

Dorket Head 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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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 site lies immediately to the south of the quarry workings at Dorket Head Quarry. Dorket Head Quarry is located on the northern edge of Arnold and the B684 Woodborough Lane. Arnold forms the northern district of the Nottingham urban area, with the city centre lying some 7.5km to the south-west. The Ibstock Dorket Head Brickworks is situated to the west of the quarry site which utilises clays that are extracted from the quarry for the manufacture of bricks.

1.2.2 As part of the quarry workings, FCC Recycling (UK) Limited hold an environmental permit (reference EPR/BV4444IQ) to operate a non-hazardous landfill at Dorket Head Quarry to fill the void that has been created from mineral extraction activities.

1.2.3 For identification purposes, Dorket Head Quarry is centred on approximate National Grid Reference (NGR) SK 81389 49495 and the site is centred on NGR SK 59887 46752. The site location and boundary are shown on Drawing Number MGL/B027237/LOC/01.

Site Classification

1.2.4 The regulated facility is an inert landfill.

Application Boundary and Site Security

1.2.5 The proposed application boundary is shown on Drawing Number MGL/B027237/LOC/01. The application site is located to the east of the existing Ibstock Dorket Head Brickworks which is operated by Ibstock Brick.

1.2.6 Access to the current quarry site is achieved by an unnamed access road off Woodborough Lane (B684). In terms of the application site, Mick George intend to submit a Non-Material Amendment (NMA) for a change in access. As part of the NMA, it is proposed that access will be off the existing access to Woodborough Lane and immediately on entry through the gates, Mick George will create a new metal surfaced road extending in a generally south eastern direction adjacent the existing clay haul road. The access will then turn to the south west before descending into the quarry. The site office, wheel cleaning and weighbridge (to the extent one is needed) will be located along the length of this new access road.

1.2.7 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

1.2.8 The surroundings of the site comprise agricultural land to the north, east and west. To the south of the site is Hobbucks Nature Reserve and a housing estate with the closest residential roads Surgeys Lane, Homefield Avenue, Strathmore Road and Shandwick Close.

Compliance with Environment Agency position statement on the location of landfills

1.2.9 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.

1.2.10 With reference to the Multi Agency Geographic Information for the Countryside (MAGIC) website, the site is not situated within a Groundwater Source Protection Zone (GSPZ). In terms of aquifers, the MAGIC

website shows that the application site overlies a Secondary B aquifer. As such, this should not prompt objection from the Environment Agency.

1.2.11 In addition, the HRA and ERA (Appendices D and F of the Environmental Permit Application) have been undertaken for the proposed application shows 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 Clay extraction at and brick making works have been undertaken at Dorket Head for over 175 years with the present factory established in the 1860's.
- 2.1.2 In 1897 the works was acquired by the Nottingham Patent Brick Company (which later became Nottingham Brick PLC) and remained in their ownership until 1987, when the site was purchased by Marley. Marley were themselves purchased by Tarmac in 1993. Ibstock acquired the site from Tarmac in 1995 and Ibstock Brick Limited remains the owner to date.
- 2.1.3 The original planning application was granted in 1961 (reference S/1/2169) with further permissions for the extension of the clay extraction working area granted in 1971 and 1974 (reference 7/74/755).
- 2.1.4 Under planning permission 7/82/755, the restoration of the mineral workings by landfilling the quarry with domestic and industrial wastes was granted in 1983. At the same time, a new vehicle access into the site off Woodborough Lane was permitted.
- 2.1.5 Further planning permissions for clay extraction were granted in 1986 (for the eastern section of the site, reference 7/01/85/1064) and in 1998 for a southerly extension (reference 7/97/0697). Both of these permissions incorporated restoration of the site by landfill with non-hazardous domestic and industrial wastes.
- 2.1.6 Two planning permissions were granted in 2013 for an "Eastern extension of the working and extraction of clay and associated minerals with subsequent low level restoration to include landscaping and diversion of public footpaths" (application reference 7/2013/0760NCC). Planning permission was granted on 17 December 2013.
- 2.1.7 The second planning application (reference 7/2013/0757NCC) was to "Vary conditions 3, 13 and 50 of planning permission 7/2003/0335 to allow a "pause" in the existing landfill to occur and to provide a revised restoration profile which will tie in with the intended low level restoration of the proposed eastern extension". Planning permission was issued on 16 December 2013.

- 2.1.8 In 2018 planning permission was granted (reference 7/2018/0159NCC) for the proposed southerly extension of the clay workings and extraction of clay and associated minerals, with subsequent restoration by infilling with imported inert waste materials to include landscaping and diversion of public rights of way.
- 2.1.9 As noted in Section 1.2.6, Mick George intend to submit a NMA for a change of access and infrastructure for the application site. An indication of these changes are provided in Section 1.2.6.

Proposed Development

- 2.1.10 The proposal entails the importation of inert waste to infill and restore the quarry void that will be created following mineral extraction activities in the southerly extension .
- 2.1.11 The works will be completed in accordance with the restoration scheme (Drawing Number DHS 3/10, Revision A) that was approved under planning permission 7/2018/0159NCC.

Proposed Operational Phasing

- 2.1.12 The application site would be worked broadly in three phases, as illustrated in Drawings DHS 3/2, DHS 3/3 and DHS 3/4. In order to maintain the required 'blend' of clays to supply to the brickworks it would be necessary to work the proposed southern extension in parallel with the approved Eastern Extension.

Site Preparation

- 2.1.13 Both topsoil and subsoil would be stripped (as separate horizons) and transported to storage areas within the quarry boundary, where the soils would be formed into screen mounds and/or stockpiles. To assist in screening the proposed operations, a 2m to 3m high soil storage mound would be created along the southern and eastern boundary of the proposed extension.
- 2.1.14 Following the removal of soils, the overburden can be stripped. Where possible, overburden is placed directly within the quarry void as part of the progressive restoration works; the overburden is tipped within the void and then graded using a bulldozer. Where this is not possible, it is placed into store located on the periphery of the workings.
- 2.1.15 Site preparation also includes the felling of the narrow woodland area located on the western side of the site and to the south. These would be felled in a phased format so to retain as many trees as possible, further aiding in the overall screening of the site.

Extraction Phase 1

- 2.1.16 Once the overburden has been removed the clay deposit can be worked on a 'campaign' basis typically lasting between six to eight weeks per annum usually within the summer months when the ground is drier.
- 2.1.17 The first phase would result in a 120m wide cut being driven in a southerly direction towards the boundary with the mineral extractions operations occurring behind the working face. This would minimize the impact on the properties located to the south of the site.

Extraction Phase 2

- 2.1.18 The second phase would advance the workings in an easterly direction parallel to the boundary and the narrow woodland shelter belt.

Extraction Phase 3

- 2.1.19 The final phase would be similarly orientated parallel to the site boundary and result in the removal of the remainder of the narrow woodland belt. This extraction phase would move in a south to north direction.

Final Landform and After Use

- 2.1.20 As detailed on the restoration scheme (Drawing Number DHS 3/10, Revision A) the site will be restored to rich grassland and broadleaved woodland. A Public Rights of Way footpath will also be reinstated and will pass through the site from the southwest to the north east of the site.

Permitted Waste Types and Quantities

- 2.1.21 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'.
- 2.1.22 Details regarding the proposed waste types including restrictions are provided in the Operating Techniques (Appendix B of the Environmental Permit Application).
- 2.1.23 The restoration of the site will require approximately 375,000 m³ of material to be brought to the site. It is proposed that up to 450,000 tonnes of material would be brought to the site each year over a 2 to 3 year period.

3.0 PATHWAY AND RECEPTOR TERM CHARACTERISATION

3.1 CLIMATE

3.1.1 Rainfall data is available from a rain gauge at Sutton Bonington, located approximately 23km south west of the site (NGR: SK 50625 26428) 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 Sutton Bonington (1981 - 2010)

Month	Average Rainfall mm (1981 – 2010)
January	52.2
February	38.9
March	43.9
April	48.9
May	44.2
June	60.2
July	54.1
August	55.5
September	51
October	61
November	54.5
December	55.9
Annual Average	620.9

3.2 WIND ROSE

3.2.1 The wind rose data, based on findings recorded at Nottingham/Watnall located approximately 9.5km south west of the site, taken from www.meteoblue.com shows that the prevailing wind direction is from the south west.

3.3 GEOLOGY

3.3.1 According to the British Geological Survey's (BGS) 'Geology of Britain Viewer', the bedrock geology of the site comprises predominately of Mudstone of the Gunthorpe Member. There is also a small parcel of land located in the northwest and north east corners of the site which have a bedrock of Siltstone and Dolomitic which are also of the Gunthorpe Member. This sedimentary bedrock was formed approximately 237 to 247 million years ago in the Triassic period in a local environment that was previously dominated by hot deserts.

3.3.2 Part of the eastern side of the site comprises Mudstone and Siltstone of the Radcliffe Member which was formed approximately 242 to 247 million years ago in the Triassic Period. This sedimentary bedrock was formed in a local environment previously dominated by hot deserts.

- 3.3.3 A large number of investigative boreholes have been installed within the wider quarry area. Three 'skerry bands' are located within the Gunthorpe Member at various depths and these comprise siltstone and fine sandstone which are strongly cemented and lithified. The uppermost unit is known as the 'Top Skerry' and has an average thickness of approximately 0.8m. The lowermost unit is known as the 'Bottom Skerry' with an average thickness of approximately 2.7m. The intermediate 'Plains Skerry' has an average thickness of approximately 1m.
- 3.3.4 The Bottom Skerry is recognised as being at the base of the currently useable 'brick clay' materials at the site and so forms the base of the currently permitted working scheme for the Dorket Head Quarry, in addition to the base of the proposed southern extension.
- 3.3.5 Superficial deposits are shown to be largely absent across the site. As the site is a quarry, any overburden has subsequently been removed and re-deposited in the excavation void space.

3.4 HYDROLOGY

- 3.4.1 According to the Flood Map for Planning Service (FMPS), the application site is not situated in an area at risk of flooding.
- 3.4.2 Within the wider vicinity of the site, there is a pond located approximately 430m north west of the site, Day (Dumble) Brook is located approximately 800m east, Lambley Dumble located approximately 1.2km southeast and Day Drook located approximately 2.7km southwest.

3.5 HYDROGEOLOGY

- 3.5.1 As mentioned in Section 1.2.9, the site is not situated within a Groundwater Source Protection Zone (GSPZ) and the majority of the application site overlies a Secondary B aquifer.

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 No mineral liner is required to be constructed for the site due to the presence of a natural geological barrier present at the base comprising of Mercia Mudstone. Therefore, the geological barrier will be formed by leaving the existing clays in place.
- 4.1.2 Engineered clay will however be used to line the base of the void where either different lithology or skerry bands are exposed in the base following extraction of the overlying mudstone. The proposed basal liner will be 0.5m thick and will have a permeability of 5×10^{-8} m/s which is equivalent to a 1m liner with a permeability of 1×10^{-7} m/s. The proposed construction of the engineered base (where required) will be subject to the specification detailed in the Construction Quality Assurance (CQA) Plan that will be produced for the site. The method and testing of the material will be pre-agreed with the Environment Agency and subsequently demonstrated to ensure that the quality of installation is to the required standards.

Side Slope Engineering

- 4.1.3 Given the confidence in the low permeability of the Mercian Mudstone between the designated skerry bands, engineered clay will be used to plug any seepage from any skerry bands in the side walls of the landfill. If required, it is proposed to excavate into the seeping band to a point where a minimum 1m with a maximum permeability of 1×10^{-7} m/s (or equivalent) of engineered clay will fill the gap to prevent any groundwater ingress into the site. By doing this it will remove any pathways for potential contaminants out of the landfill. The clay plug will tie in above and below with the Mercian Mudstone to form a low permeability seal.
- 4.1.4 The proposed testing of the clay materials in situ at the moment and the construction of the clay plug would be to the specification detailed in the Construction Quality Assurance (CQA) Plan that will be produced for the site. See the Hydrogeological Risk Assessment for further details.

