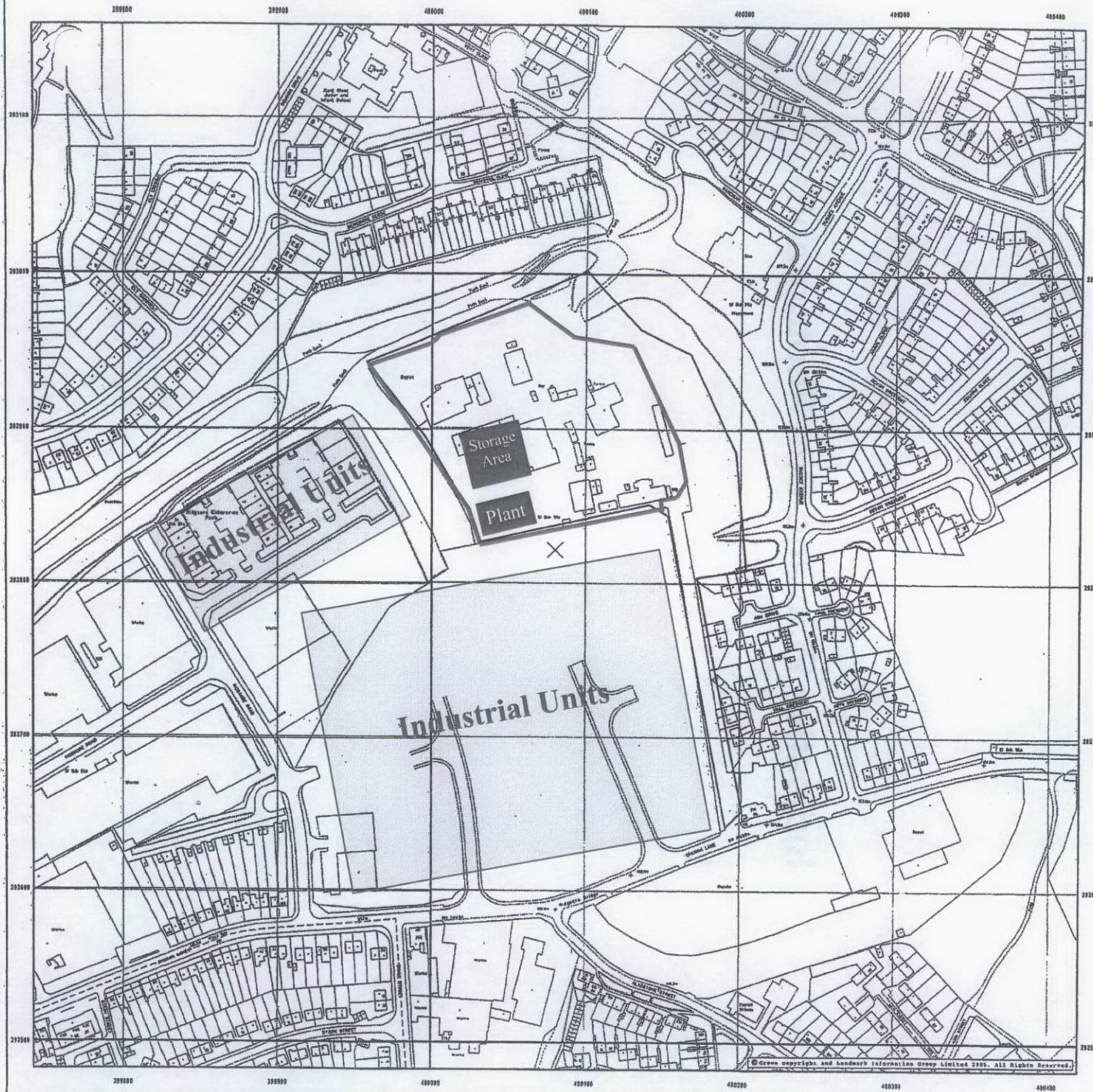


deepgreen

Appendix A

Indicative Plan and Site Photograph



100m

Historical Map Legend

- | | |
|------------------------------|-------------------------------|
| | |
| Slope | Slope |
| | |
| Bench Mark | Wells |
| | |
| Direction of Water flow | Pylon |
| | |
| Buildings with Building Seed | Electricity Transmission Line |

Administrative Boundaries

- Civil parish/community boundary
- District boundary
- County boundary
- Boundary post/stone
- Boundary merging symbol (note: these always appear in opposed pairs or groups of three)

