzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	T54	AR	5	ug/kg	290000	LQM / CIEH GAC			<5	<5		<5	<5	<5	<5
1,2,3-Trichloropropane	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
n-Propylbenzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
Bromobenzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,3,5-Trimethylbenzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
T-Butylbenzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,2,4-Trimethylbenzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	19	<5
S-Butylbenzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
p-Isopropyltoluene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
2-Chlorotoluene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
4-Chlorotoluene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,3-Dichlorobenzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,4-Dichlorobenzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5
1,2-Dichlorobenzene	T54	AR	5	ug/kg	.	.			<5	<5		<5	<5	<5	<5

A9 Tomatin to Moy - Soil Screening - Human Health Risk

						Purpose of exploratory hole	adj to petrol station	Made ground noted	General	gravel pit (infilled?)	Made ground noted	Made ground noted	Made ground noted	no longer on alignment	possible MG noted
Concentration exceeds the screening value							589245 002	594639 001	589245 003	586488 003	594639 002	594639 003	594639 004	594778 001	595097 001
Limit of detection exceeds the screening value							TPTM3031 ES8 1.20M	TPTM3040 ES2 0.30m	TPTM3049 ES2 0.50M	BHTM3048 ES3 0.50M	TPTM3087 ES3 1.00m	TPTM3115 ES2 0.50m	TPTM3119 ES3 1.00m	TPTM3127A ES3 1.00M	BHTM3225 ES3 0.30M
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	19-Jul-16	09-Aug-16	20-Jul-16	11-Jul-16	11-Aug-16	11-Aug-16	11-Aug-16	17-Aug-16	12-Aug-16
Determinand	Method	Test Sample	LOD	Units											
Arsenic	T82	AR	2	mg/kg	640	Mouchel Derived GAC Using SGV (oral ID)	<2	<2	2	2	<2	<2	<2	2	<2
Boron (water-soluble)	T82	A40	1	mg/kg	192000	LQM / CIEH GAC	<1								
Cadmium	T82	AR	1	mg/kg	230	Mouchel Derived GAC Using SGV	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	T82	AR	1	mg/kg	8840	LQM / CIEH GAC	13	8	16	15	10	8	12	13	24
Chromium (hexavalent)	T82	A40	1	mg/kg	35	LQM / CIEH GAC	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	T82	AR	1	mg/kg	71700	LQM / CIEH GAC	8	8	15	8	4	6	5	8	24
Lead	T82	AR	3	mg/kg	740	Mouchel Derived GAC	9	36	25	5	4	<3	4	9	3
Mercury	T82	AR	1	mg/kg	3600	Mouchel Derived GAC Using SGV	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	T82	AR	1	mg/kg	1800	Mouchel Derived GAC Using EFSA, 2015 (inhalation TDI)	9	4	9	9	6	5	7	9	15
Selenium	T82	AR	3	mg/kg	13000	Mouchel Derived GAC Using SGV	<3	<3	<3	<3	<3	<3	<3	<3	<3
Zinc	T82	AR	1	mg/kg	665000	LQM / CIEH GAC	32	26	44	34	23	15	26	36	58
pH acidic	T7	A40			<5.5	Professional Judgement	5.8	6.1	5.7	6.3	6.2	7.2	6.2	7.8	7.1
pH alkaline	T7	A40			>9.5	Professional Judgement	5.8	6.1	5.7	6.3	6.2	7.2	6.2	7.8	7.1
Cyanide(Total)	T4	AR	1	mg/kg	16000	Mouchel Derived GAC Using CLEAv1.06	<1	7			4	<1	<1	<1	<1
Cyanide(free)	T4	AR	1	mg/kg	16000	Mouchel Derived GAC Using CLEAv1.06	<1								
Cyanide (Complex) by Calcul	T85	AR	1	mg/kg	16000	Mouchel Derived GAC Using CLEAv1.06	<1								
Total Phenols	T149	AR	0.01	mg/kg	3200	Mouchel Derived GAC Using SGV	<0.01								
Asbestos ID	T27	AR			n/a	Presence	N.D.	N.D.			N.D.	N.D.	N.D.	N.D.	N.D.
TPH (C5-C6 aliphatic)	T54	AR	10	ug/kg	304000	LQM / CIEH GAC (lwr saturation value)	<10	<10	<10	<10	<10	<10	<10	<10	<10
TPH (C6-C8 aliphatic)	T54	AR	10	ug/kg	144000	LQM / CIEH GAC (lwr saturation value)	<10	<10	<10	<10	<10	<10	<10	<10	<10
TPH (C8-C10 aliphatic)	T54	AR	10	ug/kg	78000	LQM / CIEH GAC (lwr saturation value)	<10	<10	<10	<10	<10	<10	<10	<10	<10
TPH (C10-C12 aliphatic)	T8	AR	1	mg/kg	48	LQM / CIEH GAC (lwr saturation value)	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (C12-C16 aliphatic)	T8	AR	1	mg/kg	24	LQM / CIEH GAC (lwr saturation value)	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (C16-C21 aliphatic)	T8	AR	1	mg/kg	1600000	LQM / CIEH GAC	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (C21-C35 aliphatic)	T8	AR	1	mg/kg			<1	4	<1	<1	<1	<1	<1	<1	<1
TPH (C6-C7 aromatic)	T54	AR	10	ug/kg	1220000	LQM / CIEH GAC (lwr saturation value)	<10	<10	<10	<10	<10	<10	<10	<10	<10
TPH (C7-C8 aromatic)	T54	AR	10	ug/kg	869000	LQM / CIEH GAC (lwr saturation value)	<10	<10	<10	<10	<10	<10	<10	<10	<10
TPH (C8-C10 aromatic)	T54	AR	10	ug/kg	613000	LQM / CIEH GAC (lwr saturation value)	<10	<10	<10	<10	<10	<10	<10	<10	<10
TPH (C10-C12 aromatic)	T8	AR	1	mg/kg	364	LQM / CIEH GAC (lwr saturation value)	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (C12-C16 aromatic)	T8	AR	1	mg/kg	169	LQM / CIEH GAC (lwr saturation value)	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (C16-C21 aromatic)	T8	AR	1	mg/kg	28000	LQM / CIEH GAC	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (C21-C35 aromatic)	T8	AR	1	mg/kg	28000	LQM / CIEH GAC	<1	7	<1	<1	<1	<1	<1	<1	<1
Naphthalene	T149	AR	0.01	mg/kg	76	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	T149	AR	0.01	mg/kg	86	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	T149	AR	0.01	mg/kg	57	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01
Fluorene	T149	AR	0.01	mg/kg	31	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Phenanthrene	T149	AR	0.01	mg/kg	22000	LQM / CIEH GAC	<0.01	0.01	0.19	0.01	0.22	<0.01	<0.01	0.01	<0.01
Anthracene	T149	AR	0.01	mg/kg	530000	LQM / CIEH GAC	<0.01	<0.01	0.04	<0.01	0.04	<0.01	<0.01	<0.01	<0.01
Fluoranthene	T149	AR	0.01	mg/kg	23000	LQM / CIEH GAC	<0.01	0.03	0.42	0.03	0.19	<0.01	<0.01	0.02	<0.01
Pyrene	T149	AR	0.01	mg/kg	54000	LQM / CIEH GAC	<0.01	0.02	0.33	0.03	0.2	<0.01	<0.01	0.02	<0.01
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	90	LQM / CIEH GAC	<0.01	0.02	0.18	0.02	0.09	<0.01	<0.01	0.02	<0.01
Chrysene	T149	AR	0.01	mg/kg	140	LQM / CIEH GAC	<0.01	0.01	0.19	0.02	0.09	<0.01	<0.01	0.01	<0.01
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	100	LQM / CIEH GAC	<0.01	0.02	0.18	0.02	0.09	<0.01	<0.01	0.01	<0.01
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	140	LQM / CIEH GAC	<0.01	0.01	0.17	0.01	0.04	<0.01	<0.01	<0.01	<0.01
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	14	LQM / CIEH GAC	<0.01	0.01	0.17	0.01	0.07	<0.01	<0.01	0.01	<0.01
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	60	LQM / CIEH GAC	<0.01	0.01	0.08	0.01	0.03	<0.01	<0.01	<0.01	<0.01
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	13	LQM / CIEH GAC	<0.01	<0.01	0.03	0.01	0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	650	LQM / CIEH GAC	<0.01	0.01	0.08	0.02	0.05	<0.01	<0.01	<0.01	<0.01
PAH(total)	T149	AR	0.01	mg/kg	.	.	<0.01	0.15	2.1	0.19	1.2	<0.01	<0.01	0.1	<0.01

A9 Tomatin to Moy - Soil Screening - Human Health Risk

						Purpose of exploratory hole	adj to petrol station	Made ground noted	General	gravel pit (infilled?)	Made ground noted	Made ground noted	Made ground noted	no longer on alignment	possible MG noted
Concentration exceeds the screening value							589245 002	594639 001	589245 003	586488 003	594639 002	594639 003	594639 004	594778 001	595097 001
Limit of detection exceeds the screening value							TPTM3031 ES8 1.20M	TPTM3040 ES2 0.30m	TPTM3049 ES2 0.50M	BHTM3048 ES3 0.50M	TPTM3087 ES3 1.00m	TPTM3115 ES2 0.50m	TPTM3119 ES3 1.00m	TPTM3127A ES3 1.00M	BHTM3225 ES3 0.30M
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	19-Jul-16	09-Aug-16	20-Jul-16	11-Jul-16	11-Aug-16	11-Aug-16	11-Aug-16	17-Aug-16	12-Aug-16
Determinand	Method	Test Sample	LOD	Units											
PCB BZ#77	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#81	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#105	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#114	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#118	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#123	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#126	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#156	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#157	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#167	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#169	T1	AR	0.05	ug/kg	.	.	<0.50								
PCB BZ#189	T1	AR	0.05	ug/kg	.	.	<0.50								
Total PCBs (WHO12)				ug/kg	33	Mouchel Derived GAC Using CLEAv1.06									
Phenol	T16	AR	0.1	mg/kg	3200	Mouchel Derived GAC Using SGV	<0.1								
Bis (2-chloroethyl) ether	T16	AR	0.1	mg/kg	.	.	<0.1								
2-Chlorophenol	T16	AR	0.1	mg/kg	3600	Mouchel Derived GAC using LQM / CIEH GAC	<0.1								
1,3-Dichlorobenzene	T16	AR	0.1	mg/kg	.	.	<0.1								
1,4-Dichlorobenzene	T16	AR	0.1	mg/kg	.	.	<0.1								
1,2-Dichlorobenzene	T16	AR	0.1	mg/kg	.	.	<0.1								
Bis (2-chloroisopropyl) ether	T16	AR	0.1	mg/kg	.	.	<0.1								
2-methyl phenol	T16	AR	0.1	mg/kg	15000	Mouchel Derived GAC Using CLEAv1.06 (lwr saturation value)	<0.1								
3/4-Methylphenol	T16	AR	0.1	mg/kg	12000	Mouchel Derived GAC Using CLEAv1.06	<0.1								
Hexachloroethane	T16	AR	0.1	mg/kg	.	.	<0.1								
Nitrobenzene	T16	AR	0.1	mg/kg	.	.	<0.1								
Isophorone	T16	AR	0.1	mg/kg	.	.	<0.1								
2,4-Dimethylphenol	T16	AR	0.1	mg/kg	.	.	<0.1								
Bis (2-chloroethoxy) methan	T16	AR	0.1	mg/kg	.	.	<0.1								
2,4-Dichlorophenol	T16	AR	0.1	mg/kg	3500	Mouchel Derived GAC using LQM / CIEH GAC	<0.1								
1,2,4-Trichlorobenzene	T16	AR	0.1	mg/kg	.	.	<0.1								
Naphthalene	T16	AR	0.1	mg/kg	.	.	<0.1								
4-Chloroaniline	T16	AR	0.1	mg/kg	.	.	<0.1								
Hexachlorobutadiene	T16	AR	0.1	mg/kg	32	LQM / CIEH GAC	<0.1								
4-Chloro-3-methylphenol	T16	AR	0.1	mg/kg	.	.	<0.1								
2-Methylnaphthalene	T16	AR	0.1	mg/kg	.	.	<0.1								
Hexachlorocyclopentadiene	T16	AR	0.1	mg/kg	.	.	<0.1								
2,4,6-Trichlorophenol	T16	AR	0.1	mg/kg	879	Mouchel Derived GAC using LQM / CIEH GAC (lwr saturation value)	<0.1								
2,4,5-Trichlorophenol	T16	AR	0.1	mg/kg	.	.	<0.1								
2-Chloronaphthalene	T16	AR	0.1	mg/kg	.	.	<0.1								
2-Nitroaniline	T16	AR	0.1	mg/kg	.	.	<0.1								
Dimethyl phthalate	T16	AR	0.1	mg/kg	.	.	<0.1								
2,6-Dinitrotoluene	T16	AR	0.1	mg/kg	.	.	<0.1								
Acenaphthylene	T16	AR	0.1	mg/kg	.	.	<0.1								
Acenaphthene	T16	AR	0.1	mg/kg	.	.	<0.1								
3-Nitroaniline	T16	AR	0.1	mg/kg	.	.	<0.1								
Dibenzofuran	T16	AR	0.1	mg/kg	12	Mouchel Derived GAC Using CLEAv1.06	<0.1								
2,4-Dinitrotoluene	T16	AR	0.1	mg/kg	3700	EIC / AGS / CL:AIRE	<0.1								
2-Nitrophenol	T16	AR	0.1	mg/kg	.	.	<0.1								
Diethyl phthalate	T16	AR	0.1	mg/kg	14	EIC / AGS / CL:AIRE (lwr saturation value)	<0.1								
Fluorene	T16	AR	0.1	mg/kg	.	.	<0.1								

A9 Tomatin to Moy - Soil Screening - Human Health Risk															
						Purpose of exploratory hole	adj to petrol station	Made ground noted	General	gravel pit (infilled?)	Made ground noted	Made ground noted	Made ground noted	no longer on alignment	possible MG noted
Concentration exceeds the screening value							589245 002	594639 001	589245 003	586488 003	594639 002	594639 003	594639 004	594778 001	595097 001
Limit of detection exceeds the screening value							TPTM3031 ES8 1.20M	TPTM3040 ES2 0.30m	TPTM3049 ES2 0.50M	BHTM3048 ES3 0.50M	TPTM3087 ES3 1.00m	TPTM3115 ES2 0.50m	TPTM3119 ES3 1.00m	TPTM3127A ES3 1.00M	BHTM3225 ES3 0.30M
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	19-Jul-16	09-Aug-16	20-Jul-16	11-Jul-16	11-Aug-16	11-Aug-16	11-Aug-16	17-Aug-16	12-Aug-16
Determinand	Method	Test Sample	LOD	Units											
4-Chlorophenyl phenylether	T16	AR	0.1	mg/kg	.	.	<0.1								
4-Nitroaniline	T16	AR	0.1	mg/kg	.	.	<0.1								
Azobenzene	T16	AR	0.1	mg/kg	.	.	<0.1								
4-Bromophenyl phenylether	T16	AR	0.1	mg/kg	.	.	<0.1								
Hexachlorobenzene	T16	AR	0.1	mg/kg	0.2	LQM / CIEH GAC (lwr saturation value)	<0.1								
Pentachlorophenol	T16	AR	0.1	mg/kg	1200	LQM / CIEH GAC	<0.1								
Phenanthrene	T16	AR	0.1	mg/kg	.	.	<0.1								
Anthracene	T16	AR	0.1	mg/kg	.	.	<0.1								
Carbazole	T16	AR	0.1	mg/kg	0.0023	Mouchel Derived GAC Using CLEA v1.06 (lwr saturation value)	<0.1								
Di-n-butylphthalate	T16	AR	0.1	mg/kg	.	.	<0.1								
Fluoranthene	T16	AR	0.1	mg/kg	.	.	<0.1								
Pyrene	T16	AR	0.1	mg/kg	.	.	<0.1								
Butyl benzylphthalate	T16	AR	0.1	mg/kg	.	.	<0.1								
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	.	.	<0.1								
Chrysene	T16	AR	0.1	mg/kg	.	.	<0.1								
Bis (2-ethylhexyl)phthalate	T16	AR	0.1	mg/kg	85000	EIC / AGS / CL:AIRE	<0.1								
Di-n-octylphthalate	T16	AR	0.1	mg/kg	.	.	<0.1								
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	.	.	<0.1								
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	.	.	<0.1								
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	.	.	<0.1								
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	.	.	<0.1								
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	.	.	<0.1								
2,4-Dinitrophenol	T16	AR	0.1	mg/kg	.	.	<0.1								
4-Nitrophenol	T16	AR	0.1	mg/kg	.	.	<0.1								
Dichlorodifluoromethane	T54	AR	5	ug/kg	.	.	<5								
Chloromethane	T54	AR	5	ug/kg	.	.	<5								
Vinyl chloride	T54	AR	5	ug/kg	63	LQM / CIEH GAC	<5								
Bromomethane	T54	AR	5	ug/kg	.	.	<5								
Chloroethane	T54	AR	5	ug/kg	.	.	<5								
Trichlorofluoromethane	T54	AR	5	ug/kg	.	.	<5								
1,1-Dichloroethylene	T54	AR	5	ug/kg	.	.	<5								
Dichloromethane	T54	AR	50	ug/kg	.	.	<50								
Trans-1,2-Dichloroethene	T54	AR	5	ug/kg	22000	EIC / AGS / CL:AIRE	<5								
1,1-Dichloroethane	T54	AR	5	ug/kg	.	.	<5								
Cis-1,2-Dichloroethylene	T54	AR	5	ug/kg	14000	EIC / AGS / CL:AIRE	<5								
2,2-Dichloropropane	T54	AR	5	ug/kg	.	.	<5								
Chloroform	T54	AR	5	ug/kg	.	.	<5								
Bromochloromethane	T54	AR	5	ug/kg	.	.	<5								
1,1,1-Trichloroethane	T54	AR	5	ug/kg	700000	LQM / CIEH GAC	<5								
1,1-Dichloropropene	T54	AR	5	ug/kg	.	.	<5								
Carbon tetrachloride	T54	AR	5	ug/kg	3000	LQM / CIEH GAC	<5								
1,2-Dichloroethane	T54	AR	5	ug/kg	710	LQM / CIEH GAC	<5								
Benzene	T54	AR	1	ug/kg	.	.	<1								
1,2-Dichloropropane	T54	AR	5	ug/kg	.	.	<5								
1,1,2-Trichloroethylene	T54	AR	5	ug/kg	.	.	<5								
Bromodichloromethane	T54	AR	5	ug/kg	.	.	<5								
Dibromomethane	T54	AR	5	ug/kg	.	.	<5								
Cis-1,3-Dichloropropene	T54	AR	5	ug/kg	.	.	<5								

