

HYDROGEOLOGICAL RISK ASSESSMENT V3-ADDENDUM

Bespoke Permit Application for discharge to surface water

The Environment Agency has requested that the following is undertaken; "an assessment of the long term risks posed by the site following groundwater rebound should the adjacent abstraction cease". This should address the risk to groundwater from direct discharge of hazardous substances and non-hazardous pollutants.

Currently groundwater is abstracted from the adjacent FCC Colsterworth Landfill via a permanent groundwater drain, set at 110.5 m AOD, installed around the periphery of Phases 1 to 4 east and down gradient of Colsterworth Triangle. Groundwater is directed to a sump to the west of Phase 4 and is pumped to header lagoon and allowed to overflow to three soakaway lagoons located along the FCC site's southern boundary. This dewatering commenced prior to 2007 and the site is understood to have received its first waste in 1995 whilst mineral extraction was on-going in the west of the site.

Mineral at the FCC site is extracted to the top of the Lias clay (111-113 m AOD) in Phases 5 and 6 and to greater depth further east in Phases 1 to 4. Its landfill liner benefits from groundwater sidewall drainage which connects any groundwater from within the Lincolnshire Limestone and Northampton Sand aquifers. This has now been represented on the schematic cross section, Drawing 3601/HRA/11 v3.

The main sidewall drainage is linked to the perimeter groundwater drain (at 110.5 m AOD). Phases 5 and 6 will be constructed with 'county rock' buttress walls. The 2020 HRA for the FCC Landfill by Sirius Environmental Ltd states that this, sidewall material will be granular in nature hence an engineered sidewall drainage layer is not required.

The result of this engineering around the FCC Landfill is that the Lincolnshire Limestone and underlying Northampton Sand aquifers are effectively connected by a granular fill layer on all sides of the FCC Landfill and linked to the perimeter groundwater drain set within the Lias clay approximately 3 to 5 m lower than the base of the Northampton Sand surrounding Phases 5 and 6 of the FCC Landfill.

Available groundwater level monitoring data extends back to 1999. Data for the Lincolnshire limestone is sparse as most boreholes record water levels in deeper aquifers. However borehole 1/90 located on the northeastern boundary (now east) of Colsterworth Triangle recorded groundwater level variation in the limestone aquifer only. The recorded elevations show seasonal variation until approximately spring 2001. These levels varied between summer lows of approximately 122.7 m AOD (a single value of 119.9 m AOD was recorded in February 2004 however this is considered erroneous) and winter highs of approximately 123.4 m AOD with an extreme highs up to a maximum of 123.7 m AOD. It is reasonable to expect that these elevations are unlikely to pertain post cessation of FCC dewatering due to interconnection of the aquifers as a result of the granular sidewall drainage layer, permeable buttress wall and groundwater drain surrounding the FCC landfill, immediately down gradient of the site. As a result of this and the extensive historical Ironstone workings an averaged groundwater table between the Northampton Sand and the Lincolnshire Limestone is considered likely, together with a permanent lowering of the watertable in the Upper Lincolnshire Limestone aquifer. Historical monitoring generally indicates an unsaturated zone existed within the residual Northampton sand Aquifer.

Colsterworth Triangle is located within an 'Island' of residual natural strata. Recharge to the Lincolnshire Limestone surrounding the site occurs upgradient of the site in an area restricted by topography (dry valley to west and Cringle Brook to the north as well as former ironstone workings). The approximate likely maximum zone of the recharge to the site is indicated on Drawing 3601/HRA/12 as appended. This equates to an area of 14.4 hectares. Groundwater, post-dewatering, will predominantly flow to the east towards the River Withan. This likely flow path is also shown on Drawing 3601/HRA/12 and comprises approximately 148 ha of which 127 ha is either FCC Landfill or historical iron workings.

Due to the very small recharge zone and the impact of adjacent landfill engineering and former ironstone workings it is considered unlikely that groundwater levels surrounding Colsterworth Triangle will rebound to above the top of the Northampton Sand aquifer/base of Grantham Formation.

08/01/25