EA WML 26145

Additional Information for Deployment form

FORMER BAYER CROPSCIENCE, HAUXTON, CAMBRIDGE

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Revision 2

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4 Site Plan

Due to the complexity of the proposed works at the former Bayer Cropscience works, Hauxton, a series of drawings has been provided to illustrate the site activities during the extensive remediation works.

Drawings list:
D907_02 Vertase FLI Site to be remediated, illustrating MTL boundary.
D907_04A Vertase FLI Zone Plan 1-3.
D907_13A Vertase FLI Excavation and processing area 1st season, Excavation in the North of the site, processing in the South of the site.
D907_14A Vertase FLI Excavation and processing area 2nd season, Excavation in South and initial site compound, processing in the restored central part of the site.
D907_15A Treatment Area 1st season
D907_16A treatment Area 2nd season
D907_33C Environmental Monitoring Plan

Mobile Treatment Licence Boundary.
Outlined red on Drawing D907_02

Security and Access.
The site will have a 24hr security presence during both the working week and weekends.
The site will be securely fenced off to prevent public access, as specified in the Environmental Permit (former Mobile Treatment Licence).

Location of Principal plant.
As the site progresses the locations of all the plant will move around the site, as all areas of the site require treatment. Plant will include excavators, dump trucks, crushing and screening plant and treatment bed turners.
Detail of proposed site activities are presented in drawings D907_13A for the first year of the works and D907_14A for the second season of the works. The private water treatment plant will remain a static feature on the other site, West of the A10.

Drainage and enclosed water treatment.
All surface water and pumped shallow ground water is currently entrained into the sites original enclosed drainage system, with a series of pumps and collecting tanks (drawing D907_13A). This effluent is then pumped to a private water treatment works to the west of the remediation site. The waste water treatment plant and the original water collecting system will be preserved and maintained during the remediation works.

Treatment areas outside this captured drainage will be lined and bunded to prevent leachate runoff, all leachate will be pumped from low points to the site collection system and then treated in the waste water treatment plant. The waste water treatment plant is currently operating, and is discharging into the River Cam under licence PR1NF/1744D.

Monitoring locations
Drawing D907_33C illustrates the proposed locations for passive voc/svoc's sampling locations, dust monitoring stations and surface water monitoring locations.

Potential receptors
The site has two properties in close proximity, both to the southwest as highlighted on drawing D907_33C. The potential surface water receptors the River Cam (Granta) and Riddy Brook are also highlighted to the north of the site.

8 Waste Types and Quantities

Waste Type	EWC	Quantity	Medium
Contaminated Soil	170503*	160,000m3	Solid

9 Conceptual Site Model

Refer to drawing D907_36.
List of contaminants at the site.

Contaminants of Concern	Substance Type	Intermediated products	Final Daughter Products
Dicamba	**Herbicide**	**Carboxylic Acids**	**CO2 & H2O**
Mecoprop	**Herbicide**	**Creosol intermediates**	**CO2 & H2O**
Schradan	**Pesticide**	**Shorter chain hydrocarbons**	**CO2 & H2O**
Dichlorprop	**Herbicide**	**Carboxylic Acid**	**CO2 & H2O**
Bis(2-chloroethyl)ether	**Semi-volatile compound**	**Smaller Chain Alkanes**	**CO2 & H2O**
Ethofumesate	**Pesticide**	**Carboxylic Acid**	**Carboxylic Acid**
Hempa	**Pesticide**	**Shorter chain hydrocarbons**	**CO2 & H2O**
Vinyl Chloride	**Chlorinated Hydrocarbon**	**Ethene**	**CO2 & H2O**
4,6-Dinitro-o-cresol	**SVOC**	**Dechlorination to Phenols to straight chain alkanes.**	**CO2 & H2O**
MCPA	**Herbicide**	**Creosol / phenol to straight chain alkanes.**	**CO2 & H2O**
1,2-Dichloroethane	**Chlorinated Hydrocarbon**	**Total removal by vapour extraction**	
4-Chloro-2-methylphenol	**SVOC**	**Dechlorination to Phenols**	**Alkanes, CO2 & H2O**
Cyclohexanone	**VOC**	**Recovery by vapour**	**Alkanes, CO2 & H2O**
Phenol	**SVOC**	**Recovery by vapour**	**Alkanes, CO2 & H2O**
Trichloroethane	**Chlorinated Hydrocarbon**	**Total removal by vapour extraction**	
1,2-Dichlorobenzene	**VOC**	**Total removal by vapour extraction**	
Tetrachloroethene	**Chlorinated Hydrocarbon**	**Total removal by vapour extraction**	
BTEX	**VOC**	**Recovery by vapour**	**Alkanes, CO2 & H2O**
Simazine	**Pesticide**	**Shorter chain hydrocarbons**	**CO2 & H2O**
2,4,6-trichlorophenol	**SVOC**	**Recovery by vapour**	**Alkanes, CO2 & H2O**
Cis-1,2-dichloroethene	**Chlorinated Hydrocarbon**	**Total removal by vapour extraction**	