A9 Tomatin to Moy - Soil Screening - Human Health Risk

						Purpose of exploratory hole	adj to petrol station	Made ground noted	General	gravel pit (infilled?)	Made ground noted	Made ground noted	Made ground noted	no longer on alignment	possible MG noted
Concentration exceeds the screening value							589245 002	594639 001	589245 003	586488 003	594639 002	594639 003	594639 004	594778 001	595097 001
Limit of detection exceeds the screening value							TPTM3031 ES8 1.20M	TPTM3040 ES2 0.30m	TPTM3049 ES2 0.50M	BHTM3048 ES3 0.50M	TPTM3087 ES3 1.00m	TPTM3115 ES2 0.50m	TPTM3119 ES3 1.00m	TPTM3127A ES3 1.00M	BHTM3225 ES3 0.30M
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	19-Jul-16	09-Aug-16	20-Jul-16	11-Jul-16	11-Aug-16	11-Aug-16	11-Aug-16	17-Aug-16	12-Aug-16
Determinand	Method	Test Sample	LOD	Units											
Toluene	T54	AR	1	ug/kg	.	.	<1								
Trans-1,3-Dichloropropene	T54	AR	5	ug/kg	.	.	<5								
1,1,2-Trichloroethane	T54	AR	5	ug/kg	.	.	<5								
1,3-Dichloropropane	T54	AR	5	ug/kg	.	.	<5								
Tetrachloroethene	T54	AR	5	ug/kg	130000	LQM / CIEH GAC	<5								
Chlorodibromomethane	T54	AR	5	ug/kg	.	.	<5								
1,2-dibromoethane	T54	AR	5	ug/kg	.	.	<5								
Chlorobenzene	T54	AR	5	ug/kg	59000	LQM / CIEH GAC	<5								
1,1,1,2-Tetrachloroethane	T54	AR	5	ug/kg	120000	LQM / CIEH GAC	<5								
EthylBenzene	T54	AR	1	ug/kg	.	.	<1								
M/P Xylene	T54	AR	1	ug/kg	.	.	<1								
O Xylene	T54	AR	1	ug/kg	.	.	<1								
Styrene	T54	AR	5	ug/kg	626000	EIC / AGS / CL:AIRE (lwr saturation value)	<5								
Bromoform	T54	AR	5	ug/kg	.	.	<5								
Isopropyl benzene	T54	AR	5	ug/kg	.	.	<5								
1,1,2,2-Tetrachloroethane	T54	AR	5	ug/kg	290000	LQM / CIEH GAC	<5								
1,2,3-Trichloropropane	T54	AR	5	ug/kg	.	.	<5								
n-Propylbenzene	T54	AR	5	ug/kg	.	.	<5								
Bromobenzene	T54	AR	5	ug/kg	.	.	<5								
1,3,5-Trimethylbenzene	T54	AR	5	ug/kg	.	.	<5								
T-Butylbenzene	T54	AR	5	ug/kg	.	.	<5								
1,2,4-Trimethylbenzene	T54	AR	5	ug/kg	.	.	<5								
S-Butylbenzene	T54	AR	5	ug/kg	.	.	<5								
p-Isopropyltoluene	T54	AR	5	ug/kg	.	.	<5								
2-Chlorotoluene	T54	AR	5	ug/kg	.	.	<5								
4-Chlorotoluene	T54	AR	5	ug/kg	.	.	<5								
1,3-Dichlorobenzene	T54	AR	5	ug/kg	.	.	<5								
1,4-Dichlorobenzene	T54	AR	5	ug/kg	.	.	<5								
1,2-Dichlorobenzene	T54	AR	5	ug/kg	.	.	<5								

A9 Tomatin to Moy - Soil Screening - Human Health Risk												
						Purpose of exploratory hole	General	Made ground noted	Made ground noted	General	General	General
Concentration exceeds the screening value							596040 004	594639 005	594639 006	596040 003	594778 003	594639 007
Limit of detection exceeds the screening value							TPTM3147 ES3 0.50M	TPTM3177 ES2 0.30m	TPTM3177 ES7 1.50m	TPTM3182 ES3 0.50M	TPTM3199 ES3 0.50M	TPTM3207 ES3 0.50m
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	23-Aug-16	03-Aug-16	03-Aug-16	23-Aug-16	16-Aug-16	15-Aug-16
Determinand	Method	Test Sample	LOD	Units								
Arsenic	T82	AR	2	mg/kg	640	Mouchel Derived GAC Using SGV (oral ID)	3	<2	<2	6	<2	<2
Boron (water-soluble)	T82	A40	1	mg/kg	192000	LQM / CIEH GAC						
Cadmium	T82	AR	1	mg/kg	230	Mouchel Derived GAC Using SGV	<1	<1	<1	<1	<1	<1
Chromium	T82	AR	1	mg/kg	8840	LQM / CIEH GAC	18	18	13	13	14	11
Chromium (hexavalent)	T82	A40	1	mg/kg	35	LQM / CIEH GAC	<1	<1	<1	<1	<1	<1
Copper	T82	AR	1	mg/kg	71700	LQM / CIEH GAC	6	11	8	7	7	7
Lead	T82	AR	3	mg/kg	740	Mouchel Derived GAC	8	7	8	13	4	4
Mercury	T82	AR	1	mg/kg	3600	Mouchel Derived GAC Using SGV	<1	<1	<1	<1	<1	<1
Nickel	T82	AR	1	mg/kg	1800	Mouchel Derived GAC Using EFSA, 2015 (inhalation TDI)	9	11	6	5	9	7
Selenium	T82	AR	3	mg/kg	13000	Mouchel Derived GAC Using SGV	<3	<3	<3	<3	<3	<3
Zinc	T82	AR	1	mg/kg	665000	LQM / CIEH GAC	28	39	38	23	27	29
pH acidic	T7	A40			<5.5	Professional Judgement	5.4	7.6	6	7	5.4	7.3
pH alkaline	T7	A40			>9.5	Professional Judgement	5.4	7.6	6	7	5.4	7.3
Cyanide(Total)	T4	AR	1	mg/kg	16000	Mouchel Derived GAC Using CLEAv1.06	<1	<1	<1	<1	<1	2
Cyanide(free)	T4	AR	1	mg/kg	16000	Mouchel Derived GAC Using CLEAv1.06						
Cyanide (Complex) by Calcul	T85	AR	1	mg/kg	16000	Mouchel Derived GAC Using CLEAv1.06						
Total Phenols	T149	AR	0.01	mg/kg	3200	Mouchel Derived GAC Using SGV						
Asbestos ID	T27	AR			n/a	Presence						N.D.
TPH (C5-C6 aliphatic)	T54	AR	10	ug/kg	304000	LQM / CIEH GAC (lwr saturation value)		<10	<10	<10	<10	<10
TPH (C6-C8 aliphatic)	T54	AR	10	ug/kg	144000	LQM / CIEH GAC (lwr saturation value)		<10	<10	<10	<10	<10
TPH (C8-C10 aliphatic)	T54	AR	10	ug/kg	78000	LQM / CIEH GAC (lwr saturation value)		<10	16	<10	<10	<10
TPH (C10-C12 aliphatic)	T8	AR	1	mg/kg	48	LQM / CIEH GAC (lwr saturation value)		<1	4	<1	<1	<1
TPH (C12-C16 aliphatic)	T8	AR	1	mg/kg	24	LQM / CIEH GAC (lwr saturation value)		5	35	<1	<1	<1
TPH (C16-C21 aliphatic)	T8	AR	1	mg/kg	1600000	LQM / CIEH GAC		15	68	<1	<1	<1
TPH (C21-C35 aliphatic)	T8	AR	1	mg/kg				10	170	5	<1	<1
TPH (C6-C7 aromatic)	T54	AR	10	ug/kg	1220000	LQM / CIEH GAC (lwr saturation value)		<10	<10	<10	<10	<10
TPH (C7-C8 aromatic)	T54	AR	10	ug/kg	869000	LQM / CIEH GAC (lwr saturation value)		<10	<10	<10	<10	<10
TPH (C8-C10 aromatic)	T54	AR	10	ug/kg	613000	LQM / CIEH GAC (lwr saturation value)		<10	12	<10	<10	<10
TPH (C10-C12 aromatic)	T8	AR	1	mg/kg	364	LQM / CIEH GAC (lwr saturation value)		<1	<1	<1	<1	<1
TPH (C12-C16 aromatic)	T8	AR	1	mg/kg	169	LQM / CIEH GAC (lwr saturation value)		<1	<1	<1	<1	<1
TPH (C16-C21 aromatic)	T8	AR	1	mg/kg	28000	LQM / CIEH GAC		<1	<1	<1	<1	<1
TPH (C21-C35 aromatic)	T8	AR	1	mg/kg	28000	LQM / CIEH GAC		<1	<1	<1	<1	<1
Naphthalene	T149	AR	0.01	mg/kg	76	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Acenaphthylene	T149	AR	0.01	mg/kg	86	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Acenaphthene	T149	AR	0.01	mg/kg	57	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	T149	AR	0.01	mg/kg	31	LQM / CIEH GAC (lwr saturation value)	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Phenanthrene	T149	AR	0.01	mg/kg	22000	LQM / CIEH GAC	<0.01	<0.01	0.05	<0.01	<0.01	<0.01
Anthracene	T149	AR	0.01	mg/kg	530000	LQM / CIEH GAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	T149	AR	0.01	mg/kg	23000	LQM / CIEH GAC	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Pyrene	T149	AR	0.01	mg/kg	54000	LQM / CIEH GAC	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	90	LQM / CIEH GAC	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Chrysene	T149	AR	0.01	mg/kg	140	LQM / CIEH GAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	100	LQM / CIEH GAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	140	LQM / CIEH GAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	14	LQM / CIEH GAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	60	LQM / CIEH GAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	13	LQM / CIEH GAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	650	LQM / CIEH GAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PAH(total)	T149	AR	0.01	mg/kg	.	.	<0.01	<0.01	0.12	<0.01	<0.01	<0.01