Large-Scale National Grid Data

"Large Scale National Grid Data" superimposed 50m grids (Ordnance Survey's "Survey of Information on Microfilm") in 1992, and continued to be produced until 1993. These maps were the forerunners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

ORDNANCE SURVEY PLAN
Published 1992
Source map scale - 1:1,250

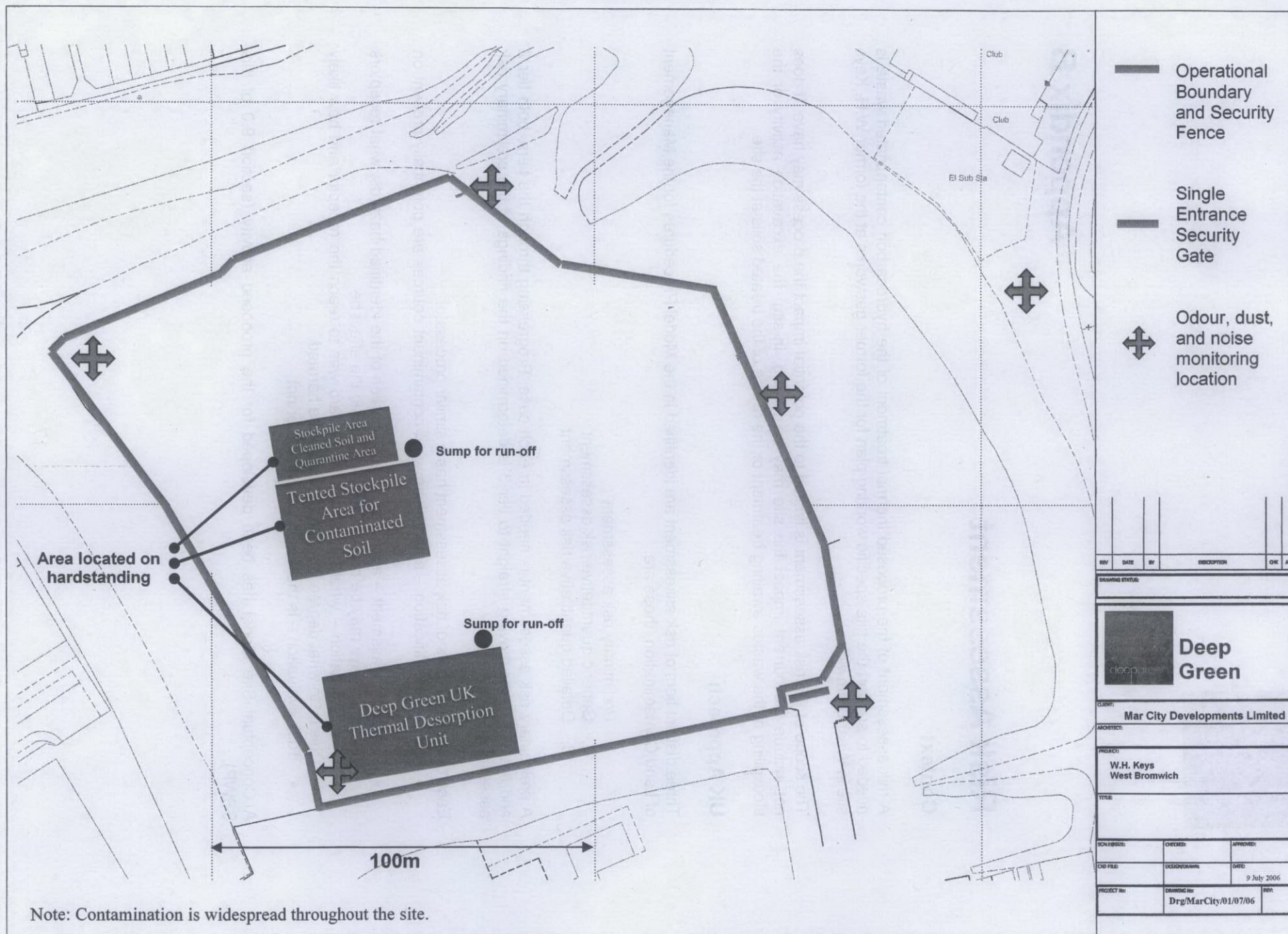
1992	1992
1992	1992
1992	1992




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-  Operational Boundary and Security Fence
-  Single Entrance Security Gate
-  Odour, dust, and noise monitoring location

