

# Great Billing Quarry

## Environmental Permit Application

### Environmental Setting and Site Design

Mick George Limited

October 2022

Prepared on Behalf of Tetra Tech Environment Planning Transport Limited.

Registered in England number: 03050297

# Document Control

<b>Document:</b>	Environmental Setting and Site Design
<b>Project:</b>	Great Billing Permit Application
<b>Client:</b>	Mick George Limited
<b>Job Number:</b>	B029956
<b>File Origin:</b>	N:\Projects\Mick George (G05059)\^Grt Billing\B029956 (Gt Billing Permit)\Reports

<b>Revision:</b>	-	<b>Status:</b>	Final
<b>Date:</b>	October 2022		
<b>Prepared by:</b>	Isabelle Mills	<b>Checked by:</b>	Alice Shaw
		<b>Approved by:</b>	Michael Jones
<b>Description of revision:</b>			

<b>Revision:</b>		<b>Status:</b>	
<b>Date:</b>			
<b>Prepared by:</b>		<b>Checked by:</b>	
		<b>Approved By:</b>	
<b>Description of revision:</b>			

<b>Revision:</b>		<b>Status:</b>	
<b>Date:</b>			
<b>Prepared by:</b>		<b>Checked by:</b>	
		<b>Approved By:</b>	
<b>Description of revision:</b>			

## TABLE OF CONTENTS

---

1.0	INTRODUCTION .....	1
2.0	SOURCE TERM CHARACTERISATION .....	4
3.0	PATHWAY AND RECEPTOR TERM CHARACTERISATION .....	7
4.0	POLLUTION CONTROL MEASURES .....	11
5.0	SITE CONDITION REPORT .....	15

## LIST OF TABLES

---

Table 1: Monthly Rainfall Data for Northampton Moulton Park (1981 - 2010) .....	7
---	---

## DRAWINGS

---

MGL/B029956/PER/01 - Environmental Permit Boundary

0047/PO/1 – 0047/PO/4 (4 Drawings) – Phasing Plans

G13/20/01 (Revision B) – Restoration Strategy 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 (ERA)
- 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 situated to the east of the Great Billing Water Recycling Centre (WRC) and is located approximately 3km east of Northampton on the south side of the dual carriageway A45. To the north west of the application site but separated from the site by the dual carriageway A45, is the settlement of Great Billing which is part of the larger Northampton urban area (nearest homes in Great Billing are approximately 400m). Also, to the north beyond the A45, is the village of Ecton (nearest homes at approximately 800m) and North east is the village of Earls Barton, over 1km from the site. The River Nene and ponds lie to the south, approximately 400m from site. Further south, beyond the River Nene, lies the village of Cogenhoe, whose closest properties are approximately 800m.
- 1.2.2 The northern boundary of the application site in the central parts reaches almost to the A45 just south of Ecton Lane where it crosses the A45. In other parts of the site the northern boundary is separated from the A45 by open land including an area of mature trees and agricultural land. The southern boundary adjoins a restored former mineral workings, comprising water bodies, beyond which is the River Nene. The western

boundary of the extraction area is partly formed by an overland drain. Barton Brook forms the eastern boundary of the site and flows south to join the Nene.

- 1.2.3 The site is centred at approximate National Grid Reference (NGR) SP 83190 62010. The site location and the environmental permit boundary is shown on Drawing Number MGL/B029956/PER/01.

#### **Site Classification**

- 1.2.4 The regulated facility is an inert landfill.

#### **Application Boundary and Site Security**

- 1.2.5 Access to the site will be through the neighbouring Anglian Water Recycling Centre site from Crow Lane, which is located to the west of the site.
- 1.2.6 The site would be secured from the public highway by substantial lockable gates at the site entrance and all reasonable precautions would be taken to prevent the unauthorised entry of the general public and the unauthorised depositing of wastes. Lighting would be installed around the refuelling and weighbridge areas which are to be intruder activated.

#### **Compliance with Environment Agency position statement on the location of landfills**

- 1.2.7 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.
- 1.2.8 With reference to the Multi Agency Geographic Information for the Countryside's (MAGIC) website under the Groundwater Vulnerability Map, the site is not situated within a Groundwater Source Protection Zone.
- 1.2.9 In terms of aquifers, the MAGIC website shows that the site overlies a Secondary A Superficial Drift Aquifer. The Environment Agency defines this type of aquifer as:-

*'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers'*

- 1.2.10 In terms of the bedrock geology, the MAGIC website indicates that there are no recorded aquifers.
- 1.2.11 For the purposes of this environmental permit application, a HRA and ERA (Appendices D and F of the

Environmental Permit Application) have been undertaken for the proposed waste disposal activities. Both documents 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 Based on the historic maps that are available on the Old-Maps website, the site has been used, at least in part, as an irrigation farm as far back as the late 19<sup>th</sup> Century. Use as an 'Irrigation Field' continues into the 20<sup>th</sup> century, with tanks shown on the mapping from the 1960s when the site was re-designated a 'Sewage Farm'.
- 2.1.2 The sewage irrigation use continued until recently, but is no longer actively used on site and much of the site is in arable use.

#### Proposed Development

- 2.1.3 In July 2018, planning permission (reference 17/00053/MINFUL) was granted by Northamptonshire County Council (NCC) the extraction of sand and gravel, construction of concrete batching plant, processing plant, including ancillary weighbridge, office, workshop, recycling activities and access, plus the importation of inert material and restoration to agricultural and nature conservation.
- 2.1.4 Planning permission 17/00053/MINFUL was granted to Anglian Water Services Ltd who went out to open tender for contractors to operate the site. Mick George were successful in the tender and they are in the process of dealing with outstanding planning conditions that are required to be discharged.
- 2.1.5 Following mineral extraction, the site will be restored in accordance with the restoration plan (Drawing Number G13/20/01, Revision B) that was formally discharged by NCC in connection to Conditions 23 and 24 of planning permission 17/00053/MINFUL. The restoration of the site will include a combination of natural habitats in the southern part of the site including reedbeds, wet and neutral grasslands, hedgerows and waterbodies. Areas of arable land with additional boundary features will be included in the northern part of the site.

#### Proposed Operational Phasing

- 2.1.6 The proposal comprises the importation of inert waste for infilling of the quarry void that would be created following mineral extraction activities at the site and would comprise ten separate phases which are detailed in the phasing plans (Drawing Numbers 0047/PO/01 – 0047/PO/04).

- 
- 2.1.7 As detailed in the phasing plans, works would comprise the stripping of topsoil and subsoil from each phase prior to excavation. Any topsoil and subsoil that's stripped from any working phase will be used to form a screening bund that will be situated along the perimeter of the working areas. As detailed on the phasing plans, topsoil and subsoil will be stored separately.
- 2.1.8 Once a phase has been stripped of topsoil and subsoil, the proposed works will comprise mineral extraction with progressive infilling with inert waste and restoration with either soils from another phase that is being stripped or from the central soil store located in the centre of the site.

### **Permitted Waste Types and Quantities**

- 2.1.9 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'.
- 2.1.10 Details regarding the proposed waste types including restrictions are provided in the Operating Techniques (Appendix B of the Environmental Permit Application).
- 2.1.11 The restoration of the site will require approximately 1,000,000m<sup>3</sup> of material to be brought to the site. When using a bulk density conversion factor of 1.6 tonnes/m<sup>3</sup> this equates to approximately 1,600,000 tonnes. In terms of annual throughput, It is proposed that up to 200,000m<sup>3</sup> (or 320,000 tonnes) of material would be brought to the site each year.

### **Landform and After Use**

- 2.1.12 As mentioned in Section 2.1.5, the restoration of the site will include a combination of natural habitats in the southern part of the site including reedbeds, wet and neutral grasslands, hedgerows and waterbodies. Areas of arable land with additional boundary features will be included in the northern part of the site.
- 2.1.13 The main aim of the restoration scheme are as follows:-
- Improve habitat connectivity within the local area, through the enhancement of the River Nene green corridor
  - Create and manage habitat for use by overwintering and breeding birds including those bird species designated as features of the UNVGP
  - Improve biodiversity on site through the creation and enhancement of habitats for a range of species



- Strengthen landscape character
- Manage existing landscape features to be retained
- Encourage public access to nature through the inclusion of mown grass footpaths and timber broadwalks leading to wetland viewing platforms.

## 3.0 PATHWAY AND RECEPTOR TERM CHARACTERISATION

### 3.1 CLIMATE

3.1.1 Rainfall data is available from a rain gauge at Northampton Moulton Park, located approximately 5.5km north west of the site shown on the Met Office website (Met Office, 2022) from 1981 to 2010 with average monthly rainfall summarised in Table 1 below.

