

Tetron Contracts Ltd
Middleton Quarry, Pollington

**Conceptual Model, Environmental Setting
and Site Design Report**

Job No 163407/ESSD

July 2024



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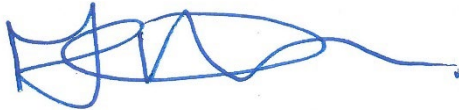
Report for

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**Middleton Quarry
Heck & Pollington Lane
Pollington
East Riding
Yorkshire**

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Issue Date**Issue**

July 2024

FINAL

Document Reference

163407/ESSD

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1.0 INTRODUCTION

Report Context

- 1.1 Middleton Quarry will be operated by Tetron Contracts Ltd (hereafter referred to as the Operator). The site is a disused sandstone quarry, having been left a damaged landscape with areas unsafe to access.
- 1.2 The site location plan is shown on drawing 163407/D/001. Plans showing the site in relation to surrounding land uses, cultural and natural heritage, and sensitive receptors are shown on 163407/D/002, 163407/ESSD/D/001 and 002. The topography of the existing quarry void is shown on 163407/D/004.
- 1.3 This Conceptual Model, Environmental Setting and Site Design (ESSD) report has been prepared by AA Environmental Limited, on behalf of Tetron Contracts Limited, in support of the bespoke inert landfill permit application, in order to restore the site to former land levels to preserve safety and provide long-term stability within the site and to the surrounding area.
- 1.4 Details of the latest proposed contours are presented in drawings 163407/D/005 and CS/D/001-002.

Site Details

- 1.5 The site is located in the village of Pollington in the East Riding of Yorkshire and can be accessed from Heck and Pollington Lane to the north. The site is located approximately 12 km west of Goole and 14 km north of Doncaster. Originally an opencast quarry for the extraction of sand and gravels. The main quarry void remains open and comprises unrestored quarry workings, with an undulating surface and some steep embankments. The site location is shown on 163407/D/002 & 163407/D/003.
- 1.6 The site is centrally located at SE 61203 20090. The total landfill volume required is 853,800 tonnes – split between circa 111,000 tonnes of geological barrier, 697,000 tonnes of inert waste soils and 46,800 tonnes of restoration soils. The site details are presented in Table 1.1.

Site National Grid	SE 61201 20073
Applicant and Operator	Tetron Contracts Limited
Agent	AA Environmental Limited
Application Type	Inert Landfill
Area	5.17 hectares
Access	Heck and Pollington Lane
Total Proposed Permitted volume	426,900 m ³ (853,800 tonnes)
Land use	Public amenity area (proposed land use subject to Planning Permission)
Surrounding Land use	The site is situated in a largely agricultural setting, with industrial and residential uses scattered in the wider surroundings. A public water supply borehole is located 20 m north of the site, which is within SPZ1.

- 1.7 The historical maps show that the site was first developed between 1948 and 1956 for the quarrying of sand and gravel. The site remained an unrestored quarry until present day, with some infilling/historic landfill on the north-east. The historical maps show sand quarries to the east and west of the site, with gradual industrial development (incl. an airfield, depot, water station and unspecified works) to the north of Heck and Pollington Lane in the mid to late 1980's, and a cement works east of Pollington village. Pollington village has been established since at least 1890, with gradual residential and commercial development since. The historical maps are shown in Appendix A, and a detailed breakdown of the historical on and off site uses are provided in Section 2 of the DQRA (Appendix B).

- 1.8 The ground level on Heck and Pollington Lane is around 14 to 15 m Above Ordnance Datum (AOD) and drops to around 7 m AOD on the southern boundary. Within the quarry void, sand has been extracted to a maximum of -5 m AOD in the south.
- 1.9 The site is bound by 2 m high mesh security fencing with a lockable security gate off Heck and Pollington Lane. The site is also bounded by heavy mature vegetation.
- 1.10 The site setting in relation to potential local environmental receptors is shown on drawings 163407/D/002 and 163407/ESSD/D/001-2 and shown in Table 1.2 below.

