



TATA STEEL UK LIMITED

P-Fields

Remediation Strategy

Project no. 315768 R02 (01)

RSK GENERAL NOTES

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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1 INTRODUCTION

1.1 Instruction

RSK Environment Limited (RSK) were commissioned by Tata Steel UK Limited (18 Grosvenor Place, London, SW1X 7HS), herein referred to as the 'Client' to prepare this Remediation Strategy for land at the Tata Steelworks, Port Talbot, SA13 2NG known as P-Fields.

The project was carried out to an agreed brief as set out in RSK's proposal email dated 07 May 2025, which was requested by the client following planning permission being granted for the wider Port Talbot site. Full and Outline Planning permission was approved by Neath Port Talbot County Borough Council on 7 November 2024 (Reference: P2024/0693). The P-Fields area of the wider Port Talbot site is located within the area granted full planning permission which is for:

Full planning permission for the installation and retention of concrete hardstanding for industrial use associated with the continued operations of the steelworks, and landscaping, green infrastructure and drainage works.

Condition 6 of the full planning approval stipulates that an assessment of the nature and extent of contamination affecting the application site area must be submitted and approved in writing, prior to any works commencing. RSK have previously undertaken desk based (Phase 1) and intrusive ground investigation (Phase 2) at the subject site, which include the relevant Generic Quantitative Risk Assessments (GQRA). The findings of these reports are provided in RSK's Draft Phase 2 Geo-Environmental Site Investigation report: P-Fields reference: 315768 R01 (00), dated 29 January 2025.

Condition 7 of the full planning approval stipulates that, No development shall commence on site until a remediation scheme to bring the site to a condition suitable for the intended use by removing any unacceptable risks to human health, buildings, other property and the natural and historic environment shall be prepared and submitted to and approved in writing with the Local Planning Authority.

Preliminary recommendations in relation to remedial actions at the subject site were provided within the RSK Phase 2 Geo-environmental investigation report.

The information provided in this report and the opinions expressed are based on the ground conditions encountered during the recent ground investigation and on the results of tests made in the field and in the laboratory.

This report should be read in conjunction with the Draft Phase 2 Geo-Environmental Investigation Report: P-Fields (reference: 315768 R01 (00), dated 29 January 2025) prepared for the site.

This report is subject to the RSK service constraints given in **Appendix A**.

1.2 Objectives

This report has been produced in general accordance with the Environment Agency (EA) guidance on Contamination Risk Management (LRCM), as adopted by Natural Resources Wales (NRW). The purpose of this report is to set out a suitable remedial strategy, to remove any unacceptable risk to identified sensitive receptors. This report will provide:

- A summary of the site Conceptual Site Model (CSM);
- A summary of the identified risks presented by the soil at the site with regards to human health, controlled waters and ground gas generation;
- A description of the remediation strategy for the site to address any unacceptable risks to enable the redevelopment for the proposed end use; and
- Where necessary, detail a verification plan for the proposed remedial works.

1.3 Limitations

This report should be considered in the light of any changes in legislation, statutory requirement or industry practices that may have occurred subsequent to the date of issue.

This Remediation Strategy is based upon previous investigations by RSK, designed generally to meet the objectives of a main investigation, as defined by BS10175:2011+A2:2017 Code of Practice for the Investigation of Potentially Contaminated Sites. The Remediation Strategy is therefore based on the ground conditions encountered during the investigations, the results of field and laboratory testing and interpretation between exploratory holes. The material encountered and samples obtained only represent a proportion of the materials present on-site, and therefore other conditions may be encountered during future ground works, which have not been revealed by these investigations.

The Remediation Strategy contains details of the procedures to be adopted for inspection and validation of the works (Verification Plan). However, it should be noted that responsibility for the correct implementation of the strategy lies with the Principal Contractor. RSK cannot be held responsible for any remedial works that are carried out without the agreed procedures involving either direct supervision by RSK, or inspection and verification of the works by a representative from RSK, or if suspect materials are not notified to RSK.

1.4 Background and brief to the project

The site's location in relation to the wider Port Talbot site is shown on **Figures 1 and 2**. The P-Fields site comprises areas laid to gravel and tarmac and is currently used as a laydown / storage area for large steel blocks as part of the steelworks slab yard. The southwestern part of the site hosts stockpiles of aggregate. There are areas of vegetation (grassed areas) with the majority located across the northwest part of the site. There are

no existing buildings located within the site boundary. The proposed development layout will incorporate the construction of large concrete slab areas with surrounding soft landscaping.

Multiple phases of intrusive ground investigation, covering the wider steelworks including the P-Fields application redline boundary, have been undertaken by RSK between 2022 and 2024. Two phases of intrusive ground investigation were undertaken under the name 'Project Cronus' which included the P-Fields site along with the surrounding area. A third phase of intrusive ground investigation was undertaken in 2024, focussing on the P-Fields area with a few investigation locations located outside of the redline boundary. Each investigation has included intrusive ground investigation locations both inside and within the immediate surrounding area of the P-Fields application redline boundary.

This Remediation Strategy contains the remediation requirements for the development which, with correct implementation and validation, will render the site safe for the proposed development.

1.5 Existing reports

The following reports detailing previous works at the site were made available for review:

- RSK Environment Limited. Phase 2 Geoenvironmental Assessment, dated January 2025, report reference: 315768 R01 (00);
- RSK Environment Limited. Geotechnical Design report, dated December 2024, report reference: 373217 R01 (00);
- RSK Environment Limited. Phase 1 Desk Study, dated September 2024, report reference: 315609 R01 (02);
- RSK Environment Limited. EAF Project Phase 1 Desk Study: Tata Steel UK Limited, dated June 2024, reference: 315531 R01 (01);
- Wardell Armstrong. EAF Project. Technical Note on Coal Mining Risk Assessment: Tata Steel UK Limited, dated 12 April 2024, reference: ST20879-0001;
- RSK Environment Limited. Supplementary Phase 2 Geoenvironmental Ground Investigation Report: Project Cronus, dated October 2022, reference: 315075 R04;
- RSK Environment Limited. Geoenvironmental Ground Investigation Report: Project Cronus, dated March 2022, reference: 315075 R03;
- RSK Environment Limited. Project Cronus Preliminary Risk Assessment: Project Cronus, dated February 2022, reference: 315075 R01.

This Remedial Strategy should be read in conjunction with the above reports. Pertinent information from these reports has been summarised in **Section 2**.

1.6 Contaminated land investigation and remediation process

The assessment and development of “brownfield” sites follows a phased approach to managing the risks associated with land contamination. The following stages are defined in the Land Contamination Risk Management (LCRM) guidance (Environment Agency (EA), 2023), as adopted by Natural Resources Wales (NRW).

1.6.1 Risk assessment

Risk assessment comprises three tiers: a preliminary risk assessment (desk study and desk-based research); generic quantitative risk assessment (based on staged investigations) and detailed quantitative risk assessment. The risk assessment tiers identify potential sources of contamination, potential pathways for migration and potential receptors of concern, and then estimates or quantifies the risks associated with the identified contaminant linkage(s) to determine if there are unacceptable risks requiring further action.

1.6.2 Implementation of the remediation strategy

There are three main stages in the implementation process: the preparation of the implementation plan; the design, implementation and verification of remediation; and (if required) long-term monitoring and maintenance.

1.7 Definitions

The following parties have a direct interest or involvement in the works described herein.

Land Owner	- Tata Steel UK Limited
Local Authority	- Neath Port Talbot County Borough Council
Pollution Control and Waste Regulatory Authority	- Natural Resources Wales (NRW)
Environmental Consultant	- RSK Environment Ltd
Principal Contractor	- TBA

2 THE SITE

2.1 Site location and description

The P-Fields site covers an area of c. 2.7 hectares, is irregular in shape with a spur to the northwest. The site is located at an approximate elevation of 6.00 m above ordnance datum (m AOD). The site predominantly comprises areas laid to gravel and tarmac and is currently used as a laydown / storage area for large steel blocks as part of the steelworks slab yard. The southwestern part of the site hosts stockpiles of aggregate. There are areas of vegetation (grassed areas) with the majority located across the northwest part of the site. There are no existing buildings located within the site boundary.

The site is located in Port Talbot, within a predominantly commercial and industrial setting. Immediate surrounding land uses are described in **Table 1**.

Table 1 Surrounding land uses

North	Morfa Colliery Memorial, unnamed access road and industrial steelworks (BOS Plant Office) located approximately 150 m from site.
East	Unnamed access road, Lower Mother Ditch (partially culverted drainage ditch), laydown area for steel block and industrial buildings further east.
South	Stockpiles of aggregates and lay down / storage areas. Further south are agricultural fields.
West	Unnamed access road and stockpile area for aggregates.

Beyond the steelworks itself are residential and commercial areas to the north and northeast, residential and open fields hills to the east, a reservoir is present approximately 1.4 km to the southeast, moorland to the south with Morfa beach and the Bristol Channel to the west. The closest residential receptor to the P-Fields site is approximately 900 m to the northeast.

2.2 Development proposals

In accordance with the agreed planning application (reference: P2024/0693), the central section of the 2.7 hectare parcel of land will be redeveloped to comprise the installation and retention of concrete hardstanding for industrial use associated with the continued operations of the steelworks, soft landscaping areas, green infrastructure and drainage works.

Proposed site plans for the site's redevelopment are presented in **Appendix B**.

2.3 Summary of existing ground conditions

The following section is designed to provide a summary of the key site information, relevant to the sites conceptual site model (CSM), as well as identified source, pathway, receptors with any relevant contaminant linkages, following the collation of all site investigation data obtained to date.

Full details of the information provided in this section can be sought from the relevant reports as detailed in **Section 1.5**.

2.3.1 Geology

Information published by the British Geological Survey (BGS) indicated the following sequence to be anticipated beneath the site, refer to **Table 2**.

Table 2 Site geology

Strata	Description	Estimated thickness
Anticipated made ground	Clay, silt, sand and gravel with low to high cobble content. Made up of reworked natural and anthropogenic material such as slag, brick, and concrete with occasional scraps of metal and other anthropogenic materials.	Variable. Up to 6 m.
Tidal Flat Deposits	Tidal Flat Deposits, including mud flat and sand flat deposits, were deposited on extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They consist of unconsolidated sediment, mainly mud and/or sand. They may form the top surface of a deltaic deposit. Normally a consolidated soft silty clay, with layers of sand, gravel and peat.	Approx. 15 m
Glacial Deposits (Till)	Gravelly clay with cobbles	Approximately 13 m.
Undifferentiated South Wales Coal Measures Formation	Coal-bearing mudstones/siltstones, and sandstones. Based on the interactive Mining Remediation Authority Map (accessed online), Two coal seams (orientated in a northwest to southeast direction) are present across the site which are as follows: Upper Nine Feet – U 9 FT (formerly known as South Fawr seam), Lower Nine Feet – L 9 FT. Marine Bands are also recorded as being present.	Up to 300 m

BGS borehole logs for historical boreholes located within 200 m of the site boundary identified shallow peat deposits at between 4.00 m and 6.00 m below ground level (bgl). Based on historical datasets, available for review, the site is understood to have historically been occupied by the Morfa Colliery. A historical BGS borehole associated with this colliery has recorded several coal seams, including the North Fawr, South Fawr,

4-FT, 6-FT and 9-FT seams. The Wardell Armstrong Coal Mining Technical Note (ref: ST20879001, dated April 2024) summarised that the risks associated with historical coal mines at the site are considered to be low to moderate.

2.3.2 Hydrology

A summary of the hydrology within the site area is summarised in **Table 3**.