Dimefox	**Pesticide**	**Shorter chain hydrocarbons**	**CO2 & H2O**

Pollution linkages, Source, Pathway and Receptor

Source	Pathway	Receptor
Contaminated soils – odour / volatile vapours	Airborne	Site operatives / visitors / site users and local residents
Contaminated soils – cross contamination / spillage	Soils, potential 'run-off' of products to permeable grounds/soils	Nearby surface water courses, site operatives / visitors / site users and local residents
Contaminated soils - dust	Airborne	Site operatives / visitors / site users / local residents.
Contaminated soils – ingestion and inhalation	Ingestion and inhalation	Site operatives / visitors / site users / local residents.
Leachate / groundwater – spillage / leakage	Soils, potential 'run-off' of products to permeable grounds/soils	Nearby surface water courses, site operatives / visitors / site users and local residents
Plant – noise	Direct	Site operatives / visitors / site users and local residents.
Plant – dust	Airborne	Site operatives / visitors / site users and local residents

Waste Residues

During the remediation works waste generation will be reduced where possible. During the earthworks and contaminated soils treatment the following wastes maybe generated:

Scrap metals	Recovered and recycled off site
Concrete and brick	Crushed, tested and reused on site as fill material.
Wood	Shredded and retain for soft landscaping on site.
Contaminated soils	Remediated, tested and reused onsite as fill material.
Leachate / contaminated water	Treated on site, tested and discharged under licence.
Vapour and Volatiles	Collected & absorbed onto biological filter media or activated carbon
Spent activated carbon	Recharged and recycled off site.
Spent biological filter media	Disposed of off site

Resultant materials from the remedial action remaining on site will be treated soils that will not pose risk to human health or controlled groundwater.

10 Risk Screening

The Site Specific Environmental Risk Assessment (SSERA) been has carried out in accordance with the National Centre for Risk Analysis and Options Appraisal: Guidance Note Number 25; Guidance on the Application of Environmental Risk Assessment for Waste Management Licensing.

The procedure for conducting the SSERA is as follows: -

1 Identify Potential Hazards
2 Determine the Likelihood and Frequency of the Hazard Occurring
3 Determine the Magnitude of the Consequence of the Hazard
4 Allocate a Level of Risk
5 Provide Controls to Manage the Risks to Acceptable Levels

Identification of Potential Hazards

The hazards associated with excavation, vapour extraction and groundwater treatment have been considered. The hazards, pathways and target have also been identified in the table below.

Source, Pathway and Target

Source and Hazard	Pathway	Targets	Control
Contaminated soils – odour / volatile vapours	Airborne	Site operatives / visitors / site users and local residents	Mobile odour neutralizers and fragrance sprays, covering systems, enclosed vapour extraction systems.
Contaminated soils – cross contamination / spillage	Soils, potential 'run-off' of products to permeable grounds/soils	Nearby surface water courses, site operatives / visitors / site users and local residents	All treatment areas lined and bunded, leachate collection sumps and pumping systems.
Contaminated soils - dust	Airborne	Site operatives / visitors / site users / local residents.	Crushing plant will be fitted with water spray bars, haul roads and treatment areas will be wetted to minimize dust generation.
Contaminated soils – ingestion and inhalation	Ingestion and inhalation	Site operatives / visitors / site users / local residents.	Minimal contact between personnel and contaminated materials, good hygiene practices to be used on site, roads and public areas to be swept and kept free of contaminated soils.
Leachate / groundwater – spillage / leakage	Soils, potential 'run-off' of products to permeable grounds/soils	Nearby surface water courses, site operatives / visitors / site users and local residents	Leachate collection sumps, enclosed pumping systems to be used, groundwater pumps are to be used to remove contamination.
Plant – noise	Direct	Site operatives / visitors / site users and local residents.	All plant to be fitted with noise suppression devices. Planning condition for working hours to be adhered to.
Plant – dust	Airborne	Site operatives / visitors / site users and local residents	Plant to be cleaned before leaving site, and on regular basis to minimize dust generation.