REV	DATE	BY	DESCRIPTION	CHK	APP
DRAWING STATUS:					
 Deep Green					
CLIENT: Mar City Developments Limited					
ARCHITECT: W.H. Keys West Bromwich					
PROJECT: W.H. Keys West Bromwich					
TITLE:					
SCALE(S):		CHECKED:		APPROVED:	
COP FILE:		DISSEMINATION:		DATE: 9 July 2006	
PROJECT NO:		DRAWING NO: Drg/MarCity/01/07/06		REV:	



Appendix B

Risk Assessment

Context

A risk assessment of the proposed thermal treatment of the hydrocarbon contaminated waste is needed to support the site specific working plan for the former gasworks at the former W.H. Keys site in West Bromwich.

The scope of the risk assessment is limited to the potential impact the process may have. It does not include the current impact the site may be having, in-situ, the excavation activity or the stockpiling of the wastes awaiting treatment or the re-use of the treated soils at the site.

UK Approach

Three distinct tiers of risk assessment are identified in the Model Procedures for the Management of Land Contamination, these are:

1. Preliminary risk assessment
2. Generic quantitative risk assessment
3. Detailed quantitative risk assessment

A preliminary risk assessment is needed in each case. Progressing through the tiers, both tier 2 and then tier 3, or moving straight to tier 3 is determined on the findings of the preliminary risk assessment.

Each of the three tiers of risk assessment has a similar process of:

- Hazard identification – establishing what contaminant sources are potentially present on a site
- Hazard assessment – analysis of the properties of the identified hazards, what receptors and pathways may be present and what could the effect be
- Risk estimation – what happens if the hazard was to reach the receptor and how likely this is, to what degree would the receptor be harmed
- Risk evaluation – is the risk unacceptable or not

A Conceptual Site Model has been developed for the proposed activity (section 9.0 of this SSWP).

Site Description

The following information was obtained from WSP Environmental UK, who are the environmental consultants for the Client for the site:

Historical maps indicate that the site has had various land uses including a grease works, an oil works, a chemical works and a tar works before being used most recently for the manufacture of bitumen based products and coatings.

The site comprises numerous large and small units where manufacturing operations take place, with associated mixing tanks and above ground fuel, solvent and bitumen storage tanks, offices, a garage, dispatch areas, drum and pallet storage areas. An electricity substation, a laboratory and a petroleum/flammable store are also situated on the site.

The eastern part of the site comprises open grass land with occasional trees, which slopes to the east to the nearby residential estates. Infilled canals are present to the north and west of the site.

The site occupies approximately 3.4 hectares and the works area is generally flat, the eastern boundary of the site slopes steeply (approximately 1 in 1) to the east down to the residential properties to the east of the site.

Site Boundaries

Access to the main site is available from a single locked entrance leading to a driveway which itself leads onto Church Lane.

The site boundaries are summarised in the table below:

BOUNDARY	DESCRIPTION
North	Filled in Canal.
East	Open ground.
South	Industrial Units
West	Filled in Canal.



Surrounding Land Uses

The site is located within an area of mixed use as indicated in the table below.

BOUNDARY	DESCRIPTION
North	Immediately north of the site is a boundary made of trees and bushes, beyond that open grassland and beyond that is residential development.
East	Immediately east of the site is a boundary made of trees and bushes, beyond that open grassland that falls away some 30ft. and beyond that is residential development.
South	Immediately south of the site is a boundary made of trees and bushes, beyond that is a disused and filled in canal and beyond that is a industrial unit.
West	Immediately west of the site is a boundary made of trees and bushes, beyond that is a disused and filled in canal, beyond that further trees and shrubs and then an industrial unit.

Sites of Ecological Importance

There are no Sites of Special Scientific Interest (SSSIs) in the vicinity of the site.

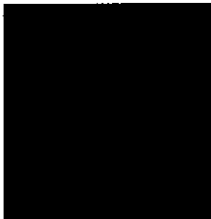
Drainage

Based on information obtained during the ground investigation the ground conditions at the site generally comprise made ground up to 10.2m in thickness overlying Glacial Till, which generally comprised gravelly clay. Middle Coal Measures comprising mudstones with thin bands of coal were generally found beneath the Glacial Till. Shallow perched water was generally encountered within the made ground.

The site is considered to have a low to medium environmental sensitivity with the site underlain by a minor aquifer, with no licensed groundwater abstractions within 1 km. Open grass playing fields are located on the western part of the site. The nearest surface features are the Hobnail Brook which is culverted adjacent to the eastern boundary of the site and the Ridgeacre Branch Canal situated 60m west of the site. An unnamed lake is also located approximately 900m north of the site.