A9 Tomatin to Moy - Soil Screening - Human Health Risk												
						Purpose of exploratory hole	General	Made ground noted	Made ground noted	General	General	General
Concentration exceeds the screening value							596040 004	594639 005	594639 006	596040 003	594778 003	594639 007
Limit of detection exceeds the screening value							TPTM3147 ES3 0.50M	TPTM3177 ES2 0.30m	TPTM3177 ES7 1.50m	TPTM3182 ES3 0.50M	TPTM3199 ES3 0.50M	TPTM3207 ES3 0.50m
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	23-Aug-16	03-Aug-16	03-Aug-16	23-Aug-16	16-Aug-16	15-Aug-16
Determinand	Method	Test Sample	LOD	Units								
PCB BZ#77	T1	AR	0.05	ug/kg	.	.						
PCB BZ#81	T1	AR	0.05	ug/kg	.	.						
PCB BZ#105	T1	AR	0.05	ug/kg	.	.						
PCB BZ#114	T1	AR	0.05	ug/kg	.	.						
PCB BZ#118	T1	AR	0.05	ug/kg	.	.						
PCB BZ#123	T1	AR	0.05	ug/kg	.	.						
PCB BZ#126	T1	AR	0.05	ug/kg	.	.						
PCB BZ#156	T1	AR	0.05	ug/kg	.	.						
PCB BZ#157	T1	AR	0.05	ug/kg	.	.						
PCB BZ#167	T1	AR	0.05	ug/kg	.	.						
PCB BZ#169	T1	AR	0.05	ug/kg	.	.						
PCB BZ#189	T1	AR	0.05	ug/kg	.	.						
Total PCBs (WHO12)				ug/kg	33	Mouchel Derived GAC Using CLEAv1.06						
Phenol	T16	AR	0.1	mg/kg	3200	Mouchel Derived GAC Using SGV			<0.1			
Bis (2-chloroethyl) ether	T16	AR	0.1	mg/kg	.	.			<0.1			
2-Chlorophenol	T16	AR	0.1	mg/kg	3600	Mouchel Derived GAC using LQM / CIEH GAC			<0.1			
1,3-Dichlorobenzene	T16	AR	0.1	mg/kg	.	.			<0.1			
1,4-Dichlorobenzene	T16	AR	0.1	mg/kg	.	.			<0.1			
1,2-Dichlorobenzene	T16	AR	0.1	mg/kg	.	.			<0.1			
Bis (2-chloroisopropyl) ether	T16	AR	0.1	mg/kg	.	.			<0.1			
2-methyl phenol	T16	AR	0.1	mg/kg	15000	Mouchel Derived GAC Using CLEAv1.06 (lwr saturation value)			<0.1			
3/4-Methylphenol	T16	AR	0.1	mg/kg	12000	Mouchel Derived GAC Using CLEAv1.06			<0.1			
Hexachloroethane	T16	AR	0.1	mg/kg	.	.			<0.1			
Nitrobenzene	T16	AR	0.1	mg/kg	.	.			<0.1			
Isophorone	T16	AR	0.1	mg/kg	.	.			<0.1			
2,4-Dimethylphenol	T16	AR	0.1	mg/kg	.	.			<0.1			
Bis (2-chloroethoxy) methan	T16	AR	0.1	mg/kg	.	.			<0.1			
2,4-Dichlorophenol	T16	AR	0.1	mg/kg	3500	Mouchel Derived GAC using LQM / CIEH GAC			<0.1			
1,2,4-Trichlorobenzene	T16	AR	0.1	mg/kg	.	.			<0.1			
Naphthalene	T16	AR	0.1	mg/kg	.	.			<0.1			
4-Chloroaniline	T16	AR	0.1	mg/kg	.	.			<0.1			
Hexachlorobutadiene	T16	AR	0.1	mg/kg	32	LQM / CIEH GAC			<0.1			
4-Chloro-3-methylphenol	T16	AR	0.1	mg/kg	.	.			<0.1			
2-Methylnaphthalene	T16	AR	0.1	mg/kg	.	.			<0.1			
Hexachlorocyclopentadiene	T16	AR	0.1	mg/kg	.	.			<0.1			
2,4,6-Trichlorophenol	T16	AR	0.1	mg/kg	879	Mouchel Derived GAC using LQM / CIEH GAC (lwr saturation value)			<0.1			
2,4,5-Trichlorophenol	T16	AR	0.1	mg/kg	.	.			<0.1			
2-Chloronaphthalene	T16	AR	0.1	mg/kg	.	.			<0.1			
2-Nitroaniline	T16	AR	0.1	mg/kg	.	.			<0.1			
Dimethyl phthalate	T16	AR	0.1	mg/kg	.	.			<0.1			
2,6-Dinitrotoluene	T16	AR	0.1	mg/kg	.	.			<0.1			
Acenaphthylene	T16	AR	0.1	mg/kg	.	.			<0.1			
Acenaphthene	T16	AR	0.1	mg/kg	.	.			<0.1			
3-Nitroaniline	T16	AR	0.1	mg/kg	.	.			<0.1			
Dibenzofuran	T16	AR	0.1	mg/kg	12	Mouchel Derived GAC Using CLEAv1.06			<0.1			
2,4-Dinitrotoluene	T16	AR	0.1	mg/kg	3700	EIC / AGS / CL:AIRE			<0.1			
2-Nitrophenol	T16	AR	0.1	mg/kg	.	.			<0.1			
Diethyl phthalate	T16	AR	0.1	mg/kg	14	EIC / AGS / CL:AIRE (lwr saturation value)			<0.1			
Fluorene	T16	AR	0.1	mg/kg	.	.			<0.1			

A9 Tomatin to Moy - Soil Screening - Human Health Risk												
						Purpose of exploratory hole	General	Made ground noted	Made ground noted	General	General	General
Concentration exceeds the screening value							596040 004	594639 005	594639 006	596040 003	594778 003	594639 007
Limit of detection exceeds the screening value							TPTM3147 ES3 0.50M	TPTM3177 ES2 0.30m	TPTM3177 ES7 1.50m	TPTM3182 ES3 0.50M	TPTM3199 ES3 0.50M	TPTM3207 ES3 0.50m
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	23-Aug-16	03-Aug-16	03-Aug-16	23-Aug-16	16-Aug-16	15-Aug-16
Determinand	Method	Test Sample	LOD	Units								
4-Chlorophenyl phenylether	T16	AR	0.1	mg/kg	.	.			<0.1			
4-Nitroaniline	T16	AR	0.1	mg/kg	.	.			<0.1			
Azobenzene	T16	AR	0.1	mg/kg	.	.			<0.1			
4-Bromophenyl phenylether	T16	AR	0.1	mg/kg	.	.			<0.1			
Hexachlorobenzene	T16	AR	0.1	mg/kg	0.2	LQM / CIEH GAC (lwr saturation value)			<0.1			
Pentachlorophenol	T16	AR	0.1	mg/kg	1200	LQM / CIEH GAC			<0.1			
Phenanthrene	T16	AR	0.1	mg/kg	.	.			<0.1			
Anthracene	T16	AR	0.1	mg/kg	.	.			<0.1			
Carbazole	T16	AR	0.1	mg/kg	0.0023	Mouchel Derived GAC Using CLEA v1.06 (lwr saturation value)			<0.1			
Di-n-butylphthalate	T16	AR	0.1	mg/kg	.	.			<0.1			
Fluoranthene	T16	AR	0.1	mg/kg	.	.			<0.1			
Pyrene	T16	AR	0.1	mg/kg	.	.			<0.1			
Butyl benzylphthalate	T16	AR	0.1	mg/kg	.	.			<0.1			
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	.	.			<0.1			
Chrysene	T16	AR	0.1	mg/kg	.	.			<0.1			
Bis (2-ethylhexyl)phthalate	T16	AR	0.1	mg/kg	85000	EIC / AGS / CL:AIRE			<0.1			
Di-n-octylphthalate	T16	AR	0.1	mg/kg	.	.			<0.1			
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	.	.			<0.1			
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	.	.			<0.1			
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	.	.			<0.1			
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	.	.			<0.1			
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	.	.			<0.1			
2,4-Dinitrophenol	T16	AR	0.1	mg/kg	.	.			<0.1			
4-Nitrophenol	T16	AR	0.1	mg/kg	.	.			<0.1			
Dichlorodifluoromethane	T54	AR	5	ug/kg	.	.			<5			
Chloromethane	T54	AR	5	ug/kg	.	.			<5			
Vinyl chloride	T54	AR	5	ug/kg	63	LQM / CIEH GAC			<5			
Bromomethane	T54	AR	5	ug/kg	.	.			<5			
Chloroethane	T54	AR	5	ug/kg	.	.			<5			
Trichlorofluoromethane	T54	AR	5	ug/kg	.	.			<5			
1,1-Dichloroethylene	T54	AR	5	ug/kg	.	.			<5			
Dichloromethane	T54	AR	50	ug/kg	.	.			<50			
Trans-1,2-Dichloroethene	T54	AR	5	ug/kg	22000	EIC / AGS / CL:AIRE			<5			
1,1-Dichloroethane	T54	AR	5	ug/kg	.	.			<5			
Cis-1,2-Dichloroethylene	T54	AR	5	ug/kg	14000	EIC / AGS / CL:AIRE			<5			
2,2-Dichloropropane	T54	AR	5	ug/kg	.	.			<5			
Chloroform	T54	AR	5	ug/kg	.	.			<5			
Bromochloromethane	T54	AR	5	ug/kg	.	.			<5			
1,1,1-Trichloroethane	T54	AR	5	ug/kg	700000	LQM / CIEH GAC			<5			
1,1-Dichloropropene	T54	AR	5	ug/kg	.	.			<5			
Carbon tetrachloride	T54	AR	5	ug/kg	3000	LQM / CIEH GAC			<5			
1,2-Dichloroethane	T54	AR	5	ug/kg	710	LQM / CIEH GAC			<5			
Benzene	T54	AR	1	ug/kg	.	.			<1			
1,2-Dichloropropane	T54	AR	5	ug/kg	.	.			<5			
1,1,2-Trichloroethylene	T54	AR	5	ug/kg	.	.			<5			
Bromodichloromethane	T54	AR	5	ug/kg	.	.			<5			
Dibromomethane	T54	AR	5	ug/kg	.	.			<5			
Cis-1,3-Dichloropropene	T54	AR	5	ug/kg	.	.			<5			

A9 Tomatin to Moy - Soil Screening - Human Health Risk												
						Purpose of exploratory hole	General	Made ground noted	Made ground noted	General	General	General
Concentration exceeds the screening value							596040 004	594639 005	594639 006	596040 003	594778 003	594639 007
Limit of detection exceeds the screening value							TPTM3147 ES3 0.50M	TPTM3177 ES2 0.30m	TPTM3177 ES7 1.50m	TPTM3182 ES3 0.50M	TPTM3199 ES3 0.50M	TPTM3207 ES3 0.50m
					Commercial / Industrial GAC 1% SOM	Source of Screening Value	23-Aug-16	03-Aug-16	03-Aug-16	23-Aug-16	16-Aug-16	15-Aug-16
Determinand	Method	Test Sample	LOD	Units								
Toluene	T54	AR	1	ug/kg	.	.			<1			
Trans-1,3-Dichloropropene	T54	AR	5	ug/kg	.	.			<5			
1,1,2-Trichloroethane	T54	AR	5	ug/kg	.	.			<5			
1,3-Dichloropropane	T54	AR	5	ug/kg	.	.			<5			
Tetrachloroethene	T54	AR	5	ug/kg	130000	LQM / CIEH GAC			<5			
Chlorodibromomethane	T54	AR	5	ug/kg	.	.			<5			
1,2-dibromoethane	T54	AR	5	ug/kg	.	.			<5			
Chlorobenzene	T54	AR	5	ug/kg	59000	LQM / CIEH GAC			<5			
1,1,1,2-Tetrachloroethane	T54	AR	5	ug/kg	120000	LQM / CIEH GAC			<5			
EthylBenzene	T54	AR	1	ug/kg	.	.			<1			
M/P Xylene	T54	AR	1	ug/kg	.	.			<1			
O Xylene	T54	AR	1	ug/kg	.	.			<1			
Styrene	T54	AR	5	ug/kg	626000	EIC / AGS / CL:AIRE (lwr saturation value)			<5			
Bromoform	T54	AR	5	ug/kg	.	.			<5			
Isopropyl benzene	T54	AR	5	ug/kg	.	.			<5			
1,1,2,2-Tetrachloroethane	T54	AR	5	ug/kg	290000	LQM / CIEH GAC			<5			
1,2,3-Trichloropropane	T54	AR	5	ug/kg	.	.			<5			
n-Propylbenzene	T54	AR	5	ug/kg	.	.			<5			
Bromobenzene	T54	AR	5	ug/kg	.	.			<5			
1,3,5-Trimethylbenzene	T54	AR	5	ug/kg	.	.			<5			
T-Butylbenzene	T54	AR	5	ug/kg	.	.			<5			
1,2,4-Trimethylbenzene	T54	AR	5	ug/kg	.	.			<5			
S-Butylbenzene	T54	AR	5	ug/kg	.	.			<5			
p-Isopropyltoluene	T54	AR	5	ug/kg	.	.			<5			
2-Chlorotoluene	T54	AR	5	ug/kg	.	.			<5			
4-Chlorotoluene	T54	AR	5	ug/kg	.	.			<5			
1,3-Dichlorobenzene	T54	AR	5	ug/kg	.	.			<5			
1,4-Dichlorobenzene	T54	AR	5	ug/kg	.	.			<5			
1,2-Dichlorobenzene	T54	AR	5	ug/kg	.	.			<5			

Annex B. Water Environment Risk Assessment

B.1. EQS Screening

ANALYSIS OF LEACHATE - A9 Tomation to Moy

Screening Values - Environmental Quality Standards

Receptor water hardness: not known * mg/l CaCO3 - most stringent hardness used
Relevant EQS Hardness Band: <40 mg/l CaCO3/l
Hardness related Freshwater EQS

Concentration exceeds screening value
Concentration exceeds screening value because limit of detection is greater than screening value
*** should not be used for ecological classification purposes**