11 Risk Assessment

The allocation of scores relating to environmental risks associated with excavation, vapour extraction and groundwater treatment are specified for the remediation site known as Bayer Cropscience, Hauxton, Cambridge.

An indication of the likelihood or frequency of occurrence of each hazard is given. A score of N = Negligible, L = Low, M = Medium, H = High is allocated. The magnitude or seriousness of the consequences of the hazard occurring is similarly assigned a score. The two scores are combined to give a measure of risk. As a result of the risks identified, control measures are implemented to reduce risks to given acceptable levels.

The risks associated with excavation, vapour extraction and groundwater treatment are assessed semi quantitatively through a scoring system. The higher the score the greater the risk is to the Environment or Human Health

The risk is comprised of two elements, protective measures and controls which are estimated and combined to produce a risk factor.

Environmental Risk Assessment

Hazard	**Specified Waste Management Operation – Excavation, vapour extraction and groundwater treatment**			
	1 Probability of Occurrence	**2 Magnitude of Consequence**	**3 Level of Risk Before Control**	**4 Levels of Risk With Controls in Place**
Odour / Volatile Vapours	**H**	**M**	**M**	**L**
Cross Contamination	**L**	**H**	**M**	**L**
Spillage	**L**	**L**	**L**	**L**
Dust	**H**	**L**	**L**	**L**
Ingestion and inhalation	**H**	**M**	**M**	**L**
Noise	**L**	**L**	**L**	**L**

For each estimated risk, appropriate protective measures, controls and action plans may be proposed. An assessment of the mitigating effects will be taken into account in a mitigated risk factor.

The scoring system to be used is as follows:
Probability of hazard occurring:

0	Never
1	Annually or less frequently
2	Monthly or less frequently
3	Weekly or less frequently
4	Daily or less frequently
5	More frequently than daily

Consequences of hazard to the environment or human health:

0	Harmless
5	Almost harmless
10	Some harm
15	Harmful
20	Very harmful
25	Extremely harmful

Mitigation to risk:

1	Ineffective or non existent
2	Partly effective
3	Effective
4	Very effective
5	Entirely effective

Semi-quantitative Risk Assessment – Excavation, vapour extraction and groundwater treatment.

Hazard	Pathway and Receptor	Probability of Hazard	Consequence of Hazard	Risk Factor	Protective Measures / Controls (Mitigation)	Mitigated Risk Factor
Odour	Windborne odours during excavation and odours from treatment windrows. Receptors include site operatives, visitors, nearby residential dwellings. Odours generated by sparge activities.	5	10	[5 x 10] 50	• Areas of excavation will be kept to a minimum and odorous working faces will be covered at the end of each working day. • Additional covers will be applied to stockpiles and treatment windrows if necessary. • If excessive odours are emanating from biopiles, further active extraction will be applied to draw volatiles through filtration equipment. • In the event that a complaint is made via the Environment Agency or Local council during the site working hours 08:00-18:00 Monday to Friday, a site engineer shall respond by attending the complainants' property to assess the nature and level of odour nuisance. Should an odour complaint be received outside of the working hours a site engineer and or competent person shall respond by attending the complainants' property to assess the nature and level of odour nuisance, unless otherwise agreed by the Environment Agency of Local Authority. • Suspending works until weather conditions improve i.e. wind drops or changes direction away from residential properties. • Odour control of the in-situ off-gas will be treated through either a biological filter or a carbon filter. With regular olfactory and PID checks at the exhaust from the system to ensure that the filter media is not spent. • The area subjected to air sparging and vapour recovery will be sealed with a suitable	[50/10] 5

