



**AN APPLICATION FOR AN ENVIRONMENTAL PERMIT  
TO AUTHORISE THE DEPOSITION OF WASTE ON  
LAND AS A RECOVERY ACTIVITY IN ORDER TO  
RESTORE AREA Z AT THE ROXWELL QUARRY  
COMPLEX, ESSEX**

**HYDROGEOLOGICAL RISK ASSESSMENT (HRA)  
REPORT**

Report reference: TAR/AZ/AW/5513/01/HRA  
January 2019



Technical advisers on environmental issues

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## 1. Introduction

- 1.1** MJCA is commissioned by Tarmac Cement and Lime Limited (Tarmac) to prepare a hydrogeological risk assessment (HRA) report to support an application for a bespoke Environmental Permit (EP) for the deposition of waste on land as a recovery activity to restore Area Z (the site) at the Roxwell Quarry Complex, Essex. The site location and the EP boundary are shown in green on Figure ESSD 1 and Figure ESSD 2 presented in the Environmental Setting and Site Design (ESSD) report.
- 1.2** The HRA is based on the hydrogeological conceptual model presented in the ESSD report. Details of the environmental setting of the site, the geology and hydrogeology, the development design, the history of the site, potential contamination migration pathways and receptors are described in the ESSD report. The structure of the HRA is based on a template produced by the Environment Agency for proposed landfill sites entitled “Hydrogeological Risk Assessment Report” Version 1 dated March 2010. As the proposed development comprises a waste recovery activity rather than a landfill disposal operation not all sections of the template are relevant although the general structure has been followed.

## 2. Hydrogeological risk assessment

- 2.1** The hydrogeological risk assessment is undertaken based on the relevant guidance presented on the .GOV.UK website<sup>1</sup>. Information on the geology, hydrology and hydrogeology of the site is presented in the ESSD report. The information is used in the ESSD report to identify the relationships between the source, pathways and the identified potential receptors.
- 2.2** There is a shortfall of material to achieve the benefits provided by the restoration of the site. It is necessary to import approximately 58,000m<sup>3</sup> of material comprising between 53,000m<sup>3</sup> and 58,000m<sup>3</sup> of inert material and up to a maximum of 5,000m<sup>3</sup> of bio-solids to supplement 3,640m<sup>3</sup> of material currently available at the site. This permit application is relevant to the importation of the inert material to the site. Based on an assumed density of the placed material of 1.7 tonnes/m<sup>3</sup> 58,000m<sup>3</sup> of inert material is equivalent to 98,600 tonnes. The total quantity of waste that will need to be deposited to complete the restoration scheme is limited by the final levels shown on the restoration plan at Appendix ESSD C.
- 2.3** The acceptance at the site of inert waste materials will be the subject of waste acceptance procedures which are implemented through the externally certified Environmental Management System (EMS). As explained in the ESSD report the use of bio-solids on agricultural land is subject to control under legislation through the Sludge (Use in Agriculture) Regulations 1989 (as amended) together with The Code of Practice and guidance provided on the GOV.UK website<sup>2</sup>. Bio-solids will be applied consistent with the relevant requirements and subject to the method statement prepared by the supplier of the bio-solids.
- 2.4** The waste materials that will be deposited at the site will comprise imported inert materials. Precipitation infiltrating the imported inert waste materials may migrate to groundwater in the sand and gravel. The groundwater in the area of the site and the surface water bodies including the River Can are potential receptors for the migration of contaminants present in the waste.

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<sup>1</sup> <https://www.gov.uk/guidance/waste-recovery-plans-and-permits>

<sup>2</sup> <https://www.gov.uk/guidance/managing-sewage-sludge-slurry-and-silage>

- 2.5** Based on the definition specified in Council Directive 1999/31/EC<sup>3</sup> inert waste comprises:

*“...waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegradable or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to health.”*

- 2.6** The waste types which will be accepted are presented in Table 1 of the approved Waste Recovery Plan (WRP). The EA guidance<sup>4</sup> states that these waste types may be acceptable without testing. On this basis it is considered that the waste does not comprise a contaminant source with the potential to have a significant detrimental effect on groundwater quality.

- 2.7** Furthermore, waste acceptance procedures will be in place to minimise the risk that unacceptable waste materials are accepted at the site and procedures will be in place for the rejection of non-conforming loads. No wastes will be accepted from contaminated sites. Because robust waste acceptance procedures will be implemented the uncertainty with regard to the presence of contaminants in the waste deposited will be low.

- 2.8** As the restoration materials imported to the site will comprise inert waste only, the water that has percolated through the waste mass is highly unlikely to contain discernible concentrations of hazardous substances and on this basis the concentrations of hazardous substances in groundwater at a relevant compliance point located down hydraulic gradient of the site also will not be discernible. The inert waste deposited at the site is highly unlikely to contain significant concentrations of non-hazardous substances which could give rise to pollution of groundwater. Based on the hydrogeological setting, the waste types that will be accepted and the waste acceptance procedures it is concluded that there is a negligible risk of unacceptable impacts on groundwater or surface water quality. Consistent with the information presented in the ESSD no attenuation layer, sealing liner or capping system will be

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<sup>3</sup> Council decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC(2003/33/EC).

<sup>4</sup> <https://www.gov.uk/guidance/waste-acceptance-procedures-for-waste-recovery-on-land>

necessary. It is concluded that there will be no significant risks to human health or to the environment from the proposed development.

### 3. Conclusions

- 3.1** Based on the hydrogeological risk assessment presented in this report it is considered that there is no significant risk from the proposed deposition of inert waste to groundwater quality in the vicinity of the site. Based on the environmental setting and the inert nature of the waste materials that will be deposited active long term site management will not be necessary in order to prevent long term groundwater pollution.
- 3.2** Waste acceptance procedures will be implemented to minimise the risk that non-inert wastes will be deposited at the site. It is considered that there will be no significant risk to groundwater or surface water bodies in the vicinity of the site.