

Greetham Quarry Environmental Permit Application

Environmental Setting and Site Design

Mick George Limited

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Prepared on Behalf of Tetra Tech Environment Planning Transport Limited.
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G17/1/19/03 (Revision D) – Working Scheme

G17/1/19/04 (Revision C) – Restoration Plan

1.0 INTRODUCTION

1.1 REPORT CONTEXT

1.1.1 This section of the Environmental Permit application corresponds to Question 1, Appendix 4 of Part B4 of the Environmental Permit application form, which requires the provision of an Environmental Setting and Site Design (ESSD) report.

1.1.2 The aim of this report is to describe the regulated facility in relation to the environmental setting, identifying the source terms, pathways and receptors that will be used as the basis for the risk assessments, including:-

- Hydrogeological Risk Assessment (HRA);
- Landfill Gas Screening Report; and
- Environmental Risk Assessment.

1.1.3 This Environmental Permit application has been prepared on behalf of the operator, Mick George Limited (Mick George), by Tetra Tech.

1.2 REGULATED FACILITY DETAILS

Site Location

1.2.1 The application site is located on a parcel of land adjacent to the existing Greetham Quarry and is located on the northern boundary of the village of Greetham and 1.75 kilometres (km) southwest of the village of Stretton. The site is centred at National grid Reference (NGR) SK 92941 15078 and the environmental permit boundary is shown on MGL/B027573/PER/01.

Site Classification

1.2.2 The regulated facility is an inert landfill.

Application Boundary and Site Security

1.2.3 The proposed application boundary is shown on Drawing Number MGL/B027573/PER/01. Access to the site will be achieved by a new access point from Thistleton Lane which runs along the northern boundary

of the site. The new access point was proposed as part of the planning application to Rutland County Council (reference 2020/0297/MIN).

- 1.2.4 As part of the mineral extraction and restoration operations, security fencing will be established around areas of the site that will be close to public access areas to prevent unauthorised access. Site gates and any perimeter fencing will be inspected on a daily basis. Any identified damage to the fence or gates that could compromise the site security will be recorded and temporarily repaired as necessary before the end of that working day. Permanent repair or replacement will be undertaken as soon as practicable.

Site Context

- 1.2.5 Access to the existing quarry is via an access road off Stretton Road (B668) on the south east side of the existing quarry. The proposed development includes plans for a new access point into the proposed extension which would allow for the site to be accessed directly off Thistleton Lane which runs along the northern boundary of the site. The site is bounded by Great Lane to the west, Thistleton Lane to the north, the existing Greetham Quarry to the East and the village of Greetham to the south.
- 1.2.6 Beyond the wider quarry site, the immediate surroundings are agricultural to the west, north and east with the village of Greetham located to the south. The nearest residential property is considered to be White House which is located approximately 40m east of the application site.

Compliance with Environment Agency position statement on the location of landfills

- 1.2.7 With reference to the Multi Agency Geographic Information for the Countryside's (MAGIC) website under the Groundwater Vulnerability Map, the site is situated within an area of High vulnerability and lies in a Groundwater Source Protection Zone (GSPZ) 2.
- 1.2.8 In terms of aquifers, the MAGIC website shows that there is a small area to the north of the site that overlies a Secondary (undifferentiated) Superficial Drift Aquifer. The Environment Agency defines this type of aquifer as:-
- “Secondary Undifferentiated - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.”*
- 1.2.9 Apart from this area, MAGIC indicates that there are no superficial deposits recorded within the application area.

1.2.10 In terms of bedrock aquifers, the MAGIC website shows the site overlies a Principal Aquifer. The Environment Agency defines these as:-

“...layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer”.

1.2.11 With reference to The Environment Agency’s Approach to Groundwater Protection guidance (published February 2018), any proposed landfill will be objected to if the site is situated within a Principal Aquifer or GSPZ 2 or 3 where the risk assessment demonstrates that active long-term management of the site is essential. In this instance, the site is an inert landfill which does not require active long-term management to prevent groundwater pollution.

1.2.12 In addition, the HRA and ERA (Appendices C and E of the Environmental Permit Application) have been undertaken for the proposed application and show that the waste disposal activities at the site do not pose a potential hazard to groundwater quality and therefore long-term management will not be required due to the environmental protection measures and waste acceptance protocols proposed for the development.