					HDPE membrane, with the unsaturated zone being subjected to negative pressure and constant active vapour recovery • The excavations and turning of contaminated soils will be lead by an Environmental Engineer who will monitor VOC and odour emission at the excavation face. He or she will advise the excavation team on how this material should be handled to best control its odour emission. He or she will liaise on a regular basis with the Engineers recording weather conditions and monitoring odour and VOC emissions around the site boundary to ensure the excavation is controlled as far as reasonably practicable • Undertake two daily patrols as part of our monitoring regime of odours and concentrations off site. We will continue this and report them to the regulators as required. • Maintain and operate the odour suppressant system around the perimeter of the site. • The speed that contaminated material can be handled with regards to the management of odour has been identified, only one excavator will be used to excavate the odorous contaminated soils from the main dig. Only under appropriate weather or site conditions will two or more excavators be permitted to excavate odours soils. • The daily volume of contaminated soils excavated will be limited to a volume that is capable of being processed and covered in	

					the same day. Odours materials will not be left in a stockpile overnight, the volume of freshly excavated contaminated material must be of a suitable volume that it can be covered at short notice to manage odours. • Continuously highly odours soils excavated may be left in the excavation at depth in an area away from the receptors to allow the odours to dissipate, before hauling the materials to the treatment area. • In order to react to any changes in weather condition it is integral to have an emergency mitigation measure cover system on standby, along with an appropriate level of staff to operate them effectively. • We will install and operate mobile masking and neutralising systems focused solely on the freshly excavated materials to help concentrate abatement efforts at the source of the odours. This system will as closely as practicable follow the excavating plant around the working area, to ensure that each bucket of freshly excavated soils is doused to reduce odour generation. The proprietary mixture used attempts to neutralise and mask odours in much the same way as household fresheners work. Note that not all excavated materials will release odours upon excavation. • At the end of the working day the excavation face will be sealed in with the back of the machine bucket to prevent odour generation overnight. An olfactory assessment will be	

					conducted by the one of the Environmental Engineers at the excavation face, if significant odours are detected after sealing the excavation face, temporary covers will be placed on the excavation to reduce odour generation further. Temporary cover systems will be utilised to reduce odour generation at anytime they are required, in particular at the weekend. • Non-working, odorous excavation faces will be covered. • We will continue to monitor the weather (via our on site weather station) and site conditions closely and take due regard. Specifically on days where conditions are likely to or show evidence that odours may be transmitted off site working areas will be adapted appropriately turning beds which represent off site working areas will be adapted appropriately turning beds which represent lower risks of odour or in more appropriate positions on site for example.	
Hazard	**Pathway and Receptor**	**Probability of Hazard**	**Consequence of Hazard**	**Risk Factor**	**Protective Measures / Controls (Mitigation)**	**Mitigated Risk Factor**
Cross Contamination	Accidental release of leachate from biopiles, stockpiles, with the potential to cause contamination of nearby soils and surface waters.	4	10	[4x10] 40	• Biopiles and contaminated stockpiles will be constructed upon existing hardstanding with any breaks or expansions joints filled, resulting in zero risk from cross contamination. • Monitoring of the treatment area will be undertaken to ensure the protective measures/controls in place are maintained, and results recorded in the mobile plant site	[40/10] 4

					diary.	

Hazard	Pathway and Receptor	Probability of Hazard	Consequence of Hazard	Risk Factor	Protective Measures / Controls (Mitigation)	Mitigated Risk Factor
Spillage / Leakage	Accidental Spillage of plant fuels causing contamination via 'run-off'. Accidental spillage or leakage of groundwater or leachate during the treatment process or during transport / storage.	3	10	[3x10] 30	• Any fuels to be stored on site will be kept secured and will be housed in a double skinned bunded container. • The use of appropriate filling procedures will be communicated to all members of staff and subcontractors on site. • Plant and machinery will be checked on a daily basis for any leaks and will be maintained accordingly. • Oil absorbent booms, pads and granules to be kept on site. • All biopiles / stockpiles will be constructed on existing hardstanding with any breaks or expansions joints filled, resulting in zero risk to cross contamination if any liquor infiltrates soils. • Groundwater treatment plant will be contained on same secure, impermeable treatment area as per soils, water containing vessels will be bunded as required. • Pumps, hoses and connectors will be checked prior to pumping commences. • All groundwater recovered will be treated appropriately prior to discharge to foul sewer.	[30/10] 3

Hazard	Pathway and Receptor	Probability of Hazard	Consequence of Hazard	Risk Factor	Protective Measures / Controls (Mitigation)	Mitigated Risk Factor
Dust	Dust may be generated during the excavation, and treatment of contaminated soils. Windborne dusts from stockpiled materials, or biopiles treatment piles may also occur. Receptor includes site operatives, visitors, nearby residential dwellings, industry, pedestrians.	4	10	[4 x 10] 40	• The site engineer shall assess dust and its impact upon neighbours throughout the working day. • The use and maintenance of good quality site roads. • Enforced speed limit of site plant. • Dust suppression via water applied by towed bowser. • Stockpiles and biopiles will be covered during inclement weather conditions.	[40/10] 4
Ingestion / Inhalation	Ingestion or inhalation of contaminated materials. Receptor includes site operatives and visitors.	3	15	[3x15] 45	• All workers and visitors will receive a site induction requiring them to wash their hands prior to eating, drinking or smoking and instructing them not to handle materials on the site without gloves.	[45/15] 3

Hazard	Pathway and Receptor	Probability of Hazard	Consequence of Hazard	Risk Factor	Protective Measures / Controls (Mitigation)	Mitigated Risk Factor
Noise	Noise Generated via Operating Plant. Receptor includes site operatives, visitors, nearby residential dwellings, industry.	4	10	[4x10] 40	• All plant and machinery will be fitted with adequate silencers and will not be operated unless in good condition. • Earthworks will only take place during normal working hours 0800 – 1800 Monday to Friday and 0800 – 1300 on Saturday. • Should any complaints be made the site engineer shall investigate. Such investigation may include the use of portable monitoring equipment to record noise levels at the location of the complaint.	[40/10] 4

13 Monitoring Plan

Gases, Vapours and Aerosol monitoring

Volatile and semi-volatile organic compounds will be monitored twice daily around the site boundary and in public areas during the remediation works. A Photo Ionization Detector will be used to give a quantitative assessment of all voc/svoc's present around the site. Qualitative olfactory assessment will be made by the Environmental Engineer on a twice daily walk-around, and reported as per Environment Agency 'Internal Guidance for the Regulation of Odour at Waste Management Facilities' July 2002 VERSION 3.0, and recorded on form ENV006 and in the site diary. Any odours detected beyond the site boundary will be reported immediately to the site manager and action will be taken immediately to mitigate the impact of site generated odours.

Volatile and semi-volatile organic compounds will be monitored at 0m, 10m and 50m down wind of all treatment areas and excavation operations using a PID by the on site environmental engineer. If excessive odours are being generated from a particular source, action will be taken to reduce this generation, lessening the impact at the site boundary.

In addition, 9no passive Tennax diffusion air sampler tubes will be placed at the eight compass points around the site boundary. The Diffusion tubes monitor VOC's/SVOC'c and will be analysed every 28 days, the results will be compared to long term exposure limits (trigger levels) generated from appropriate guidance where available. Should excessive odour be noted at the site boundary or complaint be received the emissions action plan will be put into action. It is anticipated to carryout pre-works monitoring to establish base-line values around the site, before the remediation works commence.

Highly odorous or volatile emitting soils	LEVEL 1. Wastes producing significant odour or elevated PID readings at 10m from waste will be monitored to ensure migration of VOC and odours does not occur. LEVEL 2. Wastes producing significant odour or elevated PID readings at 100m from waste will be examined and an odour abatement system such as temporary covers, odour neutralisation sprays/mist will be considered. LEVEL 3. Wastes producing significant odour or elevated VOC at the site boundary closest to residential or occupied property will be covered or an odour control misting/spraying system will be employed to ensure that a nuisance odour does not occur.

Dust monitoring systems

Six semi permanent sticky pad monitors will be installed at an height of 1.2-1.5m above the current ground level at the boundary of the site at the compass points of the site (North, Northeast, Northeast1, East South and West), as shown on drawing 907-BRI_33C It is anticipated that dust will be produced as a consequence of concrete crushing/screening and other onsite activities.

For reassurance purposes, in the early stages of excavation and turning processes, sticky-pad monitors will be collected and analysed fortnightly, when it has been shown that this material is not problematic, the collection and analysis of the sticky pads will be scaled back to monthly.

The guidance document ENV004, published by the Environmental Agency, states that a value 200mg/m^2/day is the level at which dusting is a nuisance, this level is equivalent to visual deposition. The site manager will make daily inspections paying particular attention to the possibility of visual dust deposition in areas close to receptors. The monitoring will be compared to background levels which will be established by 2 months pre-works monitoring, if significantly elevated dust levels are detected further dust control measures will be implemented.

Groundwater monitoring

A groundwater monitoring strategy has been developed by Atkins Ltd, this strategy was based on monthly monitoring of the shallow perched waters and the deeper groundwater in the Green Sand Aquifer. The established monitoring locations around the perimeter of the site, (drawing D907BRI_31E) will be preserved and maintained during the remediation works, Monitoring locations in the centre of the excavation area will be removed during the works. Water samples will be submitted to an accredited laboratory and assessed against site specific contaminants of concern.
The physical parameters associated with the borehole will be recorded and reported on form M6 and all sampling will be in accordance with the protocols included in our Standard Operating procedures.