Table 3 Summary of hydrology in site area

Condition	Description
Surface watercourses/ features	The closest identified surface watercourse to the site is a partially culverted stream known as Lower Mother Ditch which runs north to south and is located immediately outside the eastern site boundary. The Upper Mother Ditch is located approximately 100 m northeast of the site and is also partially culverted. There is also a reservoir located approximately 270 m northwest of the site. It is understood that the Lower Mother Ditch outfalls at the reservoir which then discharges into the Bristol Channel to the southwest.
Surface water abstractions	The nearest surface water abstraction point is located approximately 98 m northeast of the site and appears to be associated with evaporative cooling and process water (medium). The outfall point is indicated to be the Lower Mother Ditch. The licences are shown to be historical with the earliest dated November 2010
Site drainage	Surface drainage from the site appears to be discharged into Lower Mother Ditch which runs across the site from north to south although this is not confirmed.

2.3.3 Hydrogeology

A summary of the hydrogeological setting of the site, with respect to the anticipated geological sequence is presented below in **Table 4**.

Table 4 Summary of hydrogeological setting

Condition	Description
Aquifer characteristics	The site is underlain by a secondary aquifer relating to the South Wales Lower Coal Measures. The superficial Tidal Flat Deposits across the majority of the site are classified as Secondary (undifferentiated). The presence of low permeability clay at relatively shallow depths beneath the site, while restricting downwards migration, may increase the potential for lateral migration of shallow groundwater (and therefore mobile contamination, if present). Groundwater quality beneath the site may be affected by saline intrusion.
Depth to groundwater and flow	Groundwater in the site area is anticipated to flow in a northerly direction, i.e. towards and in the direction of flow of the Bristol Channel.

Condition	Description
	It is also likely that shallow perched water may be present in any made ground deposits present on-site.
Rising groundwater levels	The site is located in a former coal mining area and may be associated with rebounding groundwater levels following the end of mining and associated dewatering although considered unlikely based on the timescale since mining ceased.
Groundwater recharge/attenuation	Large areas of the site are currently covered with gravel surfacing. The proposed concrete slab should limit infiltration to ground and groundwater recharge, except where SUDS are present (details of which are unknown).
Licensed groundwater abstractions	The environmental database report indicates that there are no groundwater abstraction licences within 1km of the site.
Source protection zones	Information available in the Groundsure report indicates that the site does <u>not</u> lie within a currently designated groundwater Source Protection Zone (SPZ).

2.3.4 Summary of Identified Ground Conditions

The previous ground conditions encountered across the proposed development, during previous investigations, have been summarised in the following section.

Previous intrusive ground investigations within the P-Fields area, and its immediate surroundings have identified a variable thickness of made ground over superficial deposits, with the South Wales Coal Measures encountered at depth.

Made ground was encountered predominantly from ground level at all locations up to a maximum thickness of 6.10 m bgl. Made ground frequently contained gravel/cobbles of slag and varying amounts of other anthropogenic materials such as ash, slag, brick, ash, metal, clinker, tarmac and concrete.

A layer of fine to medium sand was encountered directly beneath the made ground in one investigation location with a maximum thickness of 4.40 m.

Superficial deposits across the site have been identified as comprising interbedded layers of dark organic silt, clay, peat and sand, to a maximum thickness of 9.60 m. It is determined that the conditions identified are consistent with Tidal Flat Deposits. Glaciofluvial deposits were also encountered beneath the Tidal Flat Deposits, at depths of between 10.00 m and 16.00 m bgl. Glaciofluvial deposits have been described as dense sandy clay gravel with a high cobble content of mudstone, sandstone and siltstone.

The bedrock geology was identified at depths of between 17.50 m and 22.00 m bgl and comprises the South Wales Coal Measures. Of the two deep boreholes advanced, coal was identified in both boreholes in thin bands from depths of 2.65 m bgl. The measures themselves are described as comprising weathered clay, becoming granular interbedded mudstone, siltstone and sandstone, with rock head identified at 2.52 m bgl.

Groundwater was identified during both phases of intrusive ground investigation at the site. Exploratory hole records detail seepages at between 1.00 m and 2.20 m bgl within

the made ground. Groundwater strikes were recorded within BH317 and BH323 at 2.30 m and 2.50 m bgl respectively. Resting groundwater levels were recorded as part of the site investigation monitoring programme. Monitoring wells within BH317 and BH324 were installed with response zones within the Tidal Flat Deposits and had measured resting water levels of 2.45 m and 1.26 m respectively. BH1, from the Project Cronus ground investigations (dated October 2022), had a dual install with a response zone within the Made Ground and natural geology beneath. Resting water levels were recorded in both wells at 2.05 m bgl. Likewise, BH205 with a response zone in the natural geology, from the Project Cronus investigation (dated October 2022), identified resting water levels at 2.29 m bgl.

2.3.5 Visual/olfactory evidence of contamination

During the most recent investigation works, A slight hydrocarbon odour was recorded in BH316a between 1.50 m and 3.30 m bgl. Both visual and olfactory evidence of contamination was noted in the area of the DLS regeneration yard. During the Project Cronus intrusive investigation (dated October 2022), possible visual contamination was also noted within made ground deposits at 5.80 m bgl.

Visual potentially asbestos containing materials (ACM) were not encountered in any of the exploratory holes.

2.3.6 Potential Sources of Contamination

Potential sources of soil and groundwater contamination identified during RSK's Geoenvironmental assessment report (reference: 315531 R03 (03)), based on current activities and the history of the site and surrounding area are presented in **Table 5**.

Table 5 Potential sources of soil and groundwater contamination

Potential sources	Contaminants of concern
On-site	
S1 Made ground (i.e. fill material)	Made ground material including brick, ash and clinker and containing toxic and phytotoxic metals, inorganics, polycyclic aromatic hydrocarbons (PAH) and asbestos.
S2 Current land use as steel block storage yard / stockpile area	Potentially including ash and clinker and containing toxic and phytotoxic metals, inorganics PAHs.
S3 Former land uses (railway sidings and colliery workings)	Petroleum hydrocarbons, toxic and phytotoxic metals, inorganics, PAHs and asbestos.
Off-site	
S4 Industrial process associated within the wider steelwork to the north	Toxic and phytotoxic metals, inorganics, PAHs, hydrocarbon, benzene, toluene, ethyl benzene and xylene (BTEX).

2.3.7 Identified Receptors to Contamination

The receptors (**R**) and the associated potentially complete contaminant linkages that have been identified during the Phase 2 intrusive ground investigation are detailed below:

- **R1** future site users – industrial workers [**H1**, **H2** and **H3** oral, dermal and inhalation exposure with impacted soil, soil vapour and dust/fibres, ground gases]
- **R3** future buildings and services [direct contact with contaminated soils or groundwater and chemical attack]
- **R4** surface water in the Bristol Channel [dissolution followed by lateral migration in groundwater in secondary aquifer within superficial deposits and the Lower Mother Ditch].

2.3.8 Nature and Distribution of Identified Contamination

Contaminant concentrations have been obtained from laboratory analysis of the natural and made ground strata at the site. Laboratory analysis results from across phases of ground investigation completed by RSK as part of the P-Fields and Project Cronus investigations have been compared against relevant generic assessment criteria (GAC) for soils with a commercial land use, based on 1% soil organic matter content, for Human Health and RSKs groundwater assessment criteria (EQS) for surface waters.

During both phases of investigation, investigation locations and associated laboratory analysis was undertaken both inside and external to the P-Fields redline application boundary.

Exceedances in soil GACs from both the P-Fields site investigation and Project Cronus site investigation are presented in **Table 6**.

Table 6 P-Fields GAC exceedances - Made Ground

Determinand	GAC (mg/kg)	No of exceedances	Maximum concentration (mg/kg)	
			Value	Location - depth (m bgl)
Dibenz(a,h)anthracene	3.5	1	3.9	TP309 - 0.40

No exceedances were noted in the natural soils during this investigation.

It is noted that the single exceedance for dibenz(a,h)anthracene marginally exceeds the Human Health GAC for commercial land use with 1% soil organic matter (SOM). It should also be noted that TP309 is located to the northwest of the redline boundary for the P-Fields site. Therefore, of the samples analysed from both the made ground and natural strata, within the site boundary, there were no exceedances of the relevant GAC criteria.

2.3.9 Inhalation exposure to asbestos

The most recent site investigation (P-Fields site investigation - 2024) screened nine samples for asbestos, with no asbestos detected under laboratory conditions.

During the previous Project Cronus site investigation (2022), within areas relevant to the P-Fields site area, 11 samples were screened in the laboratory with two samples found to have asbestos present. A visible fragment of chrysotile asbestos containing cement material was identified within the sample submitted to the laboratory for analysis, within TP4 at 1.40 m bgl. In addition, loose fibres of chrysotile were identified within TP211 at 0.10 m bgl.

To date, asbestos has not been recorded within samples obtained from natural soils.

The presence of asbestos, identified within the made ground soils, means that there is a complete contaminant linkage present between the made ground at the site and the proposed future site users.

2.3.10 Ground Gas assessment

Ground gas monitoring, undertaken within installed monitoring wells, as part of the previous site investigations has been completed within periods of atmospheric pressure of 986 – 1032 mbar. Measurement rounds included periods of falling atmospheric pressures and falling tides.

A summary of the gas monitoring carried out to date has identified elevated CH₄ within BH's 317 with CO₂ and flow rates generally relatively low. The origin of the elevated CH₄ is considered likely to be pockets of peat encountered within the Tidal Flat Deposits which have been oxidised as a consequence of the drilling and subsequent installation of monitoring wells. The elevated CH₄ along with the absence of significant CO₂ and flow is typical of peat, with higher initial concentrations of CH₄ normally decreasing over an extended monitoring period. Based upon the type of made ground encountered it is not considered a likely source of ground gases due to the low organic content present and absence of any significant volume of degradable or putrescible material.

The assessment discussion continued setting out that, due to the shallow nature of the groundwater beneath the site flooding many of the response zones of the monitoring well and therefore, 'true' reading may not have been recorded as part of this initial monitoring programme. Based upon the data from unflooded response zones a CS1 classification has been determined.

An uncertainty in the ground gas monitoring data remains. However, the development proposals do not include any structures or enclosed spaces. Therefore, the risk from hazardous ground gas, within the P-Fields site area, assuming the site development proposals remain as hardstanding with associated soft landscaping areas, remains low and no remedial action is considered necessary.

2.3.11 Controlled Waters

The primary controlled waters receptor has been identified as the Bristol Channel. As a result the analytical results for groundwater samples have been assessed against Environmental Quality Standards (EQS) for coastal waters for conservatism.

Screening of the laboratory analysis undertaken on groundwater samples collected during the current investigation indicated no exceedances of the EQS values.

Based on the lines of evidence assessed, the risk of any contamination within the groundwater migrating laterally to the Bristol Channel at sufficient concentrations to pose an unacceptable risk is considered low.

2.3.12 Summary of relevant contaminant linkages

The most recent site investigation assessment (reference: 315768 R01 (00)) has identified a relevant contaminant linkage between made ground soils containing asbestos free fibres and future site users in areas of soft landscaping. Therefore, a suitable remedial strategy will be required to mitigate the risk.

A relevant contaminant linkage for asbestos has been confirmed, which could present an unacceptable risk to future site workers if not mitigated. Residential neighbours have been identified adjacent to the wider Port Talbot site. However, the distance between the subject site and these neighbouring residential receptors means that this linkage is not considered to be present.

Where shallow asbestos is present, or found to be present in the course of construction across the wider site area, a cover system or non-soft finish (eg concrete, tarmac, compacted granular material) will need to be locally installed across the impacted area.