Determinand	Units	Method Detection Limit	Screening Value (µg/l) Freshwater, annual average (mean)	Screening Value (µg/l) Freshwater, Max Allowable	Source of screening value	petrol station 596040 001 TPTM3272 ES3 0.50M 23-Aug-16	petrol station 596040 002 TPTM3272 ES9 1.50M 23-Aug-16	petrol station 596039 001 TPTM3273 ES2 0.30M 23-Aug-16	petrol station 596364 001 TPTM3273 ES5 0.50m 23-Aug-16	petrol station 596039 002 TPTM3273 ES9 1.50M 23-Aug-16
Inorganics										
Arsenic (dissolved)	µg/l		50		Good Ecological Status	2.3	1.1	0.3	<0.2	2.6
Boron (dissolved)	µg/l		2000		statutory EQS	<100	<100	<100	<100	<100
Cadmium (DISSOLVED)	µg/l		0.08	0.45	statutory EQS	<0.02	<0.02	0.09	<0.02	0.04
Chromium III (dissolved)	µg/l		4.7	32*	Good Ecological Status	<1	<1	<1	<1	1
Chromium VI (dissolved)	µg/l		3.4		Good Ecological Status	<3	<3	<3	<3	<3
Copper (dissolved)	µg/l		1		Good Ecological Status	1.7	1.2	1.3	1.6	2.4
Lead (dissolved)	µg/l		7.2		statutory EQS	1.1	0.4	1.2	<0.3	<0.3
Nickel (DISSOLVED)	µg/l		20		statutory EQS	<1	<1	<1	2	<1
Selenium (dissolved)	µg/l			1	CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007	2.5	2.4	2.5	<0.5	4.5
Zinc (dissolved)	µg/l		8		Good Ecological status	12	25	99	34	14
Mercury (DISSOLVED)	µg/l		0.05	0.07	statutory EQS	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate (soluble)	µg/l		400000		Non-statutory EQS	<500	<500	<500	-	2600
Phenols	µg/l		7.7	46*	Good Ecological status	<100	<100	<100	<10	<100
Cyanide	µg/l		1	5*	Good Ecological Status	<50	<50	<50	-	<50
pH Value				6	FFD 2006/44/EC & CCME - v7.1, Dec 2007 for marine	8	7.6	6.5	7	10
pH Value				9	FFD 2006/44/EC & CCME - v7.1, Dec 2007 for marine	8	7.6	6.5	7	10
Benzene	µg/l		10	50	statutory EQS	-	-	-	<1	-
Toluene	µg/l		50	380*	Good Ecological Status	-	-	-	<1	-
Ethyl benzene	µg/l		20	200	Non statutory EQS	-	-	-	<1	-
Xylene	µg/l		30		statutory EQS	-	-	-	<1	-
Aliphatics EC5-EC6	µg/l					-	-	-	<10	-
Aliphatics EC6-EC8	µg/l					-	-	-	<10	-
Aliphatics EC8-EC10	µg/l					-	-	-	<10	-
Aliphatics EC10-EC12	µg/l					-	-	-	<10	-
Aliphatics EC12-EC16	µg/l		10		Aqueous solubility based target - EA, 2009,. Petroleum Hydrocarbons in Groundwater	-	-	-	<10	-
Aliphatics EC16-EC21	µg/l		10		Aqueous solubility based target - EA, 2009,. Petroleum Hydrocarbons in Groundwater	-	-	-	<10	-
Aliphatics EC21-EC35	µg/l		10		Aqueous solubility based target - EA, 2009,. Petroleum Hydrocarbons in Groundwater	-	-	-	<10	-
Aromatics EC5-EC7	µg/l		10	50	Benzene as surrogate (statutory EQS)	-	-	-	<10	-
Aromatics EC7-EC8	µg/l		50	380*	Toluene as surrogate (Good Ecological Status)	-	-	-	<10	-
Aromatics EC8-EC10	µg/l		50	500	Styrene as surrogate (Non-statutory EQS)	-	-	-	<10	-
Aromatics EC10-EC12	µg/l		2.4		Naphthalene as surrogate (statutory EQS)	-	-	-	<10	-
Aromatics EC12-EC16	µg/l			5.8	Acenaphthene as surrogate (CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007)	-	-	-	<10	-
Aromatics EC16-EC21	µg/l		0.1	0.4	Anthracene as surrogate (statutory EQS)	-	-	-	<10	-
Aromatics EC21-EC35	µg/l		10		Aqueous solubility based target - EA, 2009,. Petroleum Hydrocarbons in Groundwater	-	-	-	<10	-

ANALYSIS OF LEACHATE - A9 Tomation to Moy

Screening Values - Environmental Quality Standards

Receptor water hardness: not known mg/l CaCO3 - most stringent hardness used
Relevant EQS Hardness Band: <40 mg/l CaCO3/l
Hardness related Freshwater EQS

Concentration exceeds screening value
Concentration exceeds screening value because limit of detection is greater than screening value
*** should not be used for ecological classification purposes**

Determinand	Units	Method Detection Limit	Screening Value (µg/l)		Source of screening value	petrol station	petrol station	petrol station	petrol station	petrol station
						596040 001	596040 002	596039 001	596364 001	596039 002
						TPTM3272 ES3 0.50M	TPTM3272 ES9 1.50M	TPTM3273 ES2 0.30M	TPTM3273 ES5 0.50m	TPTM3273 ES9 1.50M
			Freshwater, annual average (mean)	Freshwater, Max Allowable		23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16
Acenaphthene	µg/l			5.8	CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007	-	-	-	<0.01	-
Acenaphthylene	µg/l					-	-	-	<0.01	-
Anthracene	µg/l		0.1	0.4	statutory EQS	-	-	-	0.01	-
Benzo(a)anthracene	µg/l			0.018	CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007	-	-	-	<0.01	-
Benzo(a)pyrene	µg/l		0.05	0.1	statutory EQS	-	-	-	<0.01	-
Benzo(b + k)fluoranthene	µg/l		0.03		statutory EQS	-	-	-	<0.02	-
Benzo(ghi)perylene + Indeno (1,2,3 cd) pyrene	µg/l		0.002		statutory EQS	-	-	-	<0.02	-
Chrysene	µg/l					-	-	-	<0.01	-
Dibenzo(ah)anthracene	µg/l					-	-	-	<0.01	-
Fluoranthene	µg/l		0.1	1	statutory EQS	-	-	-	<0.01	-
Fluorene	µg/l			3	CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007	-	-	-	<0.01	-
Naphthalene	µg/l		2.4		statutory EQS	-	-	-	0.04	-
Phenanthrene	µg/l			0.4	CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007	-	-	-	<0.01	-
Pyrene	µg/l			0.025	CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007	-	-	-	<0.01	-
Total PAH	µg/l					-	-	-	0.05	-
1,2-Dichlorobenzene	µg/l			0.7	CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007	-	-	-	<1	-
1,2,4-Trichlorobenzene	µg/l			24	CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007	-	-	-	<10	-
Di methyl phthalate	µg/l		800	4000	Non-statutory EQS	-	-	-	<10	-
Di ethyl phthalate	µg/l		200	1000	Non-statutory EQS	-	-	-	<10	-
Di butyl phthalate	µg/l		8	40	Non-statutory EQS	-	-	-	<10	-
Butyl benzyl phthalate	µg/l		20	100	Non-statutory EQS	-	-	-	<10	-
Di octyl phthalate	µg/l		20	40	Non-statutory EQS	-	-	-	<10	-
Di (2-ethylhexyl) phthalate	µg/l		1.3		statutory EQS	-	-	-	<10	-
Hexachlorobenzene	µg/l		0.01	0.05	statutory EQS	-	-	-	<10	-
Hexachlorobutadiene	µg/l		0.1	0.6	statutory EQS	-	-	-	<10	-
1.2-Dichloroethane	µg/l		10		statutory EQS	-	-	-	<1	-
Chlorobenzene	µg/l			1.3	CCME - Canadian Water quality guidelines for aquatic life v7.1, Dec 2007	-	-	-	<1	-
Styrene	µg/l		50	500	Non-statutory EQS	-	-	-	<1	-
Tetrachloroethene	µg/l		10		statutory EQS	-	-	-	<1	-
Trichloroethene	µg/l		10		statutory EQS	-	-	-	<1	-

B.2. RPV Screening

A9 Tomatin to Moy - Soil Leachate - Resource Protection Values

Assumes groundwater body is capable of supporting 10m3/day or 50 people - see guidance notes on determining this
Screening values apply for both current groundwater abstractions and groundwater as a future resource - see guidance notes re: how to apply them

Concentration exceeds screening value
Concentration exceeds screening value because limit of detection is greater than screening value

* All RPV's are taken from WAT-PS-10-01 Assigning groundwater assessment criteria for pollutant inputs v3.0 August 2014