Surface Water Monitoring Plan

The Riddy Brook and the River Cam (Granta) border the site to the North and Northeast. Previous site activities have impacted upon the Riddy Brook when the former Bayer Cropscience works were in production. A bentonite cut-off wall and shallow ground water pumps being installed to prevent contamination migration to the Riddy Brook, this system was successful and will remains in working order.
The environmental engineer will make a daily visual inspection of the watercourses for hydrocarbon sheening and discolouration. If sheening or discolouration is observed in any of the watercourses, immediate consultation with the Environment Agency will be undertaken. Water samples of the Riddy

Brook and the River Cam (Granta) will be taken on a monthly basis and form part of the groundwater monitoring strategy.

14 Indicator Parameters

Indicator	Justification
Dicamba	This will ensure that soils have been treated, to protect Groundwater resources and human health.
Mecoprop	
Schradan	
Dichlorprop	
Bis(2-chloroethyl)ether	
Ethofumesate	
Hempa	
Vinyl Chloride	
4,6-Dinitro-o-cresol	
MCPA	
1,2-Dichloroethane	
4-Chloro-2-methylphenol	
Cyclohexanone	
Phenol	
Trichloroethane	
1,2-Dichlorobenzene	
Tetrachloroethene	
BTEX	
Simazine	
2,4,6-trichlorophenol	
Cis-1,2-dichloroethene	
Dimefox	
Offsite dust levels resulting from onsite work kept below 200mg/m^2/day	**Ensures that not fugitive Dust problems are created**
Background VOC levels (prior to and during excavation stage) Odour levels within criteria contained within TOX reports and IPPC H1 assessments.	**Ensure minimal impact on surrounding environs from odours.**

Groundwater monitoring for the above indicators pesticides, herbicides, BTEX, TPH (using T0 results taken from onsite boreholes prior to remediation works)	**Ensures that the remediation does not further impact on groundwater**
Observation and water sampling of Riddy Brook and River Cam (Granta)	**Ensures no impact on surface watercourses**
Noise levels kept to minimum on site	**Ensures that local residents will not be significantly affected by noise.**

15 Reporting of monitoring results

All monitoring results will be reported in a clear format and where applicable, alongside trigger levels. Due to the extensive amount of data expected, it will be kept electronically and backed up regularly.

Environmental monitoring reports will be provided to the Environment Agency in an electronic format on a monthly basis, as stipulated in the Environmental Permit (WMTL). Illustrating and reviewing the past months environmental monitoring data, examples of how the data maybe displayed are below:

Groundwater and surface water will be illustrated and report graphically using an Excel package.

Noise will be monitored daily and recorded in a spreadsheet in which daily and weekly averages can be estimated and clearly illustrated.

The twice daily engineers boundary monitoring will be recorded systematically in a spread sheet, available for inspection at any time.

Example of Long term Air monitoring, for each monitoring point.

Location: North Tube
Ref ****
Exposure Dates:
****.**.** - **.**.****
ATD TUBE VIA GC-MS. TOP TEN. CONVERTED TO PPB

					Exposure Limits Where Present			
					EH 40 ppb	**H1 ppb**	**Tox ppb**	**Lowest**
compound	***molec wt***	**conc ug.m3**	**ppm**	**ppb**	**ppb**	**ppb**	**ppb**	
Naphthalene	*128*	5.47	0.0010	0.96	100	93	0.53	0.53
1,2,4-trimethylbenzene	*120*	2.51	0.0005	0.47	25	233		25
Benzene	*78*	0.95	0.0003	0.27	10	5	0.91	0.91
2-methylnaphthalene	*142.2*	2.23	0.0004	0.35		None established		
p-xylene	*106*	3.55	0.0008	0.75	400	932	46.6	46.6
Toluene	*92*	2.7	0.0007	0.66	500	465	63.06	63.06
Pentadecane	*212.4*	2.94	0.0003	0.31		None established		
1-methylnaphthalene	*142.2*	1.83	0.0003	0.29		None established		
Tetradecane	*198.2*	237	0.0268	26.79		None established		
o-xylene	*106*	1.91	0.0004	0.40	400	932	46.6	46.6

Concentration Factor Based On Gas Constant *0.0224*

16 Pollution Control

Dust fibres and Particulates

If visible dust is generated on site dust suppression will consist of towed mobile bowser to wet down haul roads and areas of dust generation. Wetting of haul roads will be repeated as necessary during the day to mitigate dust generation. All crushing and screening plant will have the recommended dust suppression equipment installed upon it and will be in correct working order during its use, as stipulated in “Secretary of States Guidance for mobile crushing and screening plant (Process Guidance 3/16(04).
Personnel required to work in dusty environments will be required to wear dust masks to prevent the inhalation of fine particulates.

VOC’s/gases/aerosols

If voc’s, gases and odours are detected around the site, all current site activities will be reviewed and those with the potential to generate odour and or VOC’s will be suspended until odour assessment of the activity has been undertaken and mitigation measures have been appropriately applied.

Odour control measures will be employed to mitigate their impact on site workers and receptors beyond the site boundary, they will consist of some or all of the list below:

- Suspend excavation and or handing of odorous material

- The excavations and turning of contaminated soils will be lead by an Environmental Engineer who will monitor VOC and odour emission at the excavation face. He or she will advise the excavation team on how this material should be handled to best control its odour emission. He or she will liaise on a regular basis with the Engineers recording weather conditions and monitoring odour and VOC emissions around the site boundary to ensure the excavation is controlled as far as reasonably practicable

- Undertake two daily patrols as part of our monitoring regime of odours and concentrations off site. We will continue this and report them to the regulators as required.

- Maintain and operate the odour suppressant system around the perimeter of the site.

- The speed that contaminated material can be handled with regards to the management of odour has been identified, only one excavator will be used

to excavate the odorous contaminated soils from the main dig. Only under appropriate weather or site conditions will two or more excavators be permitted to excavate odours soils.

- The daily volume of contaminated soils excavated will be limited to a volume that is capable of being processed and covered in the same day. Odours materials will not be left in a stockpile overnight, the volume of freshly excavated contaminated material must be of a suitable volume that it can be covered at short notice to manage odours.

- Continuously highly odours soils excavated may be left in the excavation at depth in an area away from the receptors to allow the odours to dissipate, before hauling the materials to the treatment area.

- In order to react to any changes in weather condition it is integral to have an emergency mitigation measure cover system on standby, along with an appropriate level of staff to operate them effectively.

- We will install and operate mobile masking and neutralising systems focused solely on the freshly excavated materials to help concentrate abatement efforts at the source of the odours. This system will as closely as practicable follow the excavating plant around the working area, to ensure that each bucket of freshly excavated soils is doused to reduce odour generation. The proprietary mixture used attempts to neutralise and mask odours in much the same way as household fresheners work. Note that not all excavated materials will release odours upon excavation.

- At the end of the working day the excavation face will be sealed in with the back of the machine bucket to prevent odour generation overnight. An olfactory assessment will be conducted by the one of the Environmental Engineers at the excavation face, if significant odours are detected after sealing the excavation face, temporary covers will be placed on the excavation to reduce odour generation further. Temporary cover systems will be utilised to reduce odour generation at anytime they are required, in particular at the weekend.

- Non-working, odorous excavation faces will be covered.

- We will continue to monitor the weather (via our on site weather station) and site conditions closely and take due regard. Specifically on days where conditions are likely to or show evidence that odours may be transmitted off site working areas will be adapted appropriately turning beds which represent off site working areas will be adapted appropriately turning beds which represent lower risks of odour or in more appropriate positions on site for example.

- Any odorous treatment beds that have been uncovered and subjected to treatment and processing must be covered at the end of the day in order to control odour generation. All odorous treatment beds will be covered when not being turned to prevent the odour from this material being released uncontrollably. Covering of treatment beds will clearly only be effective should the odour be emanating from the static beds. However, this covering will have a detrimental and prolonging effect on the treatment process and will undoubtedly increase the complexity of the operation. As contaminant levels reduced in the windrows as a result of the treatment process, so does the potential to generate odours. Therefore material with low levels of contaminants may not generate odours thus not require covering and will significantly benefit from being exposed to allow drying of the materials.

- All odorous materials must be covered at all times during the treatment phase with the exception of construction and turning.

- Should we need to store any treated materials on site for extended periods post treatment due to operational restrictions, we will reduce the footprint (i.e. reduce the potential surface area for odour release) and seal the surface of the stockpile where required to reduce the potential for background odour from this material.