Construction workers and future maintenance workers have not been identified in the conceptual model as receptors because risks are considered to be managed through health and safety procedures according to the CDM Regulations.

3 REMEDIATION STRATEGY

The following strategy is proposed in order to mitigate against the relevant contaminant linkage identified, with respect to human health of future site users.

Development of the conceptual site model and risk assessment has demonstrated that the site in its current condition presents the potential for an unacceptable risk to the human health of the site's future occupants through direct contact (inhalation) with site soils. A potentially unacceptable risk to future site users has also been identified with respect to contaminants including asbestos in soil via fugitive dust.

The Remediation Strategy has been designed to minimise risks to human health by reducing the risk of contact with potentially contaminated soils, considered harmful to human health.

3.1 Assumptions

RSK have made the following assumptions that should be confirmed as the project proceeds:

- Cover system material for use in areas of impacted landscaping will be validated and considered suitable for use
- the regulators have agreed to Tata's proposed materials management/reuse exemption scheme.

3.2 Implementation of the Remedial Strategy

3.2.1 Removal of asbestos impacted soils (hotspots)

A significant part of the site is expected to be covered by reinforced concrete hardstanding, effectively breaking the pathway between any contamination identified, within the shallow made ground soils, and future site users of the future development. Where this is present no additional remedial works or cover system will be necessary.

Fragments of asbestos containing materials and free fibres have been identified within the central northern part (TP4) and northeast corner (TP211) of the site. Given that TP4 will be covered by concrete hardstanding, the pathway to future site users will be broken and the associated risk removed. However, consideration will be required for material management within the area of TP4 when excavating soils to make way for the proposed slab. RSK has assumed that soils excavated in the construction of the proposed slabs will be disposed of off-site and should be segregated and tested prior to disposal. A suitable risk assessment and method statement should be provided by the contractor, prior to works commencing, detailing the specific method of handling soils within this area, to prevent cross contamination.

Given that TP211 is located within an area of proposed soft landscaping, it will be necessary to remove the shallow soils impacted with asbestos, including any visible fragments of asbestos prior to the implementation of a localised cover system, as set out in Section 3.2.2. Soils excavated within the area of TP211 should be undertaken under a watching brief by suitably qualified persons with, as a minimum, asbestos awareness training. Excavated soils should be stockpiled on an impermeable base to prevent cross contamination and tested to determine its appropriate waste stream, prior to disposal off site.

3.2.2 Cover system

Made ground containing asbestos fibres and elevated concentrations of chemical concentrations, in exceedance of the GAC criteria have been identified across the development site.

Where shallow asbestos is present, or found to be present in the course of construction across the wider site area, a cover system or non-soft finish (eg concrete, tarmac, compacted granular material) will need to be locally installed across the impacted area. Where a non-soft finish is installed, it will not require 300mm of clean material beneath it.

In addition, the Made Ground, is described as having physical properties that are unlikely to be acceptable in the upper profile of areas of soft landscaping. Formal soft landscaping is not present within P-Fields with any associated soft landscaping unlikely to benefit from a widespread topsoil cover system as the proposed sub-soils and made ground produce better Open Urban Mosaic habitat designed to support important indigenous species. Where required, the cover system for impacted areas that fall within informal soft landscaping should comprise at least 300mm of chemically material.

Soils for the cover system can be obtained from the site wider area or P-Fields as long as they meet the soil contamination criteria given in **Appendix C**.

Further to the above and for the protection of human health, it is recommended that the following criteria for asbestos in reused material shall also apply:

- Within cover system materials: None present -imported materials/suitable site won.
- Below cover system materials/marker layer (0.3m to 1.0 m bgl): No visually identifiable asbestos containing material and between <0.001% and 0.1% by weight.

If there is insufficient site derived topsoil and subsoil, considered suitable for reuse, it may be necessary to import material to make up levels in areas of soft landscaping. Any imported topsoil/subsoil used shall comply with the soil contamination criteria given in **Appendix C**. Soils to be re-used **in the cover system** or imported on to the site shall be sampled and tested at a minimum of 1 sample every 250m³ (where the material is originating from a single source, is natural soil and described as being homogenous in nature) and, at least three samples from each source (i.e. topsoil and subsoil) shall be tested for the suite of determinants given in the Green column of the reuse criteria as included in **Appendix C** unless the supplier can provide adequate documentation to show suitability for use. Ideally the Contractor shall provide details of the provenance of any

imported soil to the Environmental Consultant whose written approval will be needed before use of the material on the site.

A validation exercise as described in **Section 4** will be undertaken to show compliance with this strategy.

All waste transfer or consignment notes must be retained by the Contractor and made available to the Environmental Consultant for inclusion within the Verification Report.

Given the presence of both ACM and asbestos fibres, any excavation in the made ground should be supervised by a competent and suitably trained contractor who can advise on appropriate licencing, control measures and working practices under the Control of Asbestos Regulations 2012 (CAR:2012).

A strict material management strategy should be in place for the duration of the works, recording the location of stockpiled materials to ensure that cross contamination of stockpiles on site does not occur.

3.3 Unexpected contamination

Whilst ground investigations have previously been undertaken on the site, it remains possible that unexpected soil conditions may be encountered during the process of breaking out and earthworks. Examples may include localised areas of free-phase product; or further occurrences of unexpected gross asbestos containing materials (ACM's) within the made ground soil.

Should previously unidentified visual or olfactory residues, asbestos, fuel storage tanks or any other unexpected hazards be discovered during site works, the Contractor should contact an experienced Environmental Consultant for advice. Work should be postponed in the immediate area of the discovery and the area cordoned off.

The Environmental Consultant shall attend the site to record the location, extent and nature of the discovery and implement an appropriate sampling and analysis regime, taking due account of the type and nature of the discovery, known and probable land uses in that area of the site.

Once the laboratory analysis of the material is available, following an appropriate investigation, an assessment should be undertaken to determine whether or not remedial work/intervention is required. In accordance with the conditions set out in the planning approval, the required action will be agreed with the local authority prior to implementation.

Depending on the nature of any such impact it may be necessary to undertake validation testing with the provision of an associated Verification Report.

A record will be produced and held on site (with copies provided to the Environmental Consultant), detailing the discovery, assessment works undertaken, findings thereof, confirmation either of no action required or detailing the remedial action taken and validation thereof.

3.4 Long term monitoring

No requirement for long term monitoring has been identified.

4 VERIFICATION PLAN

All remedial works carried out on site will need to be validated and reported as highlighted below. The works will be verified in following guidance set down in LCRM (2023) and other relevant industry good practice guidance.

The purpose of the Verification Plan is to set out what data is required to demonstrate that the work has been carried out in accordance with this remedial scheme and to allow the preparation of a Verification Report.

4.1 Cover system verification

The cover system will be implemented where impacted made ground soils are present at formation level in areas of soft landscaping. The cover system will comprise a suitable thickness of topsoil/subsoil (subject to confirmation of suitability).

Where a non-soft finish (eg concrete, tarmac, compacted granular material) has been utilised, no further verification is considered necessary.

Any topsoil/subsoil used as part of the cover system shall comply with the soil contamination criteria given in **Appendix C**, these are derived from RSK's GAC for a commercial end use which are included as **Appendix D**.

The Contractor shall provide details of the provenance of site derived soil with associated chemical certificates to the Environmental Consultant whose written approval will be needed before use of the material on the site. Alternatively, the contractor may take responsibility for confirming suitability of the soils albeit this will still be subject to formal verification by a suitable consultant prior to discharge of the planning condition(s). Dependent upon the quantity of chemical data for site derived soils to be used in the cover system, it may be necessary to undertake further testing in order to be confident that soils are suitable for their proposed use.

Soils won from the P-Fields site and intended for reuse will be stockpiled and tested at a rate of one sample per 250 m³, for both subsoil and topsoil, with a minimum of three samples per source. Laboratory analysis of the samples will be compared against soil contamination criteria within the red column of the reuse criteria as provided in **Appendix C**.

Soils imported to site for use in the cover system can be validated in one of two ways:

- through receipt of suitable chemical certificates from the supplier of the soil confirming it to be clean, or
- through sampling and analysis of soil at a rate of 1 sample every 250 m³ and as a minimum three samples from each source of topsoil and subsoil. Samples will be tested for the suite of determinants given in **Appendix C**.

If there is insufficient soil from the wider development site then soils will need to be imported. Should this be the case then verification must follow the process described above.

A validation exercise will be undertaken by an Environmental Consultant that comprises a review of available chemical certificates and the excavation of test holes in the completed areas to prove thickness of topsoil/subsoil and if required to take soil samples for chemical testing.

A log and photographic account of the validation exercise will be recorded within the Verification Report along with chemical laboratory certificates.

Excess material and material deemed unsuitable for use will be disposed of off-site. Waste soils for disposal will be segregated and sampled in accordance with the guidance on the classification and assessment of waste given in technical note WM3 and the agreement and guidance received from the facility accepting the waste.

4.2 Verification report

A post remediation verification report will be produced in line with relevant LCRM and Environment Agency contaminated land guidance, as adopted by NRW. The report will contain all site data including analysis results, approvals, licences and drawings to set out the effectiveness of the remediation.

The Verification Report will include the following information:

- development and site background;
- description of the remedial methods used;
- plans showing the positions and extents of any remediated areas;
- details of site visits undertaken;
- site photographs;
- details of cover material used including the specifications of proprietary materials;
- the results of soil validation sampling and analysis; and
- details of consultations with regulatory authorities, if any.

The Verification Report will be submitted to the local authority Planning Officer.

5 ENVIRONMENTAL CONTROLS

5.1 General

5.1.1 Asbestos impacted soils removal

The RSK investigations have reported limited visible asbestos containing materials (ACM) within the made ground at the site.

Should further suspected asbestos containing materials be identified during the earthworks, specialist advice should be sought from an appropriately qualified and competent contractor as to the licencing requirements for any required works under the *Control of Asbestos Regulations 2012* (CAR:2012) and *Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials* (CAR-SOIL).

As a minimum all groundworkers will need to have Asbestos Awareness training.

5.1.2 Reuse of material

Materials may be re-used on their site of origin, subject to limitations, in the construction of the proposed development providing they are demonstrated to be geotechnically and chemically suitable (as per the reuse criteria in Appendix C) for the intended use and there is a defined need for their re-use, and in line with a recognised exemption strategy or materials reuse strategy principles as agreed between Tata and NPT.

Further to the above and for the protection of human health, it is recommended that the following criteria for asbestos in reused material shall also apply:

- Within cover system materials: None present -imported materials.
- Below cover system materials/marker layer (0.3m to 1.0 m bgl): No visually identifiable asbestos containing material and <0.001% by weight.
- Asbestos content below 1.0 m bgl and beneath marker layer: no visible asbestos and concentrations <0.1% by weight.

5.1.3 General

The targets perceived to be potentially most at risk from pollution during the remediation of the site are workers on-site, neighbouring properties and residents.

All contractors on site should adopt environmental good practice as set out in CIRIA publication C650 (2005), pollution prevention for businesses (DEFRA 2019), Environment Agency Pollution Prevention Guidelines (EAPPG) and National Planning Policy Framework (NPPF). It should be noted that whilst the EAPPG has since been withdrawn it provides useful background information.

5.1.4 Airborne pollution (dust, etc.)

Care shall be taken by the contractor to minimise the amount of dust generated on-site during excavation, backfilling and trafficking. In the event that dry weather leads to excessive dust generation, exposed soils shall be damped down, but not flooded, with clean water.

When working within made ground, consideration of control measures appropriate to the licencing status as per CAR:2012 should be utilised.