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 As detailed on the restoration scheme (Drawing Number DHS 3/10, Revision A) the site will be restored to rich grassland and broadleaved woodland. A Public Rights of Way footpath will also be reinstated and will pass through the site from the southwest to the north east of the site.
- 4.1.7 Aforementioned, the restoration works will comprise the use of topsoil and subsoil material that will be stripped and retained on site to facilitate the restoration of the 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 At Dorket Head Quarry 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 As required under Condition 38 of planning permission 7/2018/0159NCC, aftercare will be undertaken for a period of 5 years in accordance with a 'Landscaping and Aftercare Management Scheme' which will be submitted to NCC for approval.
- 4.1.11 An annual site meeting between Mick George and NCC will be undertaken to review the performance of the aftercare scheme for that year to ensure that the programme of aftercare arrangements is employed. The meeting shall also provide an opportunity for the NCC to agree alterations to the aftercare works for the following 12 months and these shall thereafter be implemented.
- 4.1.12 Any amendments to the aftercare steps will be agreed in writing between Mick George and NCC.

4.2 GROUNDWATER MANAGEMENT AND MONITORING

- 4.2.1 A total of three designated skerry bands were identified in the most recent Tetra Tech site investigation to be water bearing strata within the walls of the quarry.
- 4.2.1 If it is deemed necessary when engineering commences, to prevent any seepage into the quarry which may result in a build up of hydrostatic pressure behind the clay plug which may result in its failure, a groundwater drain containing slotted pipework will be installed behind the clay plug. The drain will consist of a 0.5m x 0.5m trench with slotted pipework and non-calcareous drainage gravel surround. The groundwater drain will have an outfall to a corner of the landfill where it will be removed.
- 4.2.3 If required, the proposed construction of the groundwater management would be to the specification detailed in the Construction Quality Assurance (CQA) Plan that will be produced for the site. See the Hydrogeological Risk Assessment (Appendix F of the Environmental Permit Application) for further details.

4.3 LEACHATE MANAGEMENT AND MONITORING

Leachate Generation

- 4.3.1 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.

4.4 GAS MANAGEMENT AND MONITORING INFRASTRUCTURE

- 4.4.1 A Gas Risk Assessment (GRA) has not been prepared for the infilling of the Dorket Head 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.
- 4.4.2 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.
- 4.4.3 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).

4.5 SURFACE WATER MANAGEMENT SYSTEM

- 4.5.1 As previously mentioned, there are a series of existing surface water lagoons, one of which is located adjacent to the north east corner of the application site and discharged in a controlled manner to the Day (Dumble) Brook located along the eastern boundary of the application site. The design of the existing surface water lagoon is sufficient to accommodate this southern extension. This discharge activity is undertaken under a discharge consent which is controlled by FCC. For the purposes of this Environmental Permit Application, it is proposed that the existing consent will be transferred from FCC to Mick George to facilitate surface water management in the application site.
- 4.5.2 As with the approved working scheme for the wider quarry, water run-off would drain into the excavation area and will be managed by a series of lagoons/sumps before flowing into the surface water lagoon.

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 is 'not applicable to those parts of a permitted landfill that have permanent deposits of waste', however it also states: 'and SCR is necessary for areas of the permitted site where you have no deposited any waste (e.g. site access areas, site offices, weighbridge, wheel cleaning facilities, etc)'. As such a Site Condition Report has been prepared and is given in Appendix K of this application.

DRAWINGS

MGL/B027237/LOC/01 - Site Location and Environmental Permit Boundary

DHS 3/10 (Revision A) – Restoration Masterplan

DHS 3/2 – Extraction Phase 1

DHS 3/3 – Extraction Phase 2

DHS 3/4 – Extraction Phase 3