Determinand	Units	Resource Protection Value	Source of Resource Protection Value*	petrol station 596040 001 TPTM3272 ES3 0.50M 23-Aug-16	petrol station 596040 002 TPTM3272 ES9 1.50M 23-Aug-16	petrol station 596039 001 TPTM3273 ES2 0.30M 23-Aug-16	petrol station 596364 001 TPTM3273 ES5 0.50m 23-Aug-16	petrol station 596039 002 TPTM3273 ES9 1.50M 23-Aug-16
Inorganics								
Arsenic	ug/l	10	Water Supply (Water Quality) (Scotland) Regulations 2001	2.3	1.1	0.3	<0.2	2.6
Boron	ug/l	1000	Water Supply (Water Quality) (Scotland) Regulations 2001	<100	<100	<100	<100	<100
Cadmium	ug/l	5	Water Supply (Water Quality) (Scotland) Regulations 2001	<0.02	<0.02	0.09	<0.02	0.04
Chromium (total)	ug/l	50	Water Supply (Water Quality) (Scotland) Regulations 2001	<1	<1	<1	<1	1
Copper	ug/l	2000	UK Water Supply (Water Quality) Regulations 2000	1.7	1.2	1.3	1.6	2.4
Lead	ug/l	10	Water Supply (Water Quality) (Scotland) Regulations 2001	1.1	0.4	1.2	<0.3	<0.3
Mercury	ug/l	1	Water Supply (Water Quality) (Scotland) Regulations 2001	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	ug/l	20	Water Supply (Water Quality) (Scotland) Regulations 2001	<1	<1	<1	2	<1
Selenium (dissolved)	ug/l	10	Water Supply (Water Quality) (Scotland) Regulations 2001	2.5	2.4	2.5	<0.5	4.5
Sulphate (soluble)	ug/l	250000	UK Water Supply (Water Quality) Regulations 2000	<500	<500	<500	-	2600
Phenols	ug/l	0.5	UK Water Supply (Water Quality) Regulations 2000	<100	<100	<100	<10	<100
Free Cyanide	ug/l	50	Water Supply (Water Quality) (Scotland) Regulations 2001	<50	<50	<50	-	<50
BTEX								
Benzene	ug/l	1	Water Supply (Water Quality) (Scotland) Regulations 2001	-	-	-	<1	-
Toluene	ug/l	700	WHO Guidelines for Drinking Water Quality	-	-	-	<1	-
Ethyl benzene	ug/l	300	WHO Guidelines for Drinking Water Quality	-	-	-	<1	-
Xylenes (total)	ug/l	500	WHO Guidelines for Drinking Water Quality	-	-	-	<1	-
PAHs								
Benzo(a)pyrene	ug/l	0.01	Water Supply (Water Quality) (Scotland) Regulations 2001	-	-	-	<0.01	-
Total PAH (sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene & indeno(123cd)pyrene	ug/l	0.1	Water Supply (Water Quality) (Scotland) Regulations 2001	-	-	-	<0.04	-
SVOCs / VOCs								
1.1-Dichloroethene	ug/l	7	US EPA National Primary Drinking Water Regulations	-	-	-	<1	-
1,2-Dichlorobenzene	ug/l	600	US EPA National Primary Drinking Water Regulations	-	-	-	<1	-
1,2,4-Trichlorobenzene	ug/l	70	US EPA National Primary Drinking Water Regulations	-	-	-	<10	-
1,4-Dichlorobenzene	ug/l	80	US EPA National Primary Drinking Water Regulations	-	-	-	<1	-
1,2-Dichloropropane	ug/l	5	US EPA National Primary Drinking Water Regulations	-	-	-	<1	-
Dichloromethane	ug/l	5	US EPA National Primary Drinking Water Regulations	-	-	-	<50	-
Hexachlorobenzene	ug/l	0.1	Water Supply (Water Quality) (Scotland) Regulations 2001	-	-	-	<10	-
Hexachlorobutadiene	ug/l	0.1	Water Supply (Water Quality) (Scotland) Regulations 2001	-	-	-	<10	-
1.1.1-Trichloroethane	ug/l	200	US EPA National Primary Drinking Water Regulations	-	-	-	<1	-
1.1.2-Trichloroethane	ug/l	5	US EPA National Primary Drinking Water Regulations	-	-	-	<1	-
1.2-Dibromoethane	ug/l	400	WHO Guidelines for Drinking Water Quality	-	-	-	<1	-
1.2-Dichloroethane	ug/l	3	Water Supply (Water Quality) (Scotland) Regulations 2001	-	-	-	<1	-
Cis-1,2-Dichloroethene	ug/l	50	US EPA National Primary Drinking Water Regulations	-	-	-	<1	-
1.2-Dichloropropane	ug/l	5	US EPA National Primary Drinking Water Regulations	-	-	-	<1	-
Chlorobenzene	ug/l	100	US EPA National Primary Drinking Water Regulations	-	-	-	<1	-
Carbon tetrachloride	ug/l	3	Water Supply (Water Quality) (Scotland) Regulations 2001	-	-	-	<1	-
Dichloropropene	ug/l	20	WHO Guidelines for Drinking Water Quality	-	-	-	<1	-
Di(2-ethylhexyl)phthalate	ug/l	6	US EPA National Primary Drinking Water Regulations	-	-	-	<10	-
Styrene	ug/l	20	WHO Guidelines for Drinking Water Quality	-	-	-	<1	-
trans-1,2-Dichloroethene	ug/l	50	WHO Guidelines for Drinking Water Quality	-	-	-	<1	-
Tetrachloroethene	ug/l	10	UK Drinking Water Standards	-	-	-	<1	-
Trichloroethene	ug/l	10	Water Supply (Water Quality) (Scotland) Regulations 2001	-	-	-	<1	-
Vinyl Chloride	ug/l	0.5	Water Supply (Water Quality) (Scotland) Regulations 2001	-	-	-	<1	-

Annex C. Phytotoxicity Risk Assessment

A9 Tomatin to Moy - Phytotoxicity Screen												
				General	General	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station	Petrol Station
				597079 001	594778 002	596040 001	596040 002	596039 001	596364 001	596039 002	596364 002
Concentration exceeds the screening value				TPTM3001 ES3 0.5m	BHTM3016 ES3 0.30M	TPTM3272 ES3 0.50M	TPTM3272 ES9 1.50M	TPTM3273 ES2 0.30M	TPTM3273 ES5 0.50m	TPTM3273 ES9 1.50M	TPTM3273 ES12 2.00m
				25-Aug-16	15-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16
Alkaline pH	pH units	>9	screen - looking at alkalinity	6.6	4.1	7.9	7.9	5	5.7	9.6	8.4
Acid pH	pH units	<5.5	screen - looking at acidity	6.6	4.1	7.9	7.9	5	5.7	9.6	8.4
Arsenic (Total)	mg/kg	50	pH>5 MAFF code of practice	<2	<2	13	6	<2	<2	8	<2
Boron	mg/kg	3	ICRCL 59/83, 1987	-	-	-	-	<1	<1	<1	<1
Cadmium (Total)	mg/kg	3	pH>5, SI 1263, 1989	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium (Total)	mg/kg	3	pH >5 MAFF code of practice	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (Total)	mg/kg	400	pH>5 MAFF code of practice	8	8	18	16	<1	2	22	5
Copper (Total)	mg/kg	100	pH 5.5-6, SI 1263, 1989	.	.	.	.	.	3	.	.
Copper (Total)	mg/kg	80	pH5-5.5 MAFF code of practice	.	.	.	.	.	.	.	.
Copper (Total)	mg/kg	100	pH5.5-6 MAFF code of practice	.	.	.	.	.	3	.	.
Copper (Total)	mg/kg	135	pH 6-7, SI 1263, 1989	8	.	.	.	.	.	.	.
Copper (Total)	mg/kg	135	pH6-7 MAFF code of practice	8	.	.	.	.	.	.	.
Copper (Total)	mg/kg	200	pH>7, SI 1263, 1989	.	.	67	12	.	.	16	6
Copper (Total)	mg/kg	200	pH>7 MAFF code of practice	.	.	67	12	.	.	16	6
Copper (Total)	mg/kg	130	ICRCL 59/83, 1987	8	3	67	12	4	3	16	6
Lead	mg/kg	300	pH>5, SI 1263, 1989	7	5	330	12	7	4	20	4
Lead	mg/kg	300	pH>5 MAFF code of practice	7	5	330	12	7	4	20	4
Zinc (Total)	mg/kg	250	pH 5.5-6, SI 1263, 1989	.	.	.	.	.	26	.	.
Zinc (Total)	mg/kg	200	pH 5-7 MAFF code of practice	30	.	.	.	22	26	.	.
Zinc (Total)	mg/kg	300	pH 6-7, SI 1263, 1989	30	.	.	.	.	.	.	.
Zinc (Total)	mg/kg	300	pH >7 MAFF code of practice	.	.	350	46	.	.	39	29
Zinc (Total)	mg/kg	450	pH>7, SI 1263, 1989	.	.	350	46	.	.	39	29
Zinc (Total)	mg/kg	300	ICRCL 59/83, 1987	30	6	350	46	22	26	39	29
Mercury (Total)	mg/kg	1	pH>5, SI 1263, 1989	<1	<1	<1	<1	<1	<1	<1	<1
Mercury (Total)	mg/kg	1	pH>5 MAFF code of practice	<1	<1	<1	<1	<1	<1	<1	<1
Nickel (Total)	mg/kg	50	pH5-5.5 MAFF code of practice	.	.	.	.	3	.	.	.
Nickel (Total)	mg/kg	60	pH 5.5-6, SI 1263, 1989	.	.	.	.	.	4	.	.
Nickel (Total)	mg/kg	60	pH5.5-6 MAFF code of practice	.	.	.	.	.	4	.	.
Nickel (Total)	mg/kg	75	pH 6-7, SI 1263, 1989	7	.	.	.	.	.	.	.
Nickel (Total)	mg/kg	75	pH6-7 MAFF code of practice	7	.	.	.	.	.	.	.
Nickel (Total)	mg/kg	110	pH>7, SI 1263, 1989	.	.	17	9	.	.	9	7
Nickel (Total)	mg/kg	110	pH>7 MAFF code of practice	.	.	17	9	.	.	9	7
Nickel (Total)	mg/kg	70	ICRCL 59/83, 1987	7	3	17	9	3	4	9	7
Selenium (Total)	mg/kg	3	pH>5 MAFF code of practice	<3	<3	<3	<3	<3	<3	<3	<3