5.1.5 Re-contamination

The programme of works and any subsequent modifications shall be designed to avoid the potential re-contamination of areas already worked, i.e. site traffic shall be routed to avoid passing from contaminated to clean areas and contaminated soils shall not be stockpiled on clean areas.

5.2 Health and safety of site personnel

It is the responsibility of the main contractor and any appointed sub-contractors to enforce an appropriate health and safety regime for all site personnel. Full details regarding the proposed working practices in connection with the remediation works shall be agreed in advance of the commencement of the works with the Planning Supervisor and if appropriate with the Environmental Health Officer.

Measures will be necessary to protect the health and safety of site workers during the site works. The contractors will be under a statutory obligation to take reasonable care to protect the health and safety of their employees. The following measures are suggested to provide a minimum level of protection:

- all ground workers on-site should be issued with protective clothing, dust masks, footwear and gloves as applicable. These should not be removed from site, and advice should be given on when and how they are to be used;
- care should be taken to minimise the amount of dust and mud generated on-site; and
- good practices relating to personal hygiene should be adhered to on-site, i.e. food and drink should only be consumed within designated areas on the site and smoking should be prohibited in all working areas.

Reference should also be made to the Health and Safety Executive (HSE) document "Protection of Workers and the General Public during the Development of Contaminated Land". Whilst this document is no longer current It is cited in building regulation guidance.

Specialist advice should be sought from an appropriately qualified and competent contractor as to the licencing requirements for the works under the Control of Asbestos Regulations 2012 (CAR:2012). As a minimum all future groundworkers will need to have Asbestos Awareness training.

5.3 Waste disposal

All excavated impacted material deemed unsuitable for re-use should be collected and removed off-site to a suitably licensed waste management facility.

Any materials to be removed off-site for disposal will require classification into inert, non-hazardous or hazardous waste. The contractor shall agree any additional testing and waste classification in advance with the landfill operator(s), as appropriate. All documentation including consignment and waste transfer notes should be supplied to the Environmental Consultant for inclusion in the validation report.

Materials deemed unsuitable to remain on site, such as asbestos impacted soils, will need to follow the suitable methodology set out for determining its waste classification and identifying its appropriate route to disposal.

RSK would recommend undertaking a preliminary hazardous waste assessment using existing data to determine data gaps in chemical analysis.

5.4 Documentation

All contaminated materials removed off-site shall be transported by an appropriately licensed waste carrier to an approved licensed waste facility for final disposal. The Contractor shall provide a full documentary record of this operation in accordance with the Duty of Care. Copies of the waste consignment documentation shall be provided to the Environmental Consultant for inclusion in the verification report.

The contractor shall be responsible for providing levelling data for the site during remedial works and be responsible for the provision of suitable drawings for incorporation into the verification report.

Where the Contractor encounters unexpected ground conditions or potentially suspect materials, they shall immediately inform the Environmental Consultant who shall then carry out an inspection as soon as is reasonably practical. If previously unidentified contamination is found this should be reported to the Local Planning Authority in writing.

A copy of the report shall be forwarded to the Local Authority for approval of the remedial strategy.

FIGURES

FIGURE 1 – SITE LOCATION PLAN (315768-BL-111-XX-D-G-11101-C01)



C01	21.01.25	First Issue	AS	JB	JB
Rev	Date	Amendment	Drawn	Chkd	Appd

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Client

Tata Steel UK

Project Name

P-Fields

Description

Site Location Plan

Dimension	Size	Scale	Geolocation	Project ID	Drawing no.	Rev	File name
m	A4	1:25,000	277645,186306	315768	11101	C01	315768-BL-111-XX-D-G-11101-C01

FIGURE 2 – SITE LAYOUT PLAN (315768-BL-112-XX-D-G-11201-C01)



DO NOT SCALE FROM THIS DRAWING

LEGEND

— Site boundary

Notes:
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C01	21.01.25	First Issue	AS	JB	JB
Rev	Date	Amendment	Drawn	Chkd	Appd



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Client		
Tata Steel UK		
Project Name		
P-Fields		
Description		
Site Layout Plan		
Project ID	Drawing no.	Revision
315768	11201	C01
File name		
315768-BL-112-XX-D-G-11201-C01		
Dimensions	Scale	Size
m	1:1250	A1



FIGURE 3 – P-FIELDS EXPLORATORY HOLE LOCATION PLAN (315768-BL-222-XX-D-G-22201-C01)



DO NOT SCALE FROM THIS DRAWING

LEGEND

- Site boundary
- Borehole location
- Trial pit location

Notes:
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C01	21.01.25	First Issue	AS	JB	JB
Rev	Date	Amendment	Drawn	Chkd	Appd



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Client		
Tata Steel UK		
Project Name		
P-Fields		
Description		
Exploratory Hole Location Plan		
Project ID	Drawing no.	Revision
315768	22201	C01
File name		
315768-BL-222-XX-D-G-22201-C01		
Dimensions	Scale	Size
m	1:1250	A1
		

FIGURE 4 – 315075 PROJECT CRONUS FIGURE 3 EXPLORATORY HOLE LOCATION PLAN



Legend:

- Borehole
- Trial Pit

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

00	27/10/2022	First Draft	DR	JB	JB
Rev	Date	Description	Drn	Chk	App

315075 - Project Cronus

TITLE:

Figure 3:
Exploratory Hole Location Plan

0 100 200

Metres

SCALE: 1:5,000 @ A3

REV 00

FIGURE 5 – PROJECT CRONUS EXPLORATORY HOLE LOCATION PLAN (315075-FIG03-REV 00-EHLP)



LEGEND

☒ Trial Pit Location

● Borehole Location

00	26.01.2022	-	MW	JB	-
Rev.	Date	Amendment	Drawn	Chkd.	Appd.



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Client		Tata Steel			
Project Title		Project Cronus			
Drawing Title		Exploratory Hole Location Plan			
Drawn	Date	Checked	Date	Approved	Date
MW	26.01.22	JB	26.01.22	-	-
Dimensions		Scale	Original Size		
m		1:6000	A3		
Project Number		Drawing Number		Figure 3	
315075					
Drawing File		Rev			
315075 - Fig 3 - rev 00 - EHLP				00	

0 100 200 300m



APPENDIX A

SERVICE CONSTRAINTS

APPENDIX A

SERVICE CONSTRAINTS

1. Service Constraints for all Reports

1.1. This Report (the "Report") and any study, inspection, investigation, sampling, testing and or interpretation carried out in connection with the Report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) trading as Carbon Zero Consulting, Leap Environmental or RSK Geosciences, for the Client named in the first paragraph of the Report (the "Client") in accordance with the terms of an RSK Fee Proposal including RSK Environment Standard Terms and Conditions (the "Appointment") between RSK and the Client, unless otherwise stated in the first paragraph of the Report. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by a geo-environmental consultant at the time the Services were performed. Nothing in this Report shall be construed as imposing any fitness for purpose obligation. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the Client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.

1.2 Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services. RSK shall not be liable in respect of any action or proceedings arising out of or in connection with this Report whether in contract, in tort, for breach of statutory duty or otherwise after the expiry of six (6) years from either (i) the date of the Report or (ii) such earlier date as prescribed by law, unless varied in the terms of the Appointment.

1.3 Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent, or condone any party, other than the Client relying upon the Services. Should this Report or any part of this Report, or details of the Services or any part of the Services, be made known to any such party, and such party relies thereon, that party does so wholly at its own and sole risk, and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent geo-environmental consultant and/or lawyer.

1.4 The Client shall not, without the prior written consent of RSK, assign, transfer, charge, mortgage, subcontract, or deal in any other manner with all or any of the benefits provided in this Report. Unless specified in the Appointment, RSK shall not be obliged to assign the benefit of the Report whether by collateral warranty, third party rights pursuant to the Contracts (Rights of Third Parties) Act 1999, letter of reliance or otherwise. If RSK agrees to any assignment of the benefit of this Report, in whatever form, benefits to third parties through collateral warranties, third party rights or letters of reliance shall not be provided unless a fee for each right, warranty or letter is agreed. The form of wording used in the warranty or letter shall be provided by RSK for agreement by the Client. Any reasonable changes to the form of wording will be implemented by mutual agreement, however the terms in the warranty or letter cannot offer the third party any greater benefit than the Appointment offered to the Client.

1.5 It is the understanding of RSK that this Report is to be used for the purpose described in the introduction to the Report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the Report is used, or the proposed use of the site change, this Report may no longer be valid and any further use of or reliance upon the Report in those circumstances by the Client without the review and advice of RSK shall be at the Client's sole and own risk. RSK shall not be liable for any use of this Report for any purpose other than that for which it was provided.

1.6 The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the Report inaccurate or unreliable. The information and conclusions contained in this Report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the Report in the future shall be at the Client's own and sole risk.

1.7 The observations and conclusions described in this Report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out, or required by the Appointment between the Client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this Report, RSK did not seek to evaluate the presence on or off site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas, fuel storage, persistent bio-accumulative or toxic chemicals (including PFAS and related compounds) or other radioactive or hazardous materials, unless specifically identified in the Services.

1.8 The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of desk based publicly available information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services and the limitations below:

- a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.
- b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.
- c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the Client or third parties, including laboratories and information services, during the performance of the Services.
- d. The Client has identified in writing to RSK, the information, reports, findings, surveys and preliminary works RSK may not rely upon when providing the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK, and including the doing of any independent investigation of the information provided to RSK, save as otherwise provided in the terms of the Appointment between the Client and RSK.

1.9 Any site drawing(s) provided in this Report is (are) not meant to be an accurate base plan for scale measurement but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for accurate setting out and should be considered indicative only.

1.10 Should RSK be requested to review the Report after the date of issue of this Report, RSK shall be entitled to additional payment at the existing rates, or such other terms as agreed between RSK and the Client.

2. Service Constraints where the Report provides an intrusive assessment of ground conditions:

2.1 The intrusive environmental ground investigation aspects of the Services are a limited sampling of soil from the site, at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this Report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together

with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope agreed between the Client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species (not tested) are not present.

2.2 The comments given in this Report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development, site usage, timescales or the Client's specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an indicative assessment of ground conditions on site. There may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

2.3 Where the Services include Investigation of an exploratory nature or relating to physical ground works, any costings and prices provided in the Report are estimated and provided for guidance purposes only. The actual cost and time quantities shall be remeasured and shall be dependent upon the ground or other conditions, constraints present, and number and depth of the investigation locations, which shall influence the number of samples and tests required, and the quantities of soil being classified.

2.4 Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works. However, this Report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

2.5 Unless stated otherwise, only preliminary geotechnical recommendations are presented in this Report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed. Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this Report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7, although this is subject to the restrictions imposed on the investigation, as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this Report will not meet the requirements of a Geotechnical Design Report (GDR) and should therefore be used for preliminary guidance only.

3. Service Constraints where the Report relates to Surface Water Management:

3.1 The Surface Water Management Inspection (SWMI) Report, documents provided, observations, actions, and recommendations, with respect to the management of potential pollution issues to surface waters, made during the site Inspection visit, are those present at the time of the visit, and may not represent those recorded by others on the same day.

3.2 The comments given in this Report and the opinions expressed are based on the weather, ground and ground water conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not

been disclosed by the inspection and therefore could not be taken into account. In addition, groundwater levels and flows, may vary from those Reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.

3.3 RSK places a degree of dependence upon oral information provided by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this Report was prepared.

3.4 This Report is a live document, to be continually reviewed and updated as the development progresses or other changes occur on site. RSK can only maintain the currency of this Report through the Client requesting support with supplementary site visits or attendance at meetings ahead of key stages of the development in relation to surface water management. Our risk rating assesses a number of risk factors in line with the source-pathway- receptor model and is therefore subject to constant change.