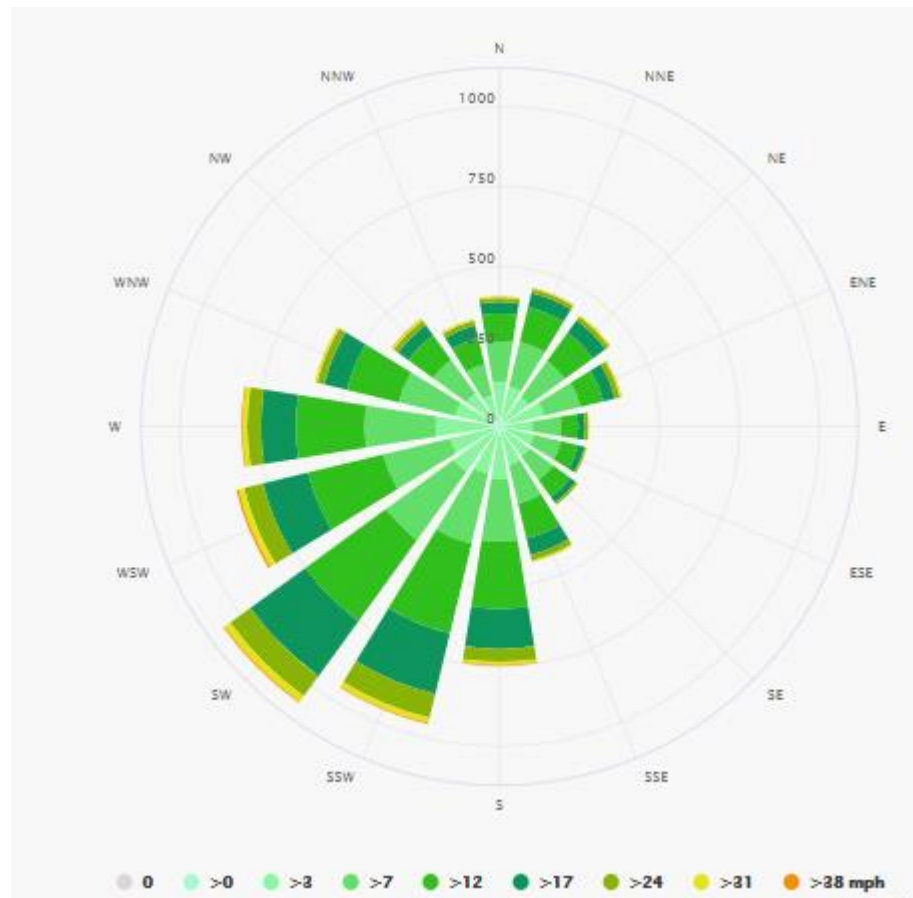
**Table 1: Monthly Rainfall Data for Northampton Moulton Park (1981 - 2010)**

Month	Average Rainfall mm (1981 – 2010)
January	54
February	41.1
March	44.1
April	49.4
May	54.4
June	54.9
July	49.2
August	54.5
September	57.6
October	63.9
November	60
December	55.3
Annual (Average)	638.1

### 3.2 WIND ROSE

3.2.1 The wind rose data, based on findings recorded at Great Billing taken from [www.meteoblue.com](http://www.meteoblue.com), shows the prevailing wind direction as South West (see Figure 1).

**Figure 1: wind Direction Recordings for Great Billing**



### 3.3 GEOLOGY

3.3.1 Using the British Geological Survey (BGS) Geology of Britain Viewer, the recorded superficial deposits which underlay the site consist of clay and silt (alluvium). These superficial deposits formed up to two million years ago in the Quaternary Period in a local environment previously dominated by rivers.

3.3.2 With regard to the bedrock geology underlying the site consists of the Lias Group deposit that comprises the Whitby Mudstone Formation. This mudstone is a sedimentary bedrock formed approximately 174 to 183 million years ago in the Jurassic Period in a local environment previously dominated by shallow seas.

### 3.4 HYDROLOGY

3.4.1 According to the Flood Map for Planning Service (FMPS) shows that the application site lies within the low probability flood area (Flood Zone 1), medium probability flood area (Flood Zone 2) and high probability

flood area (Flood Zone 3). The application site is also shown as being potentially liable to flooding from several local reservoirs / water bodies.

3.4.2 Water bodies within the vicinity of the site include the River Nene which lies to the south of the application site and flows east roughly parallel to the southern boundary of the site. Billing Brook is located approximately 1.5km west of the site. The Ecton Brook flows south through the Ecton Brook Linear park along the western edge of Great Billing, towards the Great Billing WRC.

3.4.3 The Barton Brook flows south from Sywell Wood some 7.5 km to the north of the site. Its route takes it beneath the A45 from where it flows along the eastern boundary of the site and into the Nene. The Brook is joined at Sywell Reservoir (approximately 2.7 km north of the site) by a tributary originating in the north-east of Sywell village.

## 3.5 HYDROGEOLOGY

---

3.5.1 With reference to the MAGIC website under the Groundwater Vulnerability Map, the site is not situated within a Groundwater Source Protection Zone.