Receptor ID	Description	Sensitivity	Distance from operational site
Residential			
1	a) Dwelling off Heck and Pollington Lane	High	145 m north east
	b) Pollington Residential Area (south)		From 20 m south east
	c) Highfield Residential Area	Medium	From 585 m north north east
	d) Pollington Residential Area (east)		From 850 m east
Commercial			
2	a) Gowdall Lane Business Park	Medium	From 735 m north north east
Industrial			
3	a) Unknown	Medium	From 15 m north
	b) Marshalls Civils & Drainage/ Marshalls CPM		From 155 m east
	c) Heck and Pollington Lane Industrial Estate	Low	From 115 m west
	d) D M Cranes & Burgess Pet Care		From 775 m north north east
Agricultural			
4	a) Agricultural Land	Low	From 5m (all directions)
Educational			
5	a) Pollington Balne C Of E Primary School	Medium	From 675 m south
	b) Pollington Preschool		From 700 m south
Recreational			
6	a) Pollington Cricket Ground	Medium	From 195 m south east
	b) Pollington Playing Fields		From 535 m south east
Solar Farm			
7	a) Solar Farm	Low	From 435 m north west
Watercourse			
8	a) New Fleet Drain	Low	From 450 m south
Ecological			
9	Priority Habitat (Deciduous Woodland)	Low	On-site
	Priority Habitat (Traditional Orchard)		0 m east
	Priority Habitat (Deciduous Woodland)		10 m north
	Priority Habitat (Traditional Orchard)		185 m south east
	Priority Habitat (Deciduous Woodland)		375 m north west
	Statutory Designated Sites		No statutory designated sites within 1 km.

2.0 SOURCE TERM CHARACTERISATION

The Development of the Site

Historical Development

- 2.1 The site was originally an opencast quarry for the extraction of sand and gravels, the area immediately north east of the site later became filled with an unauthorised waste deposit in the early 2000's. The main quarry void remains open, and comprises unrestored quarry workings with an undulating surface and some steep embankments. The site boundary and layout is shown in 163407/D/002.
- 2.2 The extraction had left a damaged landscape, with areas unsafe to access and is no longer practical to use. There are also some areas of known historic waste which will be treated and remediated in accordance with a Mobile Plant Licence. This is further detailed in the Detailed Qualitative Risk Assessment (Contaminated Land) (AAe, April 2021) (shown in Appendix D). This report is for information only and is in draft status as part of the support documents of the Planning application.
- 2.3 The Envirocheck Report (presented in Appendix A) shows the entire site to be a Registered Landfill. The licence has lapsed/been cancelled, and it is not clear if any waste was deposited. The licence was held by CF Harris Limited. The north-eastern area of the site is a registered Historic Landfill called Middleton Quarry, operated by CF Harris Limited. Inert materials were accepted at the site between 01 January 1983 and 31 December 1993.
- 2.4 There are two Substantiated Pollution Incident Register entries relating to the site. Registered in December 2008 and January 2009, involving construction/demolition materials and commercial waste causing a significant impact to land. This is believed to relate to the unauthorised waste deposit to the north-east of the site. Appendix B shows an investigation on the historic waste on the site.

Proposed Development

- 2.5 It is proposed that the quarry should be reinstated to former land levels. The revised scheme would entail the total permitted import of about 348,500 m³ (697,000 tonnes) of inert waste materials. The cell's geological barrier will be constructed progressively in advance in the infilling.
- 2.6 A plan and cross-sectional diagrams of the existing topography on site are shown on 163407/D/005 and 163407/CS/D/001 and 003.
- 2.7 The proposed revised restoration levels have consequences on the approved drainage design therefore this has been updated and is presented in drawing 163407/D/008.
- 2.8 Details of the restoration design and associated conceptual model and risk assessments are provided in the following reports:
- Hydrogeological Risk Assessment (1763-HRA-01), (McDonnell Cole, July 2024);
 - Landfill Gas Risk Assessment (163407/LFGRA)(AAe, July 2024)
 - Noise Management Plan (163407/NMP), AAe (July 2024);
 - Dust Emissions Management Plan (163407/DEMP), AAe (July 2024); and
 - Stability Risk Assessment (ASL, January 2023).
- 2.9 The inert waste will be covered with restoration soils and all geological barrier will be constructed in accordance with Construction Quality Assurance (CQA) Strategy Plan. The site will drain via gravity to an attenuation pond to soakaway based in the surrounding natural sandstone deposits.
- 2.10 The land formation will be constructed with inert waste only. The proposed landfilling is not anticipated to create leachate.

- 2.11 Only inert waste conforming to the 'The Landfill Tax (Qualifying Material) Order 2011' will be imported to restore the site and any imported material will be tested in line with Environment Agency guidance to ensure it complies with the inert standards and the Inert Landfill guidance.
- 2.12 The proposed final landform is shown on 163407/D/005. The site will be raised to the same existing ground level as the land surrounding the site.
- 2.13 The restoration phase (including the restoration soils) will be undertaken in accordance with the Closure & Aftercare Management Plan (July 2024).