3.5 Standard design drawings are indicative. Material types, dimensions and construction details will need to be adjusted by the Client to suit the specific conditions / flows on Site.

3.6 The full responsibility for implementing the site-specific protection and maintenance measures to protect the surface water system as stated in this Report, remains with the Client and their site management team. Additional control measures may be required to achieve the objectives set out in the Surface Water Management Plan to be implemented and financed by the Client.

4. Service Constraints where the Report relates to Waste Management:

4.1 In accordance with the definition provided in the Waste Framework Directive (WFD), materials are only considered waste if 'they are discarded, intended to be discarded or required to be discarded, by the holder'. Naturally occurring soils are not considered waste if re-used on the site of origin for the purposes of development. Soils such as made ground that are not of clean and natural origin (irrespective of whether they are contaminated or not) and other materials such as recycled aggregate, do not necessarily become waste until the criteria above are met. Excavation arisings from the development may therefore be classified as waste if surplus to requirements and/or unsuitable for re-use.

4.2 It is the duty of the waste producer, to ensure that all waste is accurately classified prior to waste disposal. Technical Guidance WM3 (EA, 2018) sets out in its Appendix D requirements for waste sampling. It is a legal requirement to correctly assess and classify waste. The level of sampling should be proportionate to the volume of waste and its heterogeneity. Unless otherwise stated, the waste assessment presented in this Report should be considered as preliminary and further testing and assessment of the waste under the provisions of a Waste Sampling Plan may be required to obtain the necessary level of data required for basic characterisation of the waste in support of disposal.

4.3 Unless stated otherwise in the Report, information relating to historical operations at the site was not reviewed as part of the assessment by RSK. In addition, unless otherwise stated in the Services, RSK was not present during the collection of the samples nor had any input on the chemical testing suite. Therefore, the waste assessment and classification detailed in this Report are based solely on any information that were provided to RSK (e.g., laboratory chemical data, exploratory hole records) and were completed without prejudice for our Client.

4.4 RSK's assumes that any ground investigation data, chemical testing results etc., that were provided by the Client to inform the waste assessment and supporting review were carried out in accordance with current best practice and relevant guidance/ standards, where applicable. Thus, the comments given in this Report and the opinions expressed are based solely on the information provided by the Client. However, it is noted that there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account as part of the RSK assessment.

5. Service Constraints for Construction Environmental Management Plan Reports:

5.1 This Report should be considered in the light of any changes in legislation, statutory requirement or industry practices that may have occurred subsequent to the date of issue.

5.2 The measures and comments outlined in this Report and any opinions expressed are based on the plans provided at the time and discussions with relevant parties. However, there may be conditions pertaining to the site that have not been disclosed by investigations and therefore could not be taken into account.

5.3 This CEMP is a live document and is subject to change throughout the project, as and when necessary, to ensure management of environmental aspects remains relevant, and to ensure continued compliance with legislation and commitments as they may change. RSK understands that this CEMP will be reviewed by the Client every six months and updated as and when necessary.

5.4 It is the full responsibility of the Principal Contractor/ Client to ensure that their works do not contravene legal requirements, and adherence to this CEMP alone cannot be a full defence regarding legal action against the Principal Contractor.

6. Service Constraints where the Report relates to Ground Gas Membrane Verification:

6.1 This Report is limited to the verification of the gas resistant membrane/vapour membrane/radon barrier after installation and no inspections were undertaken of the substrate (i.e. prepared ground). The Report therefore does not constitute as a full verification of ground gas protection system.

6.2 The comments given in this Report and the opinions expressed, are based on the condition of the ground gas membrane as encountered at the time of inspection by suitably qualified personnel. RSK cannot accept liability for any subsequent change to the status of the gas membrane by follow-on trades or other construction activity.

6.3 Where not designed by RSK, the verification of protection measures is carried out with reference to the gas protection design provided by the Client. RSK assume the scope of gas protection measures as determined by third parties to be correct and to have achieved any required approval from authorities.

6.4 The Ground Gas Design Report/Remediation Strategy and Verification Plan contains details of the procedures to be adopted for inspection and validation of the works. However, it should be noted that responsibility for the correct implementation of the strategy lies with the appointed contractor. RSK cannot be held responsible for any remedial works that are carried out without the agreed procedures involving either direct supervision by RSK, or inspection and validation of the works by a representative from RSK.

7. Service Constraints for Environmental Due Diligence (EDD) Reports:

7.1 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the site, therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information.

7.2 This Report describes the results of the EDD exercise. The scope of this EDD Report, where appropriate, covers legal or regulatory compliance with respect to UK or international regulations associated with environmental matters.

7.3 As with any EDD exercise, there is a certain degree of dependence upon information provided by the target company. The EDD does not include a site walkover / visit or liaison with site representatives unless identified in the Services. Therefore, the assessment is based on the available desk study information. Also, there is a certain degree of dependence upon oral information provided

by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this EDD exercise was performed.

7.4 This Report, including all supporting data and notes (collectively referred to hereinafter as "information"), was prepared or collected by RSK for the benefit of its Client.

7.5 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment and the site inspection visit. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the Site therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information and observations collected during the site inspection visit.

8. Service Constraints for Ground source heat energy Reports:

8.1 It is understood that this is a desktop survey only and that there are no requirements for a site walkover, service utility survey, or provision of service plans. These services can be provided upon request if required.

8.2 At a later stage, it is possible that a thermal response test (TRT) will need to be completed, for which a test borehole will have to be drilled, and these would be costed at the time. RSK can provide all aspects of subsequent site work for a GSHP system if required.

9. Service Constraints for Water Abstraction Borehole Reports:

9.1 The Report aims principally to only identify and assess the suitability of the site for a water abstraction borehole. This Report should be considered in the light of any changes in legislation, statutory requirements, and industry practices, that have occurred subsequent to the date of the Report.

9.2 Unless stated in the Report, the opinions expressed in this Report including all comments and recommendations provided are on the basis of the information obtained from a desk-based assessment.

APPENDIX B

DEVELOPMENT PLAN

 Fibre Reinforced Concrete Hardstanding
for laydown of scrap material
 Mesh Reinforced Concrete Hardstanding
for laydown of scrap material

P04	Scale Created	24/10/2002
P03	Updates following NPT Comments	12/09/2002
P02	Handstarting update following Client Comments	05/08/2002
P01	Revised Boundary following Client Comments	01/08/2002
P00	Initial Issue	19/07/2002
REV	DESCRIPTION DRAWN BY CHECKED BY APPROVED BY	DATE
RIBA PLAN OF WORK WORKSTAGE	LEVEL OF MODEL DEFINITION (LoD)	
Stage 3 - Spatial Coordination	LoD 3 - Approximate Model	
PURPOSE OF ISSUE - SUITABLE FOR ...	STATUS or SUITABILITY	
Planning Submission	Status S2 - Delivery Team Information	

PURPOSE OF ISSUE - SUITABLE FOR ...	STATUS or SUITABILITY
Planning Submission	Status S2 - Delivery Team Information



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www.lawray.co.uk

CLIENT
Tata Steel UK Ltd.

PROJECT TITLE
EAF PROJECT, PORT TALBOT

DRAWING TITLE
P Fields - Proposed Site Plan

PROJECT No. 20007 SCALE @ 100
As indicated

DRAWING No. 1152: Project - Originator - Volume - Level - Type - Role - Number
19502: Project - Originator - Functional - Spatial - Form - Discipline - Number
REVISION
EAE LAW & ORDER 00104 R04
BY: JKH 10/1/2000

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APPENDIX C

RE-USE AND IMPORT SCREENING CRITERIA

	Re-use of site won material	Imported Clean Cover
	Topsoil and Subsoil (<0.30 m bgl)	Topsoil and Subsoil (<0.30 m bgl)
Selected Key Contaminants ¹	RSK GAC and Human Health (mg/kg) and asbestos criteria	RSK GAC and Human Health (mg/kg) and asbestos criteria
	No visible staining or odour	Determined suitable for use
Asbestos	No visible fragments of asbestos containing materials and <0.001 % w/w free fibres	None present
Arsenic	640	640
Cadmium	410	410
Chromium (III)	8,600	8,600
Chromium (hexavalent)	49	49
Copper	68,000	68,000
Lead	2,300	2,300
Inorganic Mercury	1,120	1,120
Nickel	980	980
Zinc	740,000	740,000
Free cyanide	650	650
Ammonium	1,110	1,110
Benzene	27	27
Toluene	107,000	107,000
Ethyl-benzene	13,000	13,000
Total xylene	13,600	13,600
Acenaphthene	110000	110000
Acenaphthylene	110000	110000
Anthracene	540000	540000
Benzo(a)anthracene	170	170
Benzo(a)pyrene	77	77
Benzo(b)fluoranthene	45	45
Benzo(ghi)perylene	3900	3900
Benzo(k)fluoranthene	1200	1200
Chrysene	350	350
Dibenzo(ah)anthracene	3.6	3.6
Fluoranthene	23000	23000
Fluorene	68000	68000
Indeno(123-cd)pyrene	510	510
Naphthalene	183	183
Phenanthrene	22000	22000
Pyrene	54000	54000
Total phenols	690	690
Sulphate	-	-
Phenol	440	440
TPH Aliphatic EC5-EC6	3,200	3,200
TPH Aliphatic EC6-EC8	7,800	7,800
TPH Aliphatic EC8-EC10	2,00	2,00
TPH Aliphatic EC10-EC12	9,700	9,700
TPH Aliphatic EC12-EC16	59,000	59,000
TPH Aliphatic EC16-EC35	1,000,000	1,000,000
TPH Aliphatic EC35-EC44	1,000,000	1,000,000
TPH Aromatic EC8-EC10	3,500	3,500
TPH Aromatic EC10-EC12	16,000	16,000
TPH Aromatic EC2-EC16	36,000	36,000
TPH Aromatic EC16-EC21	28,000	28,000
TPH Aromatic EC21-EC35	28,000	28,000
TPH Aromatic EC35-EC44	28,000	28,000

APPENDIX D

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH

Generic assessment criteria for human health: commercial scenario

Background

RSK's generic assessment criteria (GAC) were initially prepared following the publication by the Environment Agency (EA) of soil guideline value (SGV) and toxicological (TOX) reports, and associated publications in 2009⁽¹⁾. RSK GAC were updated following the publication of GAC by LQM/CIEH in 2009⁽²⁾. RSK GAC are periodically revised when updated information on toxicological, land use or receptor parameters is published.

Updates to the RSK GAC

In 2014, the publication of Category 4 Screening Levels (C4SL)^(3,4), as part of the Defra-funded research project SP1010, included modifications to certain exposure assumptions documented within EA Science Report SC050221/SR3 (herein after referred to as SR3)⁽⁵⁾ used in the generation of SGVs.

C4SL were initially published for six substances (cadmium, arsenic, benzene, benzo(a)pyrene, chromium VI and lead) for a sandy loam soil type with 6% soil organic matter, based on a low level of toxicological concern (LLTC; see Section 2.3 of research project report SP1010⁽³⁾). Further C4SL were published in 2021 for vinyl chloride, tetrachloroethene (PCE) and trichloroethene (TCE). Where a C4SL has been published, the RSK GAC duplicates the C4SL using all input parameters within the SP1010 final project report⁽³⁾ and associated chemical specific reports⁽⁶⁾, and adopts them as GAC for these substances. Due to the use of decimal places rather than significant figures applied to the Contaminated Land Exposure Assessment (CLEA) tool outputs, the GAC presented may be marginally differently to the C4SL values, however any differences between the values are minimal and would not equate to an unacceptable risk.