3.5.2 In terms of aquifers, the MAGIC website shows that the site overlies a Secondary A Superficial Drift Aquifer. The Environment Agency defines this type of aquifer as *'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers'*

3.5.3 In terms of the bedrock geology, the MAGIC website indicates that there are no recorded aquifers.

## 3.6 RECEPTORS AND COMPLIANCE POINTS

---

### Groundwater

3.6.1 The risk of impact to groundwater is further investigated in the Hydrogeological Risk Assessment (Appendix F 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 D of the Environmental Permit 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 D 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  $1 \times 10^{-7}$  m/s or equivalent.
- 4.1.2 Prior to the commencement of landfilling, a geological barrier will be engineered existing clay 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  $1 \times 10^{-7}$  m/s or its direct equivalent of 0.5m at  $5 \times 10^{-8}$  m/s.

#### Side Slope Engineering

- 4.1.3 A clay slope liner will be constructed from existing clay. The engineered clay liner will have a thickness of 0.5m perpendicular to the side slope with a hydraulic conductivity of  $5.0 \times 10^{-8}$  m/s or the equivalent.
- 4.1.4 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 F of the Environmental Permit Application).

#### Capping

- 4.1.5 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

- 4.1.6 The site would be restored to a combination of agricultural land, grassland and wetlands. The wetlands would run east to west along the southern side of the site which would be achieved through water management, soil form and planting. Approximately half of the applications site would be restored to farmland, the southern area of which would be a grassland habitat and maintained to encourage biodiversity with new planting. The new planting would include mixed native species hedgerows with trees, and the improvement of existing hedgerows.

- 
- 4.1.7 The restoration works will comprise the use of topsoil and subsoil material that will be stripped and retained on site.
- 4.1.8 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'.
- 4.1.9 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**

- 4.1.10 Aftercare will be undertaken in accordance with the following documents that were formally discharged by NCC in connection to Conditions 23 and 34 of planning permission 17/00053/MINFUL :-
- 'Nature Conservation and Landscape Management and Restoration Strategy' document (dated April 2021); and
  - 'Great Billing Quarry – Discharge of Conditions Scheme' document (dated April 2021).
- 4.1.11 Copies of these documents are provided as part of the Closure and Aftercare Plan (Appendix I of the Environmental Permit Application).

## **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 highly unlikely that the leachate generated will have significant concentrations of pollutants and therefore no leachate management or monitoring.

## **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 G.

- 
- 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 H 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 F 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 H of the Environmental Permit Application).

#### **4.5 SURFACE WATER MANAGEMENT SYSTEM**

---

- 4.5.1 The proposed development incorporates a designated water management area which would be located on the north west side of the site (as shown on Drawing Numbers 0047/PO/1 to 0047/PO/3). The water management area would be divided into three phases. Once the mineral has been extracted the area will be engineered using a basal clay to create stilling ponds. Both surface water run off and an element of groundwater are proposed to be managed within the three stilling ponds. Once the site has been excavated it is likely that the voids will collect with water. This water will be primarily managed through pumping to temporary recharge trenches / basins from where the water is allowed to disperse to the ground via infiltration. Some losses to evaporation will also occur.
- 4.5.2 To facilitate mineral extraction and reclamation, each working phase will need to be dewatered. The general approach is to excavate a trench along the edge of the working phase to intercept the flow of groundwater. The inflow is then collected in channels which are connected to a sump from where the water is pumped to the above-mentioned recharge features. In some instances the abstracted water may need to be pumped to the three stilling ponds in the Water Management Area, or may need to be discharged to the local watercourse network.



4.5.3 To facilitate the above, Mick George have submitted applications for a surface water discharge permit and a water abstraction licence. Both applications were submitted to the Environment Agency in June 2022.

## **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 H of the Environmental Permit Application) provides details regarding the monitoring schedule of the aftercare phase.

4.6.3 The Closure and Aftercare Plan (Appendix I 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 The Environmental Permitting Regulations – Site Condition Report (H5) states that a Site Condition Report (SCR) is 'not applicable to those parts of a permitted activity that have permanent deposits of waste', however it also states: 'and SCR is necessary for areas of the permitted site where you have not deposited any wastes (e.g. site access areas, site offices, weighbridge, wheel cleaning facilities, etc)'. As such a SCR has been prepared and is given in Appendix M of this application.

---

## DRAWINGS

MGL/B029956/PER/01 - Environmental Permit Boundary

0047/PO/1 – 0047/PO/4 (4 Drawings) – Phasing Plans

G13/20/01 (Revision B) – Restoration Strategy Plan