2.0 SOURCE TERM CHARACTERISATION

2.1 THE DEVELOPMENT OF THE INSTALLATION

Historical Development

- 2.1.1 The existing Greetham Quarry site has been in operation since the 1950's by virtue of a number of planning permissions. In September 2000, the majority of these old mining permissions were reviewed, updated and consolidated through the Review of Old Mining Permissions (ROMP) process, resulting in consent M/1999/0326/09 and a schedule of modern conditions was issued.
- 2.1.2 In 2006, a 6.4ha extension was approved under permission MIN/2004/1051. Both of these current consents are time limited and expire on 30th September 2020.

Proposed Development

- 2.1.3 In 2020, a planning application was submitted to Rutland County Council for the North-Western Extension to Greetham Quarry including the Extraction of Limestone and Building Stone and Importation of Suitable Inert Materials.
- 2.1.4 As part of the restoration works, Mick George seeks to utilise imported inert waste materials in addition to on site discarded quarry waste products and soils. As such, the proposal entails the importation of inert waste to supplement the on-site quarry waste and soils to infill and progressively form a stable base and side slopes that will be created following mineral extraction activities.

Proposed Operational Phasing

- 2.1.5 The proposed phasing plan is detailed in Drawing Number G17/1/19/03 (Revision D) which shows phases 1 to 5.
- 2.1.6 Prior to Phase 1, topsoils will be removed from the internal access road way, office compound, Phase 1 extraction area and topsoils beneath Subsoil Mound S1. These soils will be stored in the peripheral screening mound T1 along the western boundary of the site and the southern section of Mound T2.
- 2.1.7 Phase 1 involves the removal of the upper 5m of limestone and will be approximately 15m wide and reduce the remaining quarry face to a typical height of 8-9m. Following completion of Phase 1, a Subsoil Mound S2 will be established on the base of that phase to provide a visual and acoustic screen between the

proposed quarry extension and the former quarry site which may be developed for commercial use to the southeast in the future.

- 2.1.8 Phase 2 involves the placement of topsoils from this area into Mound T2 in the south of the site and subsoils stored in Mound S2 (on top of phase 5). Phases 3 and Phases 4 will be completed successively with the topsoils and subsoils stored in mounds T2 and S1 or used in the progressive restoration of the northern sector of the site. The soils overlying Phases 3 and 4 will be temporarily stockpiled in the base of the worked out quarry (i.e. within Phase 2 or the northern sector of Phase 3).
- 2.1.9 The mineral will be processed generally using mobile plant where the mineral is extracted. When Phase 5 is worked, the mineral processing operations will be to the north-west, with the unexcavated rock of Phase 5 and Mound S2 providing the requisite screening to the potential development site to the south-east.
- 2.1.10 Suitable inert material will be imported to the site to aid in the progressive restoration of the site alongside on site quarry waste and soils. The material deposited at the site will be strictly inert and be accepted in accordance with waste acceptance procedures set out in Appendix B – Operating Techniques of this application.

Permitted Waste Types and Quantities

- 2.1.11 Permitted wastes accepted at the site will be strictly inert as classified under the Landfill Directive (1999/31/EC) and Council Decision (2003/33/EC) of 19 December 2002 'establishing criteria and procedures for the acceptance of waste landfills'.
- 2.1.12 Details regarding the proposed waste types including restrictions are provided in the Operating Techniques (Appendix B of the Environmental Permit Application).
- 2.1.13 A volume of 400,000m³ of imported material (or 640,000 tonnes using a conversion factor of 1.6m³/tonne) is required to restore the site and it is proposed that up to 250,000 tonnes of material would be brought to the site each year.

Landform and After Use

- 2.1.14 As detailed on the restoration scheme (Drawing Number G17/1/19/04 Revision C) the site will be restored using a low level restoration scheme with high-quality agricultural land reinstated at the base of the quarry with approximately 6.5ha of calcareous grassland around the perimeter.

3.0 PATHWAY AND RECEPTOR TERM CHARACTERISATION

3.1 CLIMATE

3.1.1 Rainfall data is available from a rain gauge at Wittering, located approximately 17.5km south east of the site (NGR: TF 04441 02595) shown on the Met Office website (Met Office, 2021) from 1981 to 2010 with average monthly rainfall summarised in Table 1 below.