For all other substances the only C4SL exposure modification relevant to a commercial end use are daily inhalation rates.

The RSK GAC have also been revised with updated toxicology published by LQM/CIEH in 2015⁽⁷⁾ or by the USEPA⁽¹⁴⁾, where a C4SL has not been published.

RSK GAC derivation for metals and organic compounds

Model selection

Soil assessment criteria (SAC) were calculated using the CLEA tool v1.071, supporting EA guidance^(5,8,9) and revised exposure scenarios published for the C4SL⁽³⁾. The SAC are also termed GAC.

Pathway selection

In accordance with SR3⁽⁵⁾ the commercial scenario considers risks to a female worker who works from the age of 16 to 65 years. It should be noted that this end use is not suitable for a workplace nursery but may be appropriate for a sports centre or shopping centre where children are present. In accordance with Box 3.5, SR3⁽⁵⁾ the pathways considered for production of the SAC in the commercial scenario are

- direct soil and dust ingestion

- dermal contact with soil both indoors and outdoors
- indoor air inhalation from soil and vapour and outdoor inhalation of soil and vapour.

With respect to volatilisation, the CLEA model assumes a simple linear partitioning of a chemical in the soil between the sorbed, dissolved and vapour phase⁽⁹⁾. The upper boundaries of this partitioning are represented by the maximum aqueous solubility and pure saturated vapour concentration of the chemical. The CLEA model estimates saturated soil concentrations where these limits are reached⁽⁹⁾. The CLEA software uses a traffic light system to identify when individual and/or combined assessment criteria exceed the lower of either the aqueous- or vapour-based soil saturation limits. Model output cells are flagged red where the saturated soil concentration has been exceeded and the contribution of the indoor and outdoor vapour pathway to total exposure is greater than 10%. In this case, further consideration of the following is required⁽⁹⁾:

- Free phase contamination may be present.
- Exposure from the vapour pathways will be over-predicted by the model, as in reality the vapour phase concentration will not increase at concentrations above saturation limits
- Where the vapour pathway contribution is greater than 90%, it is unlikely the relevant health criteria value (HCV) will be exceeded at soil concentrations at least a factor of ten higher than the relevant HCV.

Where the vapour pathway is the predominant pathway (contributes greater than 90% of exposure) or the only exposure route considered and the cell is highlighted red (SAC exceeds saturation limit), the risk based on the assumed conceptual model is likely to be negligible as the vapour risk is assumed to be tolerable at maximum possible soil concentrations. In such circumstances, the vapour pathway exposure should be considered based on the presence of free phase or non-aqueous phase liquid sources and the measured concentrations of volatile organic compounds (VOC) in the vapour phase. Screening could be considered based on setting the SAC as the modelled soil saturation limits. However, as stated within the CLEA handbook⁽⁹⁾, this is likely to not be practical in many cases because of the very low saturation limits and, in any case, is highly conservative.

It should also be noted that for mixtures of compounds, free phase may be present where soil (or groundwater) concentrations are well below saturation limits for individual compounds.

Where the vapour pathway is only one of the exposure pathways considered, an additional approach can then be utilised as detailed within Section 4.12 of the CLEA model handbook⁽⁹⁾, which explains how to calculate an effective assessment criterion manually.

SR3⁽⁵⁾ states that, as a general rule of thumb, it is recognised that estimating vapour phase concentrations from dissolved and sorbed phase contamination by petroleum hydrocarbons are at least a factor of ten higher than those likely to be measured on-site. RSK has therefore applied an empirical subsurface to indoor air correction factor of 10 into the CLEA model chemical database for all petroleum hydrocarbon fractions (including BTEX, trimethylbenzenes and the polycyclic aromatic hydrocarbons (PAH) naphthalene, acenaphthene and acenaphthylene) to reduce this conservatism.

Input selection

The most up-to-date published chemical and toxicological data was obtained from EA Report SC050021/SR7⁽¹⁰⁾, the EA TOX⁽¹⁾ reports, the C4SL SP1010 project report and associated chemical specific reports^(3,6), the 2015 LQM/CIEH report⁽⁷⁾ or the USEPA IRIS database⁽¹⁴⁾. Where a LLTC^(3,6) has been published for a substance, RSK has used these input parameters to derive the RSK GAC. Toxicological and specific chemical parameters for 1,2,4-trimethylbenzene, barium, methyl tertiary-butyl ether (MTBE), 1,1,2-trichloroethane, 1,1-dichloroethene, 1,2-dichloropropane, 2-chloronaphthalene, chloroethane, chloromethane, cis 1,2-dichloroethene, dichloromethane, hexachloroethane and trans 1,2-dichloroethene were obtained from the CL:AIRE Soil Generic Assessment Criteria report⁽¹¹⁾.

For TPH, aromatic hydrocarbons C₅–C₈ were not modelled, as this range comprises benzene (>EC5-EC7) and toluene (>EC7-EC8), which are modelled separately.

Physical parameters

For the commercial end use, the CLEA default pre-1970s three-storey office building was used. SR3⁽⁵⁾ notes this commercial building type to be the most conservative in terms of protection from vapour intrusion. The default input building parameters presented in Table 3.10 of SR3⁽⁵⁾ have been used.

The parameters for a sandy loam soil type were used in line with Table 4.4 of SR3⁽⁵⁾. This includes a value of 6% for the percentage of soil organic matter (SOM) within the soil. In RSK's experience, this is rather high for many sites. To avoid undertaking site-specific risk assessments for this SOM, RSK has produced an additional set of GAC for SOM of 1% and 2.5% for all substances using the CLEA tool.

Summary of modifications to the default CLEA SR3⁽⁵⁾ input parameters for a commercial land use

In summary, the RSK commercial GAC were produced using the default input parameters for soil properties, the air dispersion model, building properties and the vapour model detailed in SR3⁽⁵⁾. Modifications to the default SR3⁽⁵⁾ exposure scenarios based on the C4SL exposure scenarios⁽³⁾ are presented in Table 2 below. The sole modification to the default commercial input parameters is the updated inhalation rate.

The final selected GAC are presented by pathway in Table 3 with the combined GAC in Table 4.

Figure 1: Conceptual model for CLEA commercial scenario

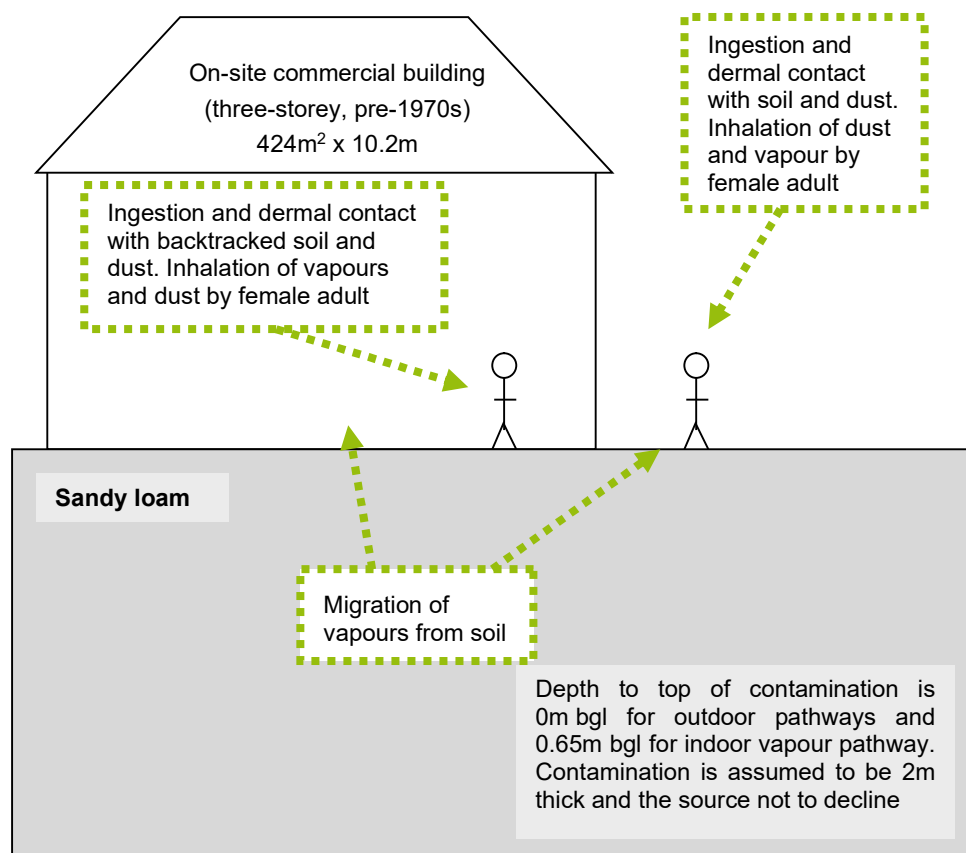


Table 1: Exposure assessment parameters for commercial scenario – inputs for CLEA model

Parameter	Value	Justification
Land use	Commercial	Chosen land use
Receptor	Female worker	Taken as female adult exposed over 49 years from age 16 to 65 years, Box 3.5, SR3 ⁽⁵⁾
Building	Office (pre-1970)	Key generic assumption given in Box 3.5, SR3 ⁽⁵⁾ . Pre-1970s three-storey office building chosen as it is the most conservative in terms of protection from vapour intrusion (Section 3.4.6, SR3 ⁽⁵⁾)
Soil type	Sandy loam	Most common UK soil type (Section 4.3.1, Table 4.4, SR3 ⁽⁵⁾)
Start age class (AC)	17	AC corresponding to key generic assumption that the critical receptor is a working female adult exposed over a 49-year period from age 16 to 65 years. Assumption given in Box 3.5, SR3 ⁽⁵⁾
End AC	17	
SOM (%)	6	Representative of sandy loam according to EA guidance note dated January 2009 entitled 'Changes We Have Made to the CLEA Framework Documents' ⁽¹³⁾
	1	To provide SAC for sites where SOM < 6% as often observed by RSK
	2.5	
pH	7	Model default

Table 2: Commercial – modified receptor inputs

Parameter	Unit	Value	Justification
Inhalation rate (AC17)	m ³ day ⁻¹	15.7	Mean value USEPA, 2011 ⁽¹²⁾ ; Table 3.2, SP1010 ⁽³⁾

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12. USEPA (2011), *Exposure factors handbook*, EPA/600/R-090/052F (Washington, DC: Office of Research and Development).
13. Environment Agency (2009), 'Changes made to the CLEA framework documents after the three-month evaluation period in 2008', released January 2009.

14. USEPA (2010). Hydrogen cyanide and cyanide salts. Integrated Risk Information Systems (IRIS) Chemical Assessment Summary. September 2010. <https://www.epa.gov/iris> (accessed 9 December 2015)

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 3

Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	SAC appropriate to pathway SOM 1% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
		Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Metals													
Arsenic	(a,b)	6.35E+02	1.25E+03	NR	NR	6.35E+02	1.25E+03	NR	NR	6.35E+02	1.25E+03	NR	NR
Barium	(b)	2.21E+04	NR	NR	NR	2.21E+04	NR	NR	NR	2.21E+04	NR	NR	NR
Beryllium		3.97E+03	1.17E+01	NR	NR	3.97E+03	1.17E+01	NR	NR	3.97E+03	1.17E+01	NR	NR
Boron		2.38E+05	2.82E+07	NR	NR	2.38E+05	2.82E+07	NR	NR	2.38E+05	2.82E+07	NR	NR
Cadmium	(a)	7.73E+02	8.57E+02	4.10E+02	NR	7.73E+02	8.57E+02	4.10E+02	NR	7.73E+02	8.57E+02	4.10E+02	NR
Chromium (III) - trivalent	(c)	3.31E+05	8.57E+03	NR	NR	3.31E+05	8.57E+03	NR	NR	3.31E+05	8.57E+03	NR	NR
Chromium (VI) - hexavalent	(a,d)	9.62E+02	4.91E+01	NR	NR	9.62E+02	4.91E+01	NR	NR	9.62E+02	4.91E+01	NR	NR
Copper		1.89E+05	8.96E+04	6.83E+04	NR	1.89E+05	8.96E+04	6.83E+04	NR	1.89E+05	8.96E+04	6.83E+04	NR
Lead	(a)	2.32E+03	NR	NR	NR	2.32E+03	NR	NR	NR	2.32E+03	NR	NR	NR
Elemental Mercury (Hg ⁰)	(d)	NR	1.54E+01	NR	4.31E+00	NR	3.26E+01	NR	1.07E+01	NR	5.80E+01	NR	2.58E+01
Inorganic Mercury (Hg ²⁺)		1.18E+03	1.97E+04	1.12E+03	NR	1.18E+03	1.97E+04	1.12E+03	NR	1.18E+03	1.97E+04	1.12E+03	NR
Methyl Mercury (Hg ⁴⁺)		3.38E+02	2.13E+03	2.92E+02	7.33E+01	3.38E+02	3.87E+03	3.11E+02	1.42E+02	3.38E+02	7.33E+03	3.23E+02	3.04E+02
Nickel	(d)	3.06E+03	9.83E+02	NR	NR	3.06E+03	9.83E+02	NR	NR	3.06E+03	9.83E+02	NR	NR
Selenium	(b)	1.23E+04	NR	NR	NR	1.23E+04	NR	NR	NR	1.23E+04	NR	NR	NR
Vanadium		2.15E+04	9.03E+03	NR	NR	2.15E+04	9.03E+03	NR	NR	2.15E+04	9.03E+03	NR	NR
Zinc	(b)	7.35E+05	1.97E+08	NR	NR	7.35E+05	1.97E+08	NR	NR	7.35E+05	1.97E+08	NR	NR
Cyanide (free)		6.56E+02	7.51E+04	6.53E+02	NR	6.56E+02	7.51E+04	6.53E+02	NR	6.56E+02	7.51E+04	6.53E+02	NR
Volatile Organic Compounds													
Benzene	(a)	1.09E+03	2.79E+01	2.72E+01	1.22E+03	1.09E+03	5.19E+01	4.96E+01	2.26E+03	1.09E+03	1.08E+02	9.80E+01	4.71E+03
Toluene		4.24E+05	6.49E+04	5.63E+04	8.69E+02	4.24E+05	1.43E+05	1.07E+05	1.92E+03	4.24E+05	3.24E+05	1.84E+05	4.36E+03
Ethylbenzene		1.91E+05	5.89E+03	5.71E+03	5.18E+02	1.91E+05	1.38E+04	1.28E+04	1.22E+03	1.91E+05	3.21E+04	2.75E+04	2.84E+03
Xylene - m		3.43E+05	6.26E+03	6.15E+03	6.25E+02	3.43E+05	1.47E+04	1.41E+04	1.47E+03	3.43E+05	3.44E+04	3.12E+04	3.46E+03
Xylene - o		3.43E+05	6.73E+03	6.60E+03	4.78E+02	3.43E+05	1.57E+04	1.50E+04	1.12E+03	3.43E+05	3.65E+04	3.30E+04	2.62E+03
Xylene - p		3.43E+05	6.03E+03	5.92E+03	5.76E+02	3.43E+05	1.41E+04	1.36E+04	1.35E+03	3.43E+05	3.28E+04	3.00E+04	3.17E+03
Total xylene		3.43E+05	6.03E+03	5.92E+03	6.25E+02	3.43E+05	1.41E+04	1.36E+04	1.47E+03	3.43E+05	3.28E+04	3.00E+04	3.46E+03
Methyl tertiary-Butyl ether (MTBE)		5.72E+05	7.58E+03	7.48E+03	2.04E+04	5.72E+05	1.23E+04	1.21E+04	3.31E+04	5.72E+05	2.34E+04	2.24E+04	6.27E+04
1,1,1,2-Tetrachloroethane		1.10E+04	1.09E+02	1.08E+02	2.60E+03	1.10E+04	2.53E+02	2.47E+02	6.02E+03	1.10E+04	5.88E+02	5.59E+02	1.40E+04
1,1,2,2-Tetrachloroethane		1.10E+04	2.81E+02	2.74E+02	2.67E+03	1.10E+04	5.75E+02	5.46E+02	5.46E+03	1.10E+04	1.26E+03	1.13E+03	1.20E+04
1,1,1-Trichloroethane		1.14E+06	6.60E+02	6.60E+02	1.43E+03	1.14E+06	1.35E+03	1.35E+03	2.92E+03	1.14E+06	2.96E+03	2.95E+03	6.39E+03
1,1,2 Trichloroethane		7.62E+03	9.02E+01	8.91E+01	4.03E+03	7.62E+03	1.84E+02	1.80E+02	8.21E+03	7.62E+03	4.02E+02	3.82E+02	1.80E+04
1,1-Dichloroethene		8.76E+04	2.43E+01	2.43E+01	2.23E+03	8.76E+04	4.30E+01	4.30E+01	3.94E+03	8.76E+04	8.68E+01	8.67E+01	7.94E+03
1,2-Dichloroethane		2.29E+02	6.73E-01	6.71E-01	3.41E+03	2.29E+02	9.71E-01	9.67E-01	4.91E+03	2.29E+02	1.67E+00	1.65E+00	8.43E+03
1,2,4-Trimethylbenzene		NR	3.29E+02	NR	4.74E+02	NR	6.41E+02	NR	1.16E+03	NR	1.04E+03	NR	2.76E+03
1,3,5-Trimethylbenzene	(e)	NR	NR	NR	2.30E+02	NR	NR	NR	5.52E+02	NR	NR	NR	1.30E+03
1,2-Dichloropropane		2.57E+04	3.14E+00	3.13E+00	1.19E+03	2.57E+04	5.54E+00	5.54E+00	2.11E+03	2.57E+04	1.11E+01	1.11E+01	4.24E+03
Carbon Tetrachloride (tetrachloromethane)		7.62E+03	2.87E+00	2.87E+00	1.52E+03	7.62E+03	6.29E+00	6.28E+00	3.32E+03	7.62E+03	1.43E+01	1.42E+01	7.54E+03
Chloroethane		NR	9.01E+02	NR	2.61E+03	NR	1.22E+03	NR	3.54E+03	NR	1.97E+03	NR	5.71E+03
Chloromethane		NR	9.54E-01	NR	1.91E+03	NR	1.11E+00	NR	2.24E+03	NR	1.49E+00	NR	2.99E+03
Cis 1,2 Dichloroethene		1.36E+01	NR	NR	3.94E+03	2.29E+01	NR	NR	6.61E+03	4.44E+01	NR	NR	1.29E+04
Dichloromethane		9.04E+03	2.63E+02	2.57E+02	7.27E+03	9.04E+03	3.50E+02	3.39E+02	9.68E+03	9.04E+03	5.53E+02	5.26E+02	1.53E+04
Tetrachloroethene (PCE)		2.67E+04	2.45E+01	2.45E+01	4.24E+02	2.67E+04	5.49E+01	5.48E+01	9.51E+02	2.67E+04	1.26E+02	1.25E+02	2.18E+03
Trans 1,2 Dichloroethene		3.23E+04	2.07E+01	NR	3.42E+03	3.23E+04	3.74E+01	NR	6.17E+03	3.23E+04	7.63E+01	NR	1.26E+04
Trichloroethene (TCE)		7.30E-01	2.59E+00	NR	1.54E+03	1.53E+00	5.43E+00	NR	3.22E+03	3.38E+00	1.20E+01	NR	7.14E+03
Vinyl Chloride (chloroethene)		1.19E+02	1.13E+00	1.12E+00	1.36E+03	1.19E+02	1.46E+00	1.45E+00	1.76E+03	1.19E+02	2.24E+00	2.20E+00	2.69E+03
Semi-Volatile Organic Compounds													
2-Chloronaphthalene		1.53E+05	3.71E+02	3.70E+02	1.14E+02	1.53E+05	9.07E+02	9.02E+02	2.80E+02	1.53E+05	2.13E+03	2.10E+03	6.69E+02
Acenaphthene		1.10E+05	2.75E+06	1.06E+05	5.70E+01	1.10E+05	5.38E+06	1.08E+05	1.41E+02	1.10E+05	8.83E+06	1.08E+05	3.36E+02

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 3

Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	SAC appropriate to pathway SOM 1% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
		Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Acenaphthylene		1.10E+05	2.68E+06	1.05E+05	8.61E+01	1.10E+05	5.23E+06	1.07E+05	2.12E+02	1.10E+05	8.65E+06	1.08E+05	5.06E+02
Anthracene		5.49E+05	1.13E+07	5.23E+05	1.17E+00	5.49E+05	2.35E+07	5.36E+05	2.91E+00	5.49E+05	4.13E+07	5.42E+05	6.96E+00
Benzo(a)anthracene		2.84E+02	4.08E+02	1.67E+02	1.71E+00	2.84E+02	4.47E+02	1.74E+02	4.28E+00	2.84E+02	4.67E+02	1.76E+02	1.03E+01
Benzo(a)pyrene	(a)	7.68E+01	2.04E+02	5.58E+01	9.11E-01	7.68E+01	2.09E+02	5.61E+01	2.28E+00	7.68E+01	2.11E+02	5.63E+01	5.46E+00
Benzo(b)fluoranthene		7.13E+01	1.17E+02	4.43E+01	1.22E+00	7.13E+01	1.20E+02	4.47E+01	3.04E+00	7.13E+01	1.21E+02	4.49E+01	7.29E+00
Benzo(g,h,i)perylene		6.29E+03	1.05E+04	3.93E+03	1.54E-02	6.29E+03	1.06E+04	3.95E+03	3.85E-02	6.29E+03	1.07E+04	3.96E+03	9.23E-02
Benzo(k)fluoranthene		1.88E+03	3.11E+03	1.17E+03	6.87E-01	1.88E+03	3.17E+03	1.18E+03	1.72E+00	1.88E+03	3.21E+03	1.19E+03	4.12E+00
Chrysene		5.67E+02	8.89E+02	3.46E+02	4.40E-01	5.67E+02	9.25E+02	3.52E+02	1.10E+00	5.67E+02	9.47E+02	3.55E+02	2.64E+00
Dibenzo(a,h)anthracene		5.67E+00	9.32E+00	3.53E+00	3.93E-03	5.67E+00	9.52E+00	3.55E+00	9.82E-03	5.67E+00	9.64E+00	3.57E+00	2.36E-02
Fluoranthene		2.29E+04	1.89E+06	2.26E+04	1.89E+01	2.29E+04	2.72E+06	2.27E+04	4.73E+01	2.29E+04	3.32E+06	2.27E+04	1.13E+02
Fluorene		7.31E+04	4.55E+05	6.30E+04	3.09E+01	7.31E+04	1.06E+06	6.84E+04	7.65E+01	7.31E+04	2.24E+06	7.08E+04	1.83E+02
Hexachloroethane		2.09E+01	NR	NR	8.17E+00	4.98E+01	NR	NR	2.01E+01	1.11E+02	NR	NR	4.81E+01
Indeno(1,2,3-cd)pyrene		8.10E+02	1.31E+03	5.01E+02	6.13E-02	8.10E+02	1.35E+03	5.06E+02	1.53E-01	8.10E+02	1.37E+03	5.09E+02	3.68E-01
Naphthalene		3.64E+04	1.87E+03	1.78E+03	7.64E+01	3.64E+04	4.39E+03	3.92E+03	1.83E+02	3.64E+04	9.94E+03	7.81E+03	4.32E+02
Phenanthrene		2.28E+04	5.35E+05	2.19E+04	3.60E+01	2.28E+04	1.09E+06	2.24E+04	8.96E+01	2.28E+04	1.86E+06	2.25E+04	2.14E+02
Pyrene		5.49E+04	4.47E+06	5.42E+04	2.20E+00	5.49E+04	6.46E+06	5.44E+04	5.49E+00	5.49E+04	7.91E+06	5.45E+04	1.32E+01
Phenol		1.10E+06	2.65E+04	2.59E+04	2.42E+04	1.10E+06	3.04E+04	2.96E+04	3.81E+04	1.10E+06	3.46E+04	3.35E+04	7.03E+04

