

5.4.20 No asbestos was observed in any excavations, and none was detected in the fill samples analysed. The report issued by Wilbourn Associates (Appendix 5.2) states that no asbestos was encountered in 21 samples that were subject to laboratory analysis. However, they report that asbestos fragments were encountered in four trial pits.

Landfill Gas

5.4.21 A considerable volume of information is available on the landfill gas production at the Turner Road site^{22,23,24,25,26,27}.

5.4.22 Although the waste can be considered old (pre-1965), methane and carbon dioxide are still being produced. Wood may well be the main source for anaerobic decomposition and this material is known to be slow to decompose. The flow of landfill gas is likely to be low and will reduce with time but generation could go on for 50 years and there is sufficient potential for the gases to accumulate in voids and building spaces to warrant precautions to be incorporated in the development design. Concentrations in excess of 50% methane and 20% carbon dioxide are still being recorded on Turner Road.

5.4.23 Landfill gas may be explosive where methane levels fall within the range of 5 - 15% by volume - the lower and upper explosive limits respectively (LEL and UEL). Below the LEL it may still be flammable. Landfill gas may also constitute an asphyxiant hazard in enclosed spaces. In the ground, gas protection measures should be considered necessary where the concentration of methane exceeds 1% by volume in air.²⁸

5.4.24 Carbon dioxide is an asphyxiant that has the potential to collect in closed spaces- cellars, manholes etc. The short and long term exposure limits are 1.5% and 0.5% by volume respectively. The Building Regulations 1991 indicate that specific design measure for the exclusion of carbon dioxide from buildings should be considered when concentrations in the ground exceed 1.5% v/v and are required where the concentrations in the ground exceed 5%

5.4.25 As was relevant for water movement, the fact that the site has not been lined means that the sandstone and/or sand particularly where it is fissured, may facilitate migration of gases off site.

5.4.26 In addition the old tip may well extend under Turner Road at the south-east corner allowing migration off site. Adjacent sand quarries may offer a further route for gas migration.

Sandstone Bedrock

5.4.27 All analytical data for materials underlying the fill were below relevant reference levels for all determinands analysed.

Groundwater

5.4.28 None of the boreholes constructed as part of the recent site investigations encountered groundwater. Samples were obtained from two existing monitoring wells located within the north-eastern corner of the site. Results from this analysis show only slight elevations of calcium, magnesium sulphate, nitrite, manganese and 2 PAH compounds. These boreholes are located in what is believed to be the highest point of the hydraulic gradient within the site.

²² MJ Carter Associates 11-11-94 Report on Landfill Gas Survey for Bassetlaw DC.

²³ Biffa Waste Services 1995 Report No 9185 Drilling Works for Bassetlaw DC

²⁴ Biffa waste Services 1995 Report No 9185a Sampling and Monitoring Interpretation

²⁵ Colin Gibb 1998 Gas production/Migration report Bassetlaw DC

²⁶ Peter Cole Consultants 1998 Site Investigation report for North Notts. College New Centre

²⁷ Wilbourn Associates 2002 Report on Land Quality

²⁸ CIRIA 1995 Report 149 Protecting Development from Methane

Table 5.5 - Impact Significance Framework - Turner Road

Impact Item	IMPACT IDENTIFICATION - ENVIRONMENTAL HAZARD - PATHWAY - RECEPTOR			IMPACT EVALUATION			IMPACT MANAGEMENT & REDUCTION MEASURES		
	Source	Impact event/scenario and hazard pathway	Receptor	Likelihood of event/scenario	Severity of event/scenario	Impact significance rating	Current situation	Development Scenario	Mitigation required?
1	Development on a landfilled sand quarry	Migration of landfill gases (methane, carbon dioxide etc) into new buildings and voids presenting, at worst, an explosion or asphyxiation hazard.	Human beings, building property	3	3	Major	Landfill gas currently vents passively to atmosphere through the landfill surface at sufficiently low concentration to present minimal hazard.	Hard cover development will dramatically change the migration routes of landfill gas and potentially force gas horizontally rather than vertically creating the potential for impact on surrounding properties	Yes
2		Migration of landfill gases (methane, carbon dioxide etc) into adjacent buildings and voids presenting, at worst, an explosion or asphyxiation hazard.	Human beings, building property	3	3	Major	Landfill gas currently vents passively to atmosphere through the landfill surface at sufficiently low concentration to present minimal hazard.	Hard cover development will dramatically change the migration routes of landfill gas and potentially force gas horizontally rather than vertically creating the potential for impact on surrounding properties	Yes
3		Vertical leaching of waste contaminants to groundwater within the Sherwood Sandstones	Ground-water	1	3	Moderate	Rainfall has percolated through the landfill mass for up to 70 years. The leachability of contaminants within the fill is limited.	Hard cover development will significantly reduce volume of water entering the fill.	Enhancement