The limited permeability of the overlying Glacial Till appears to be preventing significant groundwater contamination and thus protecting the underlying minor aquifer and Hobnail Brook from the contamination identified with shallow soils on site.

C



The risk associated with the operations of DGUK is considered low. Stockpiled pre-treated material awaiting treatment will be stored on contaminated areas of the site and either tented or covered. Treated material awaiting analytical approval will be stored on hardstanding, and treated material which has analytical approval will be expeditiously placed into areas as a restoration material. Any potentially contaminated run-off will be collected and sampled to determine its fate.

Site Services

BT cables, electricity cables and a sub-station, are located within the site boundaries.

No other significant underground services are known to be present.

Environmental Consultation

WSP has contacted relevant regulatory bodies for the area to obtain pertinent information relating to the site and the surrounding area.

Environmental Health

The Contaminated Land Officer for the area from the Environmental Health Department at Sandwell Metropolitan Borough Council has indicated that there are no issues with regards to Contaminated Land in the vicinity of the site but the site is located in a former industrial area so appropriate assessment should be undertaken. Recently built properties to the south east of the site have had issues with ground gas and protection measures have been required in some cases.

Building Control

The Building Control Officer for the area from Sandwell Metropolitan Borough Council was contacted with regard to any pertinent information relating to the site and its surrounding area. The officer was not aware of any previous site investigation reports which may be available for the site. The officer indicated that the site is situated in an area that is affected by coal mining and he reported that several shafts are known to exist on the site. He was not aware of whether they had been capped or treated. Top up pipes for the canal may underlie the site. With regard to the suitability of ground beneath the site for development, the officer reported that houses constructed in the area in the 1950s were mostly built on reinforced slab foundations. However, two houses on Ash Drive, to the east of the driveway, had to be demolished due to subsidence although it is thought they were constructed on strip footings. Most of the buildings on Vector Industrial Park are reportedly built on ground improved by vibro or on piled foundations.

Planning Department

Sandwell Metropolitan Borough Council Planning Department have been unable to provide a response.

Geology, Hydrogeology and Hydrology

The information provided on geology, hydrogeology and hydrology is below is taken from available information sources.

Geological Mapping at 1:10,000 scale, Sheet SP 09 SW (Solid and Drift), indicates that the following geological sequence underlies the site:

Geological Unit	Indicative Thickness
Made Ground	Unknown
Glacial Till	Unknown
Middle Coal Measures	46 - 240 m

The Made Ground is described as mainly colliery spoil. The Glacial Till is described as red brown pebbly clay. The Middle Coal Measure strata comprise a series of mudstones with sandstones, coal seams, ironstones and fireclays. Most of the coal and ironstone horizons are of a thickness that is likely to have been worked economically.

The Geological Map also indicates that the strata of the Coal Measures dip to the west beneath the site. The Two Foot Coal outcrops beneath the eastern margin of the site, the Brooch Coal outcrops on the south east corner of the site and the Thick Coal outcrops approximately 300m to the east of the site. A fault, trending south west to north east, down thrown to the west, passes beneath the south east corner of the site.

Borehole logs for the area have been obtained from the British Geological Survey (BGS). These relate to the shafts at Coles Farm Colliery, Ridgacre Colliery, Hall End Colliery, Jervoise Colliery, Upper Tantary Colliery and Timmins Pits. Consideration of the shaft records closest to the site indicates the following:

The base of the Thick Coal is likely to be at a depth of between 36 and 45m on the east of the fault.

Hydrology

Based on the Environment Agency Groundwater Vulnerability Map for the area (No. 22, South Staffordshire and East Shropshire), the Glacial Till and Middle Coal Measures strata underlying the site are classified as Minor aquifers.

There are no currently licensed groundwater abstractions within 1 km of the site. Reference has been made to the Environment Agency Source Protection Zone (SPZ) plan for the area. The plan indicates that the site is not located within an SPZ. Based on the above information, the underlying minor aquifers are considered to have a low sensitivity.



Flooding

It is believed that there has been no history of flooding at the subject site.