Total petroleum hydrocarbons

Aliphatic hydrocarbons EC5-EC6		4.77E+06	3.19E+03	3.19E+03	3.04E+02	4.77E+06	5.86E+03	5.86E+03	5.58E+02	4.77E+06	1.21E+04	1.21E+04	1.15E+03
Aliphatic hydrocarbons >EC6-EC8		4.77E+06	7.79E+03	7.78E+03	1.44E+02	4.77E+06	1.74E+04	1.74E+04	3.22E+02	4.77E+06	3.97E+04	3.96E+04	7.36E+02
Aliphatic hydrocarbons >EC8-EC10		9.53E+04	2.02E+03	2.00E+03	7.77E+01	9.53E+04	4.91E+03	4.85E+03	1.90E+02	9.53E+04	1.17E+04	1.13E+04	4.51E+02
Aliphatic hydrocarbons >EC10-EC12		9.53E+04	9.97E+03	9.69E+03	4.75E+01	9.53E+04	2.47E+04	2.29E+04	1.18E+02	9.53E+04	5.89E+04	4.73E+04	2.83E+02
Aliphatic hydrocarbons >EC12-EC16		9.53E+04	8.26E+04	5.88E+04	2.37E+01	9.53E+04	2.04E+05	8.17E+04	5.91E+01	9.53E+04	4.81E+05	9.02E+04	1.42E+02
Aliphatic hydrocarbons >EC16-EC35	(b)	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aliphatic hydrocarbons >EC35-EC44	(b)	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aromatic hydrocarbons >EC8-EC10		3.81E+04	3.55E+03	3.46E+03	6.13E+02	3.81E+04	8.66E+03	8.11E+03	1.50E+03	3.81E+04	2.05E+04	1.70E+04	3.58E+03
Aromatic hydrocarbons >EC10-EC12		3.81E+04	1.92E+04	1.62E+04	3.64E+02	3.81E+04	4.69E+04	2.79E+04	8.99E+02	3.81E+04	1.10E+05	3.42E+04	2.15E+03
Aromatic hydrocarbons >EC12-EC16		3.81E+04	2.02E+05	3.62E+04	1.69E+02	3.81E+04	4.76E+05	3.73E+04	4.19E+02	3.81E+04	1.03E+06	3.78E+04	1.00E+03
Aromatic hydrocarbons >EC16-EC21	(b)	2.82E+04	NR	NR	5.37E+01	2.83E+04	NR	NR	1.34E+02	2.84E+04	NR	NR	3.21E+02
Aromatic hydrocarbons >EC21-EC35	(b)	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01
Aromatic hydrocarbons >EC35-EC44	(b)	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01

Notes:

EC - equivalent carbon. GrAC - groundwater screening value. SAC - soil screening value.

The CLEA model output is colour coded depending upon whether the soil saturation limit has been exceeded.

	Calculated SAC exceeds soil saturation limit and may significantly affect the interpretation of any exceedances as the contribution of the indoor and outdoor vapour pathway to total exposure is >10%.
	Calculated SAC exceeds soil saturation limit but the exceedance will not affect the SAC significantly as the contribution of the indoor and outdoor vapour pathway to total exposure is <10%.
	Calculated SAC does not exceed the soil saturation limit.

The SAC for organic compounds are dependant upon soil organic matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58. 1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.

SAC for TPH fractions, PAHs naphthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway (Section 10.1.1, SR3)

(a) SAC for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead are derived using the C4SL toxicology data.

(b) SAC for barium and selenium should not include the inhalation pathway as no expert group HCV has been derived; aliphatic and aromatic hydrocarbons >EC16 should not include inhalation pathway due to their non-volatile nature and inhalation exposure being minimal (oral, dermal and inhalation exposure is compared to the oral HCV); arsenic should only be based on oral contribution (rather than combined) owing to the relative small contribution from inhalation in accordance with the SGV report. The Oral SAC should be adopted for zinc and benzo(a)pyrene.

(c) SAC for CrIII should be based on the lower of the oral and inhalation SAC (see LQM/CIEH 2015 Section 6.8)

(d) SAC for elemental mercury, chromium VI and nickel should be based on the inhalation pathway only.

(e) SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used.

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 4
Human Health Generic Assessment Criteria for Commercial Scenario

Compound	SAC for Soil SOM 1% (mg/kg)	SAC for Soil SOM 2.5% (mg/kg)	SAC for Soil SOM 6% (mg/kg)
Metals			
Arsenic	640	640	640
Barium	22,000	22,000	22,000
Beryllium	12	12	12
Boron	240,000	240,000	240,000
Cadmium	410	410	410
Chromium (III) - trivalent	8,600	8,600	8,600
Chromium (VI) - hexavalent	49	49	49
Copper	68,000	68,000	68,000
Lead	2,300	2,300	2,300
Elemental Mercury (Hg ⁰)	15 (4)	33 (11)	58 (26)
Inorganic Mercury (Hg ²⁺)	1,120	1,120	1,120
Methyl Mercury (Hg ⁴⁺)	290 (73)	310 (142)	320
Nickel	980	980	980
Selenium	12,000	12,000	12,000
Vanadium	9,000	9,000	9,000
Zinc	740,000	740,000	740,000
Cyanide (free)	650	650	650
Volatile Organic Compounds			
Benzene	27	50	98
Toluene	56,000 (869)	107,000 (1,916)	184,000 (4,357)
Ethylbenzene	6,000 (518)	13,000 (1,216)	27,000 (2,844)
Xylene - m	6,200 (625)	14,100 (1,474)	31,200 (3,457)
Xylene - o	6,600 (478)	15,000 (1,120)	33,000 (2,618)
Xylene - p	5,900 (576)	13,600 (1,353)	30,000 (3,167)
Total xylene	5,900 (625)	13,600 (1,474)	30,000 (3,457)
Methyl tertiary-Butyl ether (MTBE)	7,500	12,100	22,400
1,1,1,2 Tetrachloroethane	110	250	560
1,1,2,2-Tetrachloroethane	270	550	1,130
1,1,1-Trichloroethane	700	1,300	3,000
1,1,2 Trichloroethane	89	180	382
1,1-Dichloroethene	24	43	87
1,2-Dichloroethane	0.67	0.97	1.65
1,2,4-Trimethylbenzene	330	640	1,040
1,3,5-Trimethylbenzene	NR	NR	NR
1,2-Dichloropropane	3	6	11
Carbon Tetrachloride (tetrachloromethane)	2.9	6.3	14.2
Chloroethane	901	1,223	1,972
Chloromethane	1.0	1.1	1.5
Cis 1,2 Dichloroethene	14	23	44
Dichloromethane	257	339	526
Tetrachloroethene (PCE)	24	55	125
Trichloroethene (TCE)	0.7	1.5	3.4
Trans 1,2 Dichloroethene	21	37	76
Vinyl Chloride (chloroethene)	1.1	1.4	2.2
Semi-Volatile Organic Compounds			
2-Chloronaphthalene	370 (114)	902 (280)	2,098 (669)
Acenaphthene	110,000	110,000	110,000
Acenaphthylene	110,000	110,000	110,000
Anthracene	520,000	540,000	540,000
Benzo(a)anthracene	170	170	180
Benzo(a)pyrene	77	77	77
Benzo(b)fluoranthene	44	45	45
Benzo(g,h,i)perylene	3,900	3,900	4,000
Benzo(k)fluoranthene	1,200	1,200	1,200
Chrysene	350	350	350
Dibenzo(a,h)anthracene	3.5	3.6	3.6
Fluoranthene	23,000	23,000	23,000
Fluorene	63,000 (31)	68,000	71,000
Hexachloroethane	21 (8)	50 (20)	111 (48)
Indeno(1,2,3-cd)pyrene	500	510	510
Naphthalene	1,800 (76)	3,900 (183)	7,800 (432)
Phenanthrene	22,000	22,000	23,000
Pyrene	54,000	54,000	54,000
Phenol	440*	690*	1,300*
Total Petroleum Hydrocarbons			
Aliphatic hydrocarbons EC ₅ -EC ₆	3,200 (304)	5,900 (558)	12,100 (1,150)
Aliphatic hydrocarbons >EC ₅ -EC ₈	7,800 (144)	17,400 (322)	39,600 (736)
Aliphatic hydrocarbons >EC ₈ -EC ₁₀	2,000 (78)	4,800 (190)	11,300 (451)
Aliphatic hydrocarbons >EC ₁₀ -EC ₁₂	9,700 (48)	22,900 (118)	47,300 (283)
Aliphatic hydrocarbons >EC ₁₂ -EC ₁₆	59,000 (24)	82,000 (59)	90,000 (142)
Aliphatic hydrocarbons >EC ₁₆ -EC ₃₅	1,000,000**	1,000,000**	1,000,000**
Aliphatic hydrocarbons >EC ₃₅ -EC ₄₄	1,000,000**	1,000,000**	1,000,000**
Aromatic hydrocarbons >EC ₅ -EC ₁₀	3,500 (613)	8,100 (1,503)	17,000 (3,580)
Aromatic hydrocarbons >EC ₁₀ -EC ₁₂	16,000 (364)	28,000 (899)	34,000 (2,150)
Aromatic hydrocarbons >EC ₁₂ -EC ₁₆	36,000 (169)	37,000	38,000
Aromatic hydrocarbons >EC ₁₆ -EC ₂₁	28,000	28,000	28,000
Aromatic hydrocarbons >EC ₂₁ -EC ₃₅	28,000	28,000	28,000
Aromatic hydrocarbons >EC ₃₅ -EC ₄₄	28,000	28,000	28,000
Minerals			
Asbestos	Stage 1 test – No asbestos detected with ID; Stage 2 test - <0.001% dry weight (exceedance of either equates to an exceedance of the GAC) ¹		
Notes:			
* Generic assessment criteria not calculated owing to low volatility of substance and therefore no pathway, or an absence of toxicological data.			
NR - SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used			
EC - equivalent carbon. GRAC - groundwater assessment criteria. SAC - soil assessment criteria.			
* The GAC for Phenol is based on a threshold which is protective of direct contact (SC050021/Phenol SGV report)			
** Denoted SAC calculated exceeds 100% contaminant, hence 100% (1,000,000mg/kg) has been taken as SAC			
The SAC for organic compounds are dependent on Soil Organic Matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58.			
1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.			
SAC for TPH fractions, PAHs naphthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway, section 10.1.1, SR3.			
(VALUE IN BRACKETS)			
RSK has adopted an approach for petroleum hydrocarbons in accordance with LQM/CIEH whereby the concentration modelled for each petroleum hydrocarbon fraction has been tabulated as the SAC with the corresponding solubility or vapour saturation limits given in brackets.			