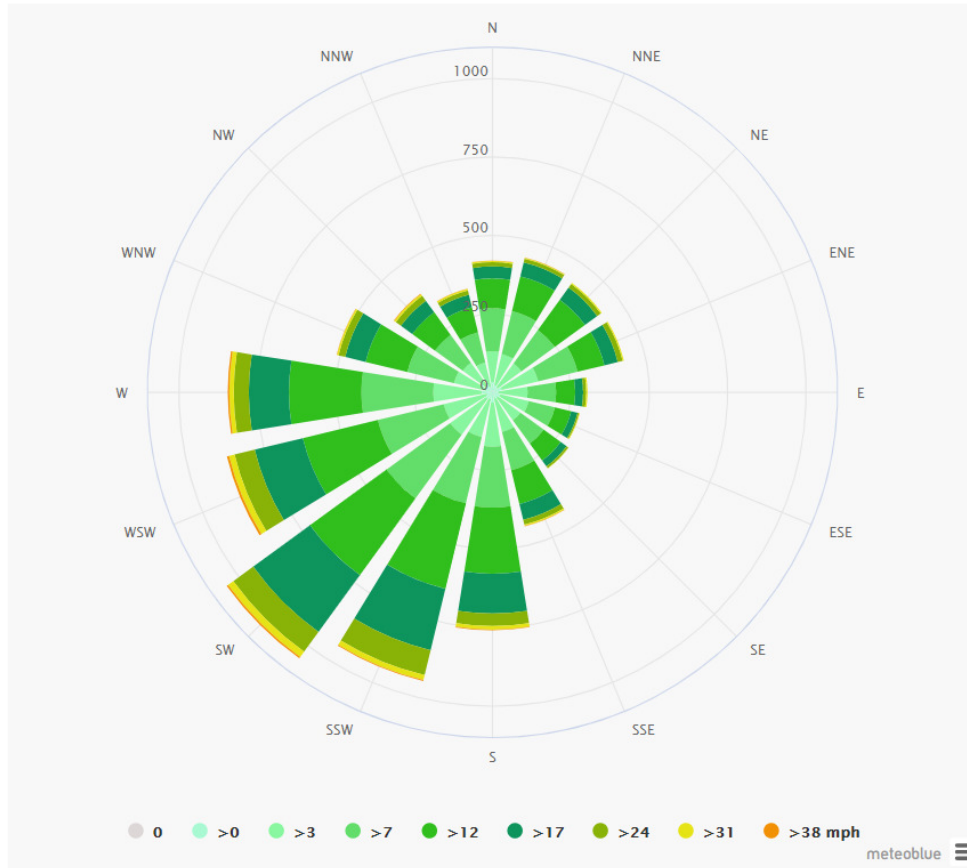
Table 1: Monthly Rainfall Data from Wittering (1981 - 2010)

Month	Average Rainfall mm (1981 – 2010)
January	48
February	36.8
March	42
April	49.6
May	54.9
June	52
July	52.4
August	55.8
September	55.2
October	59.3
November	55.8
December	47.2
Annual (Average)	608.9

3.2 WIND ROSE

3.2.1 The wind rose data, based on findings recorded at Greetham taken from www.meteoblue.com, shows the prevailing wind direction as South West (SW) (see Figure 1).

Figure 1: Wind Direction Recordings at Greetham



3.3 GEOLOGY

- 3.3.1 Using the British Geological Survey (BGS) Geology of Britain Viewer, there is no recorded superficial geology for the majority of the site, however the north and north east boundary of the site is underlain by Till, Mid Pleistocene (Diamicton). These superficial deposits were formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by ice age conditions.
- 3.3.2 The bedrock geology for the southern side of the site is Lower Lincolnshire Limestone Member. The northern side of the site is underlain on Upper Lincolnshire Limestone Member. This sedimentary bedrock formed approximately 168 to 170 million years ago in the Jurassic Period. Local environment previously dominated by shallow carbonate seas.

3.4 HYDROLOGY

- 3.4.1 According to the Flood Map for Planning Service (FMPS) and the Amber Planning Flood Risk Assessment produced, this is located in Flood Zone 1 which has a low probability of flooding.
- 3.4.2 The site is located within the catchment of North Brook a tributary of the River Gwash. North Brook flows west to east approximately 75m south of the existing quarry boundary and approximately 220m south of the proposed extension area. There are no other open surface water features in the vicinity of the proposed development area.

3.5 HYDROGEOLOGY

- 3.5.1 With reference to the Multi Agency Geographic Information for the Countryside's (MAGIC) website under the Groundwater Vulnerability Map, the site is situated within an area of High vulnerability and lies in a Source Protection Zone 2. Zone 2 (Outer Protection Zone) is defined by the 400-day travel time from a point below the water table.
- 3.5.2 In terms of aquifers, the MAGIC website shows that the site overlies a Principal Aquifer. The existing quarry also overlies the same Principal Aquifer.

3.6 RECEPTORS AND COMPLIANCE POINTS

Groundwater

- 3.6.1 The principal receptor is considered to be the groundwater within the Principal Aquifer which is further investigated in the Hydrogeological Risk Assessment (Appendix E of the Environmental Permit Application).

Surface Water

- 3.6.2 The risk of contaminated rainwater run-off as a result of the proposed development has been considered in the Environmental Risk Assessment (Appendix C of the main application).

Amenity

- 3.6.3 Sensitive receptors located within 1km of the application site have been considered in the Environmental Risk Assessment which is provided as Appendix C of the Environmental Permit Application.

4.0 POLLUTION CONTROL MEASURES

4.1 SITE ENGINEERING

Basal Engineering

- 4.1.1 A geological barrier is a fundamental requirement for all landfills according to the Landfill Directive and must provide sufficient attenuation to prevent a risk to soil and groundwater. The geological barrier shall have a minimum thickness of 1m and a permeability of no greater than 1×10^{-7} m/s or equivalent.
- 4.1.2 Prior to the commencement of landfilling, a geological barrier will be engineered using imported materials. The geological barrier will be constructed in compliance with the Environmental Permitting Regulations and will have a hydraulic conductivity of less than 1m at 1×10^{-7} m/s or its direct equivalent of 0.5m at 5×10^{-8} m/s.

Side Slope Engineering

- 4.1.3 A clay side slope liner will be constructed from suitable waste materials against a suitable 1 in 2.5 subgrade slope. The liner will have a horizontal crest width of 2m from the edge of the formation and be constructed at a slope of 1 in 3. The engineered clay liner will have a thickness of 0.5m perpendicular to the side slope with a hydraulic conductivity of 5.0×10^{-8} m/s or the equivalent.

The proposed construction of the clay liner would be to the specification detailed in the Construction Quality Assurance (CQA) Plan that will be submitted to the Agency for approval prior to engineering taking place. See the Hydrogeological Risk Assessment for further details (Appendix E of the Environmental Permit Application).

Capping

- 4.1.4 In accordance with the requirements of the Landfill Directive, an engineered cap (clay or plastic) is not required. On completion of filling to final levels, the site will be capped with 1m of restoration soils comprising not less than 0.3m of topsoil.

Restoration

- 4.1.5 The application site is presently in agricultural use and it is the intention of Mick George to restore the site back to agricultural land with calcareous grassland around the perimeter which will provide the opportunity for contributions to green infrastructure improvements.

- 4.1.6 As mentioned in Sections 2.1.7 to 2.1.9, the restoration works will comprise the use of topsoil and subsoil material that will be stripped and retained on site to provide temporary screening bunds.
- 4.1.7 With reference to the Environment Agency's guidance notes for the Part B4 application form, an agricultural and ecological benefit statement is only required if the proposed activity involves the deposit of waste to provide a growing medium and/or nutrients to support plant growth. This is characterised in the guidance notes as recovery code R10 'Land treatment resulting in benefit to agriculture or ecological improvement'.
- 4.1.8 In light of the above, the growing medium works will not comprise the use of waste and therefore will not comprise a waste recovery activity. As such, it is considered that an agricultural and ecological benefit statement will not be required to support this application.

Aftercare

- 4.1.9 Aftercare for the proposed calcareous grassland and agricultural land will be undertaken for a minimum of 5 years. The calcareous grassland will also include exposed rock faces (or crags) and scree areas comprising loose tipped limestone quarry waste with randomly spaced limestone boulders to provide a variation in habitat. The calcareous grasslands require a management regime of cutting, the frequency and timing of which will, in part, dictate the type of vegetation community that forms. In year 1 aftercare management of the seeded/hay-strewn areas will include the following operations:-
- Mowing of the developing sward: the first cut will be undertaken when the sward reaches 100 - 150mm height with the sward being cut back to 50 - 75mm. The arisings will be taken off-site or dispersed across the mown area;
 - Repeated mowing as required during the rest of the year following the above prescription;
 - No hay cropping will be undertaken during year 1; and
 - Patches of invasive species developing within the sward (creeping thistle, spear thistle, ragwort) will be treated via "weed-wipe" or similar applicator with an appropriate herbicide.
- 4.1.10 In years 2 to 5 following establishment of the sward during year 1, aftercare management in subsequent years will adopt a traditional agricultural regime involving the following operations:-
- Hay crop taken in late July – early August following seed set: the precise timing of the cut will depend on seasonal weather; and
 - Patches on invasive species developing within the sward (creeping thistle, spear thistle, Ragwort) will be treated with "weed-wipe" or similar applicator with an appropriate herbicide.

4.1.11 The aftercare for the agricultural land will involve the monitoring of the soil structure throughout the five-year aftercare period. Soils will be sampled and analysed periodically throughout the aftercare period with the results being used to determine the amounts and types of any nutrients that are deemed necessary to fulfil the long term aims of the soils rehabilitation. Care will be taken to ensure that no work, other than previously approved authorised cultivations, is allowed to take place during periods deemed to be out with the normal accepted cultivation window. Annual aftercare meetings will be arranged to review progress.

4.1.12 Annual review meetings will be held with the Mineral Planning Authority if requested, where the previous year's operations will be discussed and the proposals for the following year presented for approval. The operator will maintain records combined into an "aftercare terrier" for the re-instated land and which will include the following details recorded annually:-

- Details of soil replacement depths and areas restored to topsoil level in the previous twelve months;
- Proposed species/variety/mixture used and the seeding rate;
- The amounts/types of herbicides used with the dates of application;
- Details of any secondary treatment undertaken;
- Cultural operations undertaken; and
- Results of the grassland monitoring for species establishment.

4.2 LEACHATE MANAGEMENT AND MONITORING

Leachate Generation

4.2.1 Leachate is generated by rainfall infiltrating through areas of open waste and also through areas of restored waste. Due to the inert nature of the waste, it is considered that the generation of leachate is highly unlikely and therefore no leachate management or monitoring is proposed.

4.3 GAS MANAGEMENT AND MONITORING INFRASTRUCTURE

4.3.1 A Gas Risk Assessment (GRA) has not been prepared for the infilling of the Greetham Quarry site, as the Landfill Technical Guidance Note LFTGN03 indicates that new inert landfills do not pose a landfill gas hazard. Nevertheless, a landfill gas screening report has been prepared which has been submitted with the Environmental Permit Application as Appendix I.

4.3.2 In waste gas monitoring boreholes will be installed following the completion of each phase in order to monitor the levels of gas produced by the waste mass in accordance with the requirements of the Environment Agency's guidance note on inert landfills.

4.3.3 Further details regarding the monitoring of landfill gas, including the location of the proposed monitoring points are provided in the Environmental Management and Monitoring Plan (Appendix J of the Environmental Permit Application).

4.4 GROUNDWATER MANAGEMENT AND MONITORING

4.4.1 An HRA has been prepared to assess the potential risk of significant impacts on groundwater quality as a result of the proposed development. A copy of the HRA is provided as Appendix E of the Environmental Permit Application.

4.4.2 The HRA concludes that the proposed activity does not pose a potential hazard to groundwater quality and therefore long-term management will not be required. However, the HRA does propose compliance limits for groundwater monitoring.

4.4.3 Details regarding groundwater monitoring are provided in the Environmental Management and Monitoring Plan (Appendix J of the Environmental Permit Application).

4.5 SURFACE WATER MANAGEMENT SYSTEM

4.5.1 In the existing quarry, the site is free draining with no off-site discharge of surface water. All rainfall, and any internal rainfall runoff, is contained within the quarry boundary and directed to the quarry excavation from where drainage to the underlying limestone occurs naturally. The proposed western extension would operate on the same principle with rainfall and internal runoff directed to quarry excavations with no direct offsite discharge of surface water. Surface water generated from the restored site would be retained within the site and allowed to drain by infiltration to underground strata.

4.6 POST CLOSURE CONTROLS

4.6.1 The post closure controls will ensure long-term management and monitoring of the regulated facility.

4.6.2 The Environmental Management and Monitoring Plan (Appendix J of the Environmental Permit Application) provides details regarding the monitoring schedule of the aftercare phase.

4.6.3 The Closure and Aftercare Plan (Appendix K of the Environmental Permit Application) provides details of the measures to be taken upon and after the closure of the landfill to avoid pollution risk.

5.0 SITE CONDITION REPORT

- 5.0.1 Environmental Permitting Regulations – Site Condition Report (H5) states that as Site Condition Report is *‘not applicable to those parts of a permitted landfill that have permanent deposits of waste.’* As such, a Site Condition Report has not been prepared in support of this application.

DRAWINGS

MGL/B027573/PER/01 – Site Location and Environmental Permit Boundary

G17/1/19/03 (Revision D) – Working Scheme

G17/1/19/04 (Revision C) – Restoration Plan