Contamination

The following soil and groundwater contamination has been identified at the site:

- Site wide arsenic, cadmium, chromium, nickel, zinc, barium, vanadium, naphthalene
- and PAH contamination in the shallow (<1m) soils.
- Elevated concentrations of hydrocarbons generally recorded in shallow soils across the whole site.
- Hotspots of deeper poly-aromatic hydrocarbons and total petrol hydrocarbons contamination in the central and southern areas of the site.
- Elevated concentrations of BTEX and phenols recorded in soils in the northern part of the site.
- Elevated concentrations of leachable phenol, total PAH and benzo(a)pyrene across the site.
- Elevated concentrations of phenols, hydrocarbons and benzo(a)pyrene from both perched groundwater within the made ground and within the shallow groundwater in the middle coal measures.

Remediation will be required to ensure that the site is 'suitable for use'. The site specific clean up criteria derived by the QRA have been submitted to the EA.

Given the complex nature of the contamination on site thermal desorption has been selected as the most appropriate remediation technology that meets the technical challenges and environmental requirements.



Discussion

Only when a "source" and a "receptor" are connected via a "pathway" is there any level of risk. This is referred to as a plausible pollution linkage. If one or more of these three elements are missing there is no risk. The UK approach to risk is that of "risk reduction", the risk being managed to an acceptable level.

There are a number of ways of managing risk:

- Source - removal or treatment

- Pathway – modified or blocked

- Receptor – removed, protected or behaviour changed to reduce contact with the risk

Within a preliminary risk assessment professional judgement is applied to each of the identified risks. Options for managing that risk are then considered and decided upon. A decision is then made to determine if the risk will be adequately managed or if further, more detailed, assessment is needed (moving on to the next tier of risk assessment).

Having considered the sources of concern from the proposed treatment process, the site setting, the distance to the relevant receptor, a low, medium, or high risk level can be allocated. Having considered the risk and the proposed control measures that will be put into place a resultant risk level can then be assigned.

The following table builds on the Site Conceptual Model for the site and identifies a relative risk score for each of the plausible pollution linkages identified for the site.

Source	Pathway	Receptor	Risk level	Proposed control	Resultant risk
Excavation of contaminated soils	Not Applicable (N/A)	N/A	N/A	Outside of DGUK area of control	N/A
Stockpile of excavated contaminated soil	N/A	N/A	N/A	Outside of DGUK area of control	N/A
Pre-treatment operations: Dust	Wind	Humans Residential Industrial Units	Medium	1. Damping down 2. Covering 3. Limiting work during extreme weather conditions	Low
Pre-treatment: Noise	Air	Humans Residential Industrial Units	Medium	1. Strategic plant layout 2. Screening 3. Acoustic housing	Low
Loading shovel	Air	Humans Residential	Medium	Alternative devices to a reversing bleeper could be employed at certain hours, provided Risk Assessment and Health and Safety approval is granted.	Medium
Thermal Desorption Unit (TDU): Dust and noise	Wind	Humans Residential Industrial Units Road traffic	Medium	1. Damping down 2. Covering 3. Limiting work during extreme weather conditions	Low
TDU: Off gases	Air	Humans Residential Industrial Units	High	Oxidising Unit	Low
TDU: Quench water	Run off	Ground waters	Low	Impermeable pavement drained to collection point and such waters re-introduced to plant	Low
Treated material: Dusts	Wind	Humans Residential Industrial Units	Medium	1. Damping down 2. Covering 3. Limiting work during extreme weather conditions 4. Re-used on site under Main Contractors control	Low



Un-suitable materials: Dusts	Wind	Humans Residential Industrial Units	Medium	1. Damping down 2. Covering 3. Immediate removal from site	Low
Un-suitable materials: leachate	Runoff	Ground waters	Medium	Impermeable pavement drained to collection point and such waters re-introduced to plant	Low
Soluble contaminants: Pretreatment / treatment / storage of treated material	Made ground / permeable strata	Ground waters	Medium	Impermeable pavement drained to collection point and such waters re-introduced to plant	Low
Fuel Oil	Made ground / permeable strata / runoff	Ground waters	Medium	Stored in impermeable tanks within bunded area	Low
Maintenance: Lubricating oil	Made ground / permeable strata / runoff	Ground waters	Medium	Only quantities necessary for the intended job are used at any one time. If spilt the spilled oil will be cleared up immediately.	Low
Odour	Air	Humans Residential Industrial Units	Medium	Odorous material will be: 1. Covered 2. Blend with other material 3. Removed from site immediately 4. Odour mask / neutraliser	Low

Conclusion

Provided the control measures proposed are put in place then the risks from the proposed thermal desorption plant can adequately be managed. There is therefore no need to move to the next tier of risk assessment.