- As we need to turn odorous beds along any boundary they will only be turned when the wind direction and speed will allow for any odour dilution across the site, not directly over the boundary thus reducing the impact on residents in both Hauxton and Harston.

- Install a vapour extraction system, to remove voc's from odour generating material.

- Site personnel will be advised not to work in odorous areas, or will work up wind of the odorous material. If personnel have to work in and around odorous material they will be advised to wear organic vapour masks, to prevent the inhalation of voc/svoc's/ gasses/ aerosols.

Benzene poses the greatest risk to site personnel and general public beyond the site boundary using the EH40 value of 1ppm for Benzene inhalation during an eight hour working period.

If values recorded in the work place are above this value for all total VOC's measured on the PID, site personnel will be advised to wear protective organic vapour masks. Staff wearing protective mask will work within the tolerances the masks filter. If a constant value of 1ppm or above is detected at the site boundary the site activities generating this level of voc will be suspended to allow the voc's to dissipate and mitigation measures as above will be applied to the activity to

ensure total voc readings at the site boundary do not exceed 1ppm if the activity is to be continued.

19 Commissioning, operating and maintenance

All plant involved in the operations covered by the Mobile treatment Licence will be operated by certified personnel and installed to the appropriate industry standard. Certificates will be available on site for inspection for all operating plant.

Samples of material to be treated will be taken upon commencement of the works and during the works to ensure the plant is operating correctly, and not causing pollution to the environment, detriment to the amenity or harm to human health.

The previously discussed environmental monitoring procedures will also ensure that the plant operations will not causing pollution to the environment, detriment to the amenity or harm to human health.

All operating plant will have weekly maintenance checks by trained operators, and records will be kept on site for inspection, any default identified with the plant will be corrected immediately before the plant is used under the conditions of the MTL.

21 Control of Noise.

To minimise the impact of noise from the site activities, the treatment plant will only operated during the working hours specified in the planning conditions. All plant will be fitted with noise reducing exhausts, and baffles. A solid wooden panel fence will be erected which will reduce site generated noise levels off site, as much of the boundary trees and vegetation will also remain during the works, to also baffle and absorb site generated noise.

From a Noise Impact Assessment carried out by Spectrum Acoustic Consultants (October 2006) Back ground noise levels have been generated around the site, the main source of noise is currently from the A10, Cambridge road. The report classifies the land next to the A10 as Noise Exposure Category C, giving an equivalent average sound level of 63-72 dB during the day (0700-2300). This range will be considered as the site background and the daily average will not exceed the upper limit.

Noise will be monitored twice daily as part of the engineer’s boundary monitoring, average noise levels will be recorded at the eight compass points beyond the site boundary, in public access areas.

If there is a significant exceedance above the background noise level and associated complaints are received from 3rd parties the site manager will take measures to reduced site generated noise levels by either: reducing the amount of plant on site, areas in which noise emitting plant is working, or restricting the hours of certain activities.

22 Control of Odours and VOC's

Due to the type of materials present and based upon significant experience of working upon similar sites, it is possible that some odour may be perceptible during excavations and processing and have the potential to migrate beyond the site boundary. Odours will be monitored on a daily basis and recorded on the odour assessment form, as stipulated in section 13 monitoring plan.

Monitoring will be undertaken twice daily during excavation works or if excessive odours are noted. If complaints are received following excavations, detailed assessment of the complaint justification may be required to assess the magnitude and nature of the impact.

Should odours be detected at the site boundary or complaints are received the following mitigation measures will be adopted:

Highly odorous or volatile emitting soils	LEVEL 1. Wastes producing significant odour or elevated PID readings (1ppm) at 10m from waste will be monitored to ensure migration of VOC and odours does not occur. LEVEL 2. Wastes producing significant odour or elevated PID readings (1ppm) at 100m from waste will be examined and an odour abatement system such as temporary covers, odour neutralisation sprays/mist will be deployed. LEVEL 3. Wastes producing significant odour or elevated VOC at the site boundary closest to residential or occupied property will be covered or an odour control misting/spraying system will be employed to ensure that a nuisance odour does not occur.

The full list of mitigation measures are previously listed in Section 16 Pollution Control.

In-situ remediation off-gas will be treated either through a biological filter or an activated carbon filter media. Air exhausting through the system will be regularly checked by PID and olfactory methods to ensure that the media is not spent. The area subjected to air sparging and vapour recovery will be sealed with a suitable HDPE membrane, with the unsaturated zone being subjected to negative pressure and constant active vapour recovery.