A9 Tomatin to Moy - Phytotoxicity Screen											
				adj to petrol station	adj to petrol station	Made ground noted	General	gravel pit (infilled?)	Made ground noted	Made ground noted	Made ground noted
				589245 001	589245 002	594639 001	589245 003	586488 003	594639 002	594639 003	594639 004
Concentration exceeds the screening value				TPTM3031 ES1 0.30M	TPTM3031 ES8 1.20M	TPTM3040 ES2 0.30m	TPTM3049 ES2 0.50M	BHTM3048 ES3 0.50M	TPTM3087 ES3 1.00m	TPTM3115 ES2 0.50m	TPTM3119 ES3 1.00m
				19-Jul-16	19-Jul-16	09-Aug-16	20-Jul-16	11-Jul-16	11-Aug-16	11-Aug-16	11-Aug-16
Alkaline pH	pH units	>9	screen - looking at alkalinity	5.8	5.8	6.1	5.7	6.3	6.2	7.2	6.2
Acid pH	pH units	<5.5	screen - looking at acidity	5.8	5.8	6.1	5.7	6.3	6.2	7.2	6.2
Arsenic (Total)	mg/kg	50	pH>5 MAFF code of practice	3	<2	<2	2	2	<2	<2	<2
Boron	mg/kg	3	ICRCL 59/83, 1987	<1	<1	-	-	-	-	-	-
Cadmium (Total)	mg/kg	3	pH>5, SI 1263, 1989	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium (Total)	mg/kg	3	pH >5 MAFF code of practice	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (Total)	mg/kg	400	pH>5 MAFF code of practice	12	13	8	16	15	10	8	12
Copper (Total)	mg/kg	100	pH 5.5-6, SI 1263, 1989	13	8	.	15	.	.	.	.
Copper (Total)	mg/kg	80	pH5-5.5 MAFF code of practice	.	.	.	.	.	.	.	.
Copper (Total)	mg/kg	100	pH5.5-6 MAFF code of practice	13	8	.	15	.	.	.	.
Copper (Total)	mg/kg	135	pH 6-7, SI 1263, 1989	.	.	8	.	8	4	.	5
Copper (Total)	mg/kg	135	pH6-7 MAFF code of practice	.	.	8	.	8	4	.	5
Copper (Total)	mg/kg	200	pH>7, SI 1263, 1989	.	.	.	.	.	.	6	.
Copper (Total)	mg/kg	200	pH>7 MAFF code of practice	.	.	.	.	.	.	6	.
Copper (Total)	mg/kg	130	ICRCL 59/83, 1987	13	8	8	15	8	4	6	5
Lead	mg/kg	300	pH>5, SI 1263, 1989	26	9	36	25	5	4	<3	4
Lead	mg/kg	300	pH>5 MAFF code of practice	26	9	36	25	5	4	<3	4
Zinc (Total)	mg/kg	250	pH 5.5-6, SI 1263, 1989	30	32	.	44	.	.	.	.
Zinc (Total)	mg/kg	200	pH 5-7 MAFF code of practice	30	32	26	44	34	23	.	26
Zinc (Total)	mg/kg	300	pH 6-7, SI 1263, 1989	.	.	26	.	34	23	.	26
Zinc (Total)	mg/kg	300	pH >7 MAFF code of practice	.	.	.	.	.	.	15	.
Zinc (Total)	mg/kg	450	pH>7, SI 1263, 1989	.	.	.	.	.	.	15	.
Zinc (Total)	mg/kg	300	ICRCL 59/83, 1987	30	32	26	44	34	23	15	26
Mercury (Total)	mg/kg	1	pH>5, SI 1263, 1989	<1	<1	<1	<1	<1	<1	<1	<1
Mercury (Total)	mg/kg	1	pH>5 MAFF code of practice	<1	<1	<1	<1	<1	<1	<1	<1
Nickel (Total)	mg/kg	50	pH5-5.5 MAFF code of practice	.	.	.	.	.	.	.	.
Nickel (Total)	mg/kg	60	pH 5.5-6, SI 1263, 1989	5	9	.	9	.	.	.	.
Nickel (Total)	mg/kg	60	pH5.5-6 MAFF code of practice	5	9	.	9	.	.	.	.
Nickel (Total)	mg/kg	75	pH 6-7, SI 1263, 1989	.	.	4	.	9	6	.	7
Nickel (Total)	mg/kg	75	pH6-7 MAFF code of practice	.	.	4	.	9	6	.	7
Nickel (Total)	mg/kg	110	pH>7, SI 1263, 1989	.	.	.	.	.	.	5	.
Nickel (Total)	mg/kg	110	pH>7 MAFF code of practice	.	.	.	.	.	.	5	.
Nickel (Total)	mg/kg	70	ICRCL 59/83, 1987	5	9	4	9	9	6	5	7
Selenium (Total)	mg/kg	3	pH>5 MAFF code of practice	<3	<3	<3	<3	<3	<3	<3	<3

A9 Tomatin to Moy - Phytotoxicity Screen											
				no longer on alignment	possible MG noted	General	Made ground noted	Made ground noted	General	General	General
				594778 001	595097 001	596040 004	594639 005	594639 006	596040 003	594778 003	594639 007
Concentration exceeds the screening value				TPTM3127A ES3 1.00M	BHTM3225 ES3 0.30M	TPTM3147 ES3 0.50M	TPTM3177 ES2 0.30m	TPTM3177 ES7 1.50m	TPTM3182 ES3 0.50M	TPTM3199 ES3 0.50M	TPTM3207 ES3 0.50m
				17-Aug-16	12-Aug-16	23-Aug-16	03-Aug-16	03-Aug-16	23-Aug-16	16-Aug-16	15-Aug-16
Alkaline pH	pH units	>9	screen - looking at alkalinity	7.8	7.1	5.4	7.6	6	7	5.4	7.3
Acid pH	pH units	<5.5	screen - looking at acidity	7.8	7.1	5.4	7.6	6	7	5.4	7.3
Arsenic (Total)	mg/kg	50	pH>5 MAFF code of practice	2	<2	3	<2	<2	6	<2	<2
Boron	mg/kg	3	ICRCL 59/83, 1987	-	-	-	-	-	-	-	-
Cadmium (Total)	mg/kg	3	pH>5, SI 1263, 1989	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium (Total)	mg/kg	3	pH >5 MAFF code of practice	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (Total)	mg/kg	400	pH>5 MAFF code of practice	13	24	18	18	13	13	14	11
Copper (Total)	mg/kg	100	pH 5.5-6, SI 1263, 1989	.	.	.	.	.	.	.	.
Copper (Total)	mg/kg	80	pH5-5.5 MAFF code of practice	.	.	6	.	.	.	7	.
Copper (Total)	mg/kg	100	pH5.5-6 MAFF code of practice	.	.	.	.	.	.	.	.
Copper (Total)	mg/kg	135	pH 6-7, SI 1263, 1989	.	.	.	.	8	7	.	.
Copper (Total)	mg/kg	135	pH6-7 MAFF code of practice	.	.	.	.	8	7	.	.
Copper (Total)	mg/kg	200	pH>7, SI 1263, 1989	8	24	.	11	.	.	.	7
Copper (Total)	mg/kg	200	pH>7 MAFF code of practice	8	24	.	11	.	.	.	7
Copper (Total)	mg/kg	130	ICRCL 59/83, 1987	8	24	6	11	8	7	7	7
Lead	mg/kg	300	pH>5, SI 1263, 1989	9	3	8	7	8	13	4	4
Lead	mg/kg	300	pH>5 MAFF code of practice	9	3	8	7	8	13	4	4
Zinc (Total)	mg/kg	250	pH 5.5-6, SI 1263, 1989	.	.	.	.	38	.	.	.
Zinc (Total)	mg/kg	200	pH 5-7 MAFF code of practice	.	.	28	.	38	23	27	.
Zinc (Total)	mg/kg	300	pH 6-7, SI 1263, 1989	.	.	.	.	38	23	.	.
Zinc (Total)	mg/kg	300	pH >7 MAFF code of practice	36	58	.	39	.	.	.	29
Zinc (Total)	mg/kg	450	pH>7, SI 1263, 1989	36	58	.	39	.	.	.	29
Zinc (Total)	mg/kg	300	ICRCL 59/83, 1987	36	58	28	39	38	23	27	29
Mercury (Total)	mg/kg	1	pH>5, SI 1263, 1989	<1	<1	<1	<1	<1	<1	<1	<1
Mercury (Total)	mg/kg	1	pH>5 MAFF code of practice	<1	<1	<1	<1	<1	<1	<1	<1
Nickel (Total)	mg/kg	50	pH5-5.5 MAFF code of practice	.	.	9	.	.	.	9	.
Nickel (Total)	mg/kg	60	pH 5.5-6, SI 1263, 1989	.	.	.	.	.	.	.	.
Nickel (Total)	mg/kg	60	pH5.5-6 MAFF code of practice	.	.	.	.	.	.	.	.
Nickel (Total)	mg/kg	75	pH 6-7, SI 1263, 1989	.	.	.	.	6	5	.	.
Nickel (Total)	mg/kg	75	pH6-7 MAFF code of practice	.	.	.	.	6	5	.	.
Nickel (Total)	mg/kg	110	pH>7, SI 1263, 1989	9	15	.	11	.	.	.	7
Nickel (Total)	mg/kg	110	pH>7 MAFF code of practice	9	15	.	11	.	.	.	7
Nickel (Total)	mg/kg	70	ICRCL 59/83, 1987	9	15	9	11	6	5	9	7
Selenium (Total)	mg/kg	3	pH>5 MAFF code of practice	<3	<3	<3	<3	<3	<3	<3	<3