Site Engineering

Groundwater Management

- 2.14 The groundwater level at the site is located between circa -5 m below OD to -15 m below OD. The highest groundwater level is typically recorded in BH201 which is downgradient with respect to the site, and the lowest groundwater level is typically shown in BH204 which is upgradient of the site and within the SPZ1. It is considered likely that the pumping station north of the site influences the depth of groundwater recorded in BH204.
- 2.15 Up gradient and down gradient groundwater monitoring is undertaken within the 4 boreholes which were initially installed around the boundaries of the main landfill site (BH201 – BH204). All monitoring wells are shown on drawing 163407/D/006.
- 2.16 The boreholes have been monitored 12 times prior to the submission of this planning application. The groundwater monitoring data are further discussed in the Hydrogeological Risk Assessment (within the wider permit application). These boreholes will be sampled quarterly (from the start of infilling) during operation. Once the site has been infilled, this frequency will be reviewed with the Environment Agency. Groundwater quality monitoring parameters are set out in the Hydrogeological Risk Assessment.

Basal Lining System

- 2.17 The proposed design includes for a geological barrier of 1 m thickness and to a hydraulic permeability of no greater than $1 \times 10^{-7} \text{ ms}^{-1}$. Proposed designs are shown on 163407/D/004.
- 2.18 The base of the geological barrier within the cell will be placed no lower than 0 m AOD, which is more than 4 m above the known groundwater level. The range in thickness of waste above the barrier is from 8 – 12 m thick.
- 2.19 The geological barrier will be constructed and tested in accordance with the EA's inert landfill guidance and an approved CQA Strategy Plan (this will be submitted to the EA once the permit has been approved).
- 2.20 The Flood Risk Assessment (shown in Appendix C), was completed as part of the supporting documents for the planning application for the site provides details of the long-term surface water management for the restoration. For further information refer to the Hydrogeological Risk Assessment.

Side Slope Lining System

- 2.21 The side slopes lining will be the same as the geological barrier. The side slopes will be built using a 1:3 gradient.
- 2.22 A Stability Risk Assessment for the restoration design is set out within the wider permit application documents.

Capping System

- 2.23 There is no capping system proposed in accordance with the EA's inert landfill guidance.

Restoration and Aftercare

- 2.24 The final restoration scheme has been summarised above and is shown on 163407/D/005 and 163407/CS/D/001 to 003. For further details refer to Closure & Aftercare Management Plan (163407/CAP).

Leachate Management and Monitoring Infrastructure

Leachate Generation

- 2.25 No leachate control or monitoring is required.

Leachate Management and Monitoring

- 2.26 No leachate management and monitoring system is required.

Landfill Gas Management and Monitoring Infrastructure

Landfill Gas Generation

- 2.27 Due to the inert (low organic content) nature of the material to be imported the risk that ground gas will be generated in significant quantities is considered very low.
- 2.28 The waste material will be subject to pre-acceptance procedures ensuring low organic content and it will be placed in an engineered manner, reducing void space and ground gas.
- 2.29 For landfill gas management, monitoring and infrastructure, please refer to the Landfill Gas Risk Assessment (AAe, July 2024).

Surface Water Management System

- 2.30 For further details, please refer to the Flood Risk Assessment (shown in Appendix C) and the Hydrogeological Risk Assessment (163407/HRA).

Post Closure Controls

- 2.31 Due to relatively simple, single cell design of the proposed restoration landform on site, the likelihood for degradation or failure of management systems, swales, soakaways and liners are considered to be low.
- 2.32 Following completion, the requirement for, and frequency of, groundwater monitoring post closure will be agreed with the Environment Agency in the Closure & Aftercare Management Plan.
- 2.33 The ground level across the site will be surveyed annually to demonstrate that the site is stable. This will include designated stations within the restored soils.
- 2.34 The conceptualisation of management measures and technical controls throughout the lifecycle of the active landfilling restoration are outlined in Table 2.2.

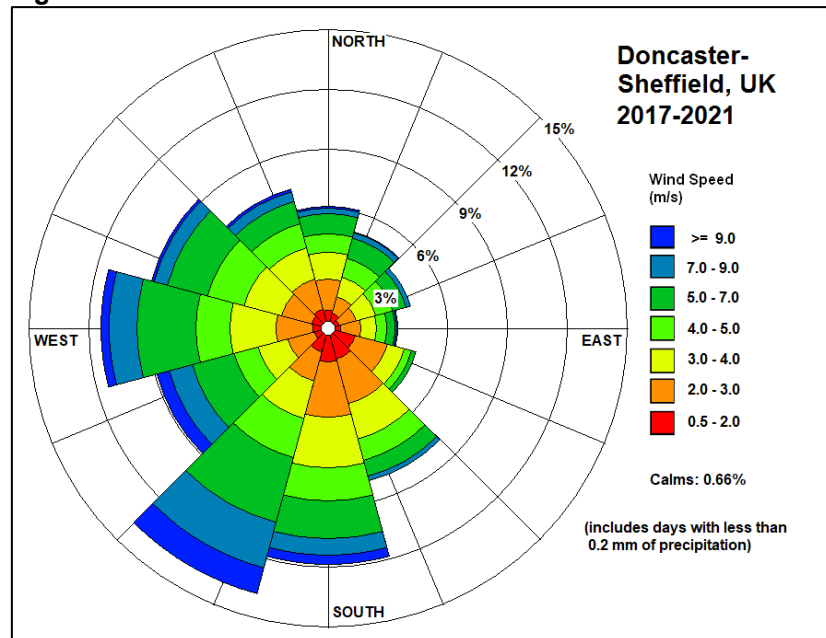
Table 2.2 Management measures and technical controls					
Landfill Phases	Leachate Management	Landfill Gas Management	Groundwater Management	Containment System (Geological Barrier)	Restoration level / site drainage
During Site Restoration (Active)	No leachate management required.	Refer to the Landfill Gas Risk Assessment.	Quarterly monitoring during operation. Refer to the Hydrogeological Risk Assessment.	Completion of barrier to ensure 1 m thickness coverage, $<1 \times 10^{-7}$ ms ⁻¹ permeability in accordance with CQA Strategy Plan.	CQA of permanent site drainage. Temporary earthworks drainage required. Surveying / setting out during construction.
Closure and Aftercare Period	No leachate management required.	Refer to the Landfill Gas Risk Assessment.	Refer to the Hydrogeological Risk Assessment.	None required	Annual settlement survey and site inspection.

3.0 PATHWAY AND RECEPTOR TERM CHARACTERISATION

Air quality / climate

- 3.1 The operating controls during the restoration are set out in the Dust Emissions Management Plan (163407/DEMP).
- 3.2 Neither the site nor the surrounding land is an Air Quality Management Area (AQMA).
- 3.3 The frequency of exposure and likelihood of any fugitive emissions on sensitive land uses is determined by the magnitude of release, proximity of receptors and prevailing meteorological conditions.
- 3.4 Meteorological wind data for five years, has been acquired from ADM Limited. The wind data has been taken from the Met Office Station in Doncaster-Sheffield, which is approximately 23 km south of the site. The prevailing wind direction is from the west south west. This is considered representative of the conditions at the site.

Figure 1. Doncaster - Sheffield Windrose



Geology

- 3.5 The Envirocheck Report shows the site to have no superficial geology. There are superficial deposits of the Lacustrine Beach Deposits (sand and gravel) at the site's boundary where ground is undisturbed by quarrying activities. The superficial deposits are expected to have been removed from the site during quarrying activities. The underlying bedrock geology is of the Sherwood Sandstone Group (Sandstone).
- 3.6 The ground level on Heck and Pollington Lane is between 14 m AOD and 15 m AOD and falls to 7 m AOD at the southern boundary. The base of the quarry void typically varies between 1 and 5 m AOD, with the maximum depth recorded at -5 m AOD. There is residual sandstone outcrop at the centre of the site
- 3.7 Previous site investigations at Middleton Quarry are listed below and copies can be found in Appendix B and D:

- Slingsby Plant Hire Ltd, Pollington Site Investigation: Phase 1 Laboratory Testing and Review, ref. CE-POL0231-RP01 dated April 2010; and
 - AA Environmental Ltd, Detailed Quantitative Risk Assessment (Land Contamination), ref. 163407/DQRA/001I dated 30th April 2021 (this includes AAe SI data from 2017 and 2020).
- 3.8 The Slingsby Plant Hire investigation included the excavation of 5 trial pits, excavated to depths between 2.1 m and 2.8 m. The investigation was limited to a section of the north of the site along Heck and Pollington Lane, land associated with the unauthorised deposition of waste. The trial pit locations are not provided.
- 3.9 Strata encountered was typically a gravelly sandy clay (with varying proportions of sand and gravel), with anthropogenic material comprised of plastic, concrete, brick, glass, timber, rootlets and reinforcement bar. Asbestos Containing Materials were identified during a site walkover but were not identified during the trial pit excavation. Soil analysis, and water analysis of pooled surface water were undertaken.
- 3.10 The 2017 AA Environmental Ltd investigation included 10 trial pits (TP101-TP110) to provide initial characterisation of the unauthorised waste deposits in the north east of the site.
- 3.11 The 2020 AA Environmental Ltd investigation included the excavation of 6 trial pits (TP201-TP206) to further characterise and refine the extent of the unauthorised waste deposits, one soakaway (SA201) to determine the infiltration rate of the underlying soils; and the installation of 4 gas and groundwater monitoring boreholes (BH201 and B204) to facilitate monitoring.
- 3.12 The geology encountered generally comprised of the unauthorised waste between 3.5 to 5.0 m thick, overlying the Sherwood Sandstone Group; the wider site to be covered by Made Ground/topsoil overlying the Sherwood Sandstone Group; some areas to be exposed natural sandstone of the Sherwood Sandstone Group.

Man-made Subsurface Pathways

- 3.13 Other than the quarry extraction activities and existing void, there are no reports of any other man-made sub-surface pathways at the site, such as drains or pipes.

Hydrology

- 3.14 There are no surface waters within 500 m of the site. The nearest is a surface water lagoon located circa 505 m south east of the site within the boundary of the adjacent concrete contractors site. The next nearest is the New Fleet Drain North circa 550 m south of the site, with the Knottingley and Goole Canal parallel to the drain at 590 m south of the site.
- 3.15 The site is located in Flood Zone 1 (which is all the land that falls outside of Zones 2 and 3). Areas in this flood zone have the lowest probability of flooding from rivers and the sea and the chance of flooding in any one year is less than 0.1% (i.e. less than 1 in 1,000 year chance). Further detail on flooding is provided in the Environmental Risk Assessment. The nearest area of flood zone is circa 200 m downgradient and south of the site boundary.

Hydrogeology

Aquifer Characteristics

- 3.16 The Sherwood Sandstone is a Principal Aquifer. The groundwater levels have been monitored between -5 m AOD in the southwest falling to -15 m in the north-east. The groundwater level deepens towards the off-site abstraction borehole to the north-east. It is anticipated that there is high-flow conditions through the Sherwood Sandstone. The superficial deposits surrounding the site are classified as a Secondary 'A' Aquifer.

3.17 The site is located within a Nitrate Vulnerable Zone (NVZ). The entirety of the site is within SPZ 2, with the exception of the very southwestern corner.

Groundwater

3.18 The site walkover shows that groundwater has emerged at the very base of the quarry, where the ground level is measured at -5 m AOD.

3.19 The site investigation (undertaken by AAe, January 2017) included the installation of groundwater monitoring facilities. The groundwater quality, flow and compliance points are addressed in the Hydrogeological Risk Assessment.

Surface Water

3.20 The surface water from the landfill area will discharge to ground via soakaways into the natural sandstone.

Landfill Gas

3.21 Aftercare monitoring will be undertaken on a quarterly basis for 2 years to confirm that biodegradable waste has not been accepted at the site.

Loss of Amenity

3.22 The nearest residential properties are located directly south of the site as shown on 163407/D/003. In the event of uncontrolled fugitive dust emissions there is a risk of loss of amenity to affected residents.

3.23 A Dust Emissions Management Plan has been developed in support of the permit application. Full details of the mitigation and monitoring during the restoration of the quarry are set out in the Dust Emissions Management Plan (163407/DEMP).

3.24 Full details of the assessment and potential noise impacts and mitigation measures have been provided in the Noise Management Plan (163407/NMP).

Habitats

3.25 There are no statutory ecological designations (e.g. SSSI, Special Protection Areas or Special Areas of Conservation) within, covering or immediately surrounding the site.

3.26 The site itself contains Priority Habitats (deciduous woodlands), which are also directly south east adjacent to the site (others within 1 km of the site are identified in Table 1.2).

163407/ESSD

AA Environmental Limited

July 2024

DRAWINGS

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D