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**Thorpe Marsh Green Energy Hub Ltd**

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# **THORPE MARSH LANDFILL (EPR/CP3091SC/V002) AMENITY RISK ASSESSMENT**

# THORPE MARSH LANDFILL (EPR/CP3091SC/V002) AMENITY RISK ASSESSMENT

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Description **Thorpe Marsh Landfill (EPR/CP3091SC/V002) Amenity  
Risk Assessment**

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## CONTENTS

<b>1.</b>	<b>INTRODUCTION</b>	<b>4</b>
1.1	Project Background	4
1.2	Objectives and Scope of Works	4
1.3	Constraints and Limitations	4
<b>2.</b>	<b>SITE BACKGROUND</b>	<b>6</b>
2.1	Site Description	6
2.2	Proposed Activities	6
<b>3.</b>	<b>POTENTIAL SOURCES OF RISK</b>	<b>8</b>
3.1	Deposition on Land	8
3.2	Discharge to Surface Water	8
3.3	Accidents	8
3.4	Fire	8
3.5	Odour	8
3.6	Noise and Vibration	8
3.7	Flooding	9
3.8	Fugitive Emissions	9
3.9	Visible Emissions	9
3.10	Bioaerosols	9
3.11	Unexpected Ground Conditions	9
3.12	Summary	9
<b>4.</b>	<b>POTENTIAL RECEPTORS</b>	<b>10</b>
4.1	Human Health	10
4.2	Groundwater	10
4.3	Surface Water	10
4.4	Ecological Designations	11
4.5	Summary of Receptors	11
<b>5.</b>	<b>RISK SCREENING</b>	<b>13</b>
<b>6.</b>	<b>CONCLUSIONS AND RECOMMENDATIONS</b>	<b>18</b>

## TABLE OF TABLES

Table 4-1 – Sensitive Receptors.....	11
Table 5-1 – Pollutant Linkages Risk Assessment .....	14

## APPENDICES

### Appendix 1

Figures

### Appendix 2

CEMP

# 1. INTRODUCTION

## 1.1 Project Background

Ramboll UK Limited ("Ramboll") has produced this Amenity Risk Assessment (ARA) report for Thorpe Marsh Landfill (the "site") as part of our ongoing support to Thorpe Marsh Green Energy Hub Limited ("TMGEHL" or herein "the Client"). The landfill is to be redeveloped into a Battery Energy Storage System ("BESS"), and the design works are ongoing.

Thorpe Marsh Landfill is a regulated waste disposal site covered by an Environmental Permit (WML number WD20D53, originally granted in 1977, now EPR/CP3091SC/V002). The permit allowed the disposal of Pulverised Fuel Ash ("PFA") as well as domestic, commercial, and industrial wastes from the adjacent Thorpe Marsh Power Station. The landfill was operated prior to the implementation of the 2001 Landfill Directive (LfD) and was designed as a 'dilute and disperse' land-raise landfill. The waste disposal cell was formed by the construction of a three sided, 'U' shaped ("horseshoe") bund using PFA. Within the cell, limited or no PFA deposition took place, due to the closure of the Power Station in 1994 when the landfill was put into closure. In a discrete area at the southern end of the site PFA waste was co-disposed with other permitted waste types. These discrete waste areas will not be disturbed by the proposed development work.

The report provides an ARA for the potential impacts of the proposed permitted activities, which includes re-opening of the landfill to facilitate the creation of a development platform by re-profiling PFA from both the eastern and western arms of the 'U' shaped bund. The landfill will subsequently be redeveloped into a BESS.

## 1.2 Objectives and Scope of Works

The objective of this report is to assess the potential impact that permitted activities on site could have on local sensitive receptors. This includes identification of potential sources of harm or nuisance, pathways and receptors, and completion of an initial risk screening to identify potential risks which require further, detailed assessment.

This assessment has been undertaken in accordance with current guidance on 'Risk assessments for your environmental permit'<sup>1</sup> dated 21<sup>st</sup> November 2023.

## 1.3 Constraints and Limitations

This report has been prepared by Ramboll exclusively for the intended use by the Client in accordance with the agreement between Ramboll and the Client defining, among others, the purpose, the scope and the terms and conditions for the services. No other warranty, expressed or implied, is made as to the professional advice included in this report or in respect of any matters outside the agreed scope of the services or the purpose for which the report and the associated agreed scope were intended, or any other services provided by Ramboll.

In preparation of the report and performance of other services, Ramboll has relied upon publicly available information, information provided by the Client and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll was accurate, complete, and available to Ramboll within the reporting schedule. Ramboll did not undertake full time supervision of the site investigation, and so has had to rely on the Client providing much of the general information on the works.

Ramboll's services are not intended as legal advice, nor an exhaustive review of site conditions and / or compliance. This report and accompanying documents are initial and intended solely for the use and benefit of the Client for this purpose only and may not be used by or disclosed to, in whole or in part, any other person without the express written consent of Ramboll. Ramboll

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<sup>1</sup> Risk assessments for your environmental permit - GOV.UK ([www.gov.uk](http://www.gov.uk))

neither owes nor accepts any duty to any third party, unless formally agreed by Ramboll through that party entering into, at Ramboll's sole discretion, a written reliance agreement.

Unless otherwise stated in this report, the scope of services, assessment and conclusions made assume that the site will continue to be used for its current purpose and end-use without significant changes either on-site or off-site.

The ground investigation works described were undertaken during a discrete period of time. The findings and conclusions presented in this report are accordingly factually limited by these circumstances. The previous field investigations were restricted to a level of detail necessary to meet the stated objectives of the services. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant period of time has elapsed since the sampling took place. The interpretation of the geological and environmental quality conditions is therefore based on extrapolation from point-source data in a heterogeneous environment (i.e., the site conditions are not fixed; chemical quality will vary over time and also reflecting the variable nature of ground permeability).

Unless stated otherwise, the geological information provided is for general environmental interpretation and should not be used for other geotechnical and / or design purposes.

## 2. SITE BACKGROUND

### 2.1 Site Description

The site is located to the west of the former Thorpe Marsh Power Station (which was active between 1963 and 1994), approximately 6 km north of Doncaster town centre. The approximate centre of the site is at National Grid Reference 459480, 409490. A site location plan is presented as Figure 1, Appendix 1.

The original permit installation boundary drawing associated with WML number WD20D53 is shown on Figure 2, Appendix 1. The total permit site area extends to approximately 61 Ha (hectares). This includes c.17 Ha of land to the west which is currently occupied by the Thorpe Marsh Nature Reserve and the eastern 44 Ha comprises the former Thorpe Marsh Power Station pulverised fuel ash (PFA) landfill. The landfill plot is unsurfaced and is mostly covered by naturally regenerating grassland and some small areas of scrub / woodland. The outer flanks were spread with a thin layer of topsoil historically and there are isolated areas of hard standing and surfaced roads.

The surrounding land use comprises predominantly agricultural land including the following:

- To the north, the existing Network Rail freight line with agricultural fields and minor roads beyond. Approximately 0.9 km from the northern boundary is the village of Thorpe-in-Balne.
- To the east, the former Thorpe Marsh (coal-fired) Power Station site (now demolished) and the existing National Grid 400 kV Thorpe Marsh Substation. Further to the east, Thorpe Bank (road), the River Don (approx. 1km), agricultural fields, and the River Dun Navigation. Approximately 1.5 km from the eastern boundary is the village of Barnby Dun.
- To the south, the EA Beck (also referred to in documentation as the Thorpe Marsh Drain), agricultural fields and Fordstead Lane (road). Approximately 2 km from the southern boundary is the village of Arksey.
- To the west, the (Yorkshire Wildlife Trust managed) Thorpe Marsh Nature Reserve (with Thorpmere Pond present) followed by agricultural fields and another Network Rail line beyond. Approximately 4.75 km from the western boundary are the towns or Adwick-le-Street and Carcroft.

The raised Ea Beck is present approximately 90 m south and it is flanked by levees. Beyond the Ea Beck there is a further ground level drain located from approximately 20m with a network of drains in the wider agricultural land.

### 2.2 Proposed Activities

The proposed activities include the excavation, relocation and compaction of approximately 400,000m<sup>3</sup> of PFA, which will be placed on top of existing landfill waste. No additional waste is proposed to be imported to site.

The source of the PFA will be the eastern and western arms of the existing 'U' shaped bund, which will be relocated into the center of the bund and compacted to form a development platform for the BESS. The development platform will also provide a low permeability cap to the existing deposits, with new surface water drainage taking run-off to attenuation ponds located to the south and south-east of the landfill, prior to discharge under consent.

The PFA has become partially consolidated over time, so a mechanical screener will be used to remove oversize material for crushing prior to placement.

PFA is a non-hazardous waste. Other waste types are not anticipated, however if encountered these will be segregated and disposed of off-site.

PFA will be routinely sampled for laboratory analysis to check its chemical composition and waste classification. PFA which does not meet the acceptance criteria for the landfill will be segregated for off-site disposal, however the presence of out-of scope material is not anticipated based on investigation data obtained to date.

There are no existing building structures on the site and therefore no significant demolition activities will take place other than groundworks relating to the PFA.

## 3. POTENTIAL SOURCES OF RISK

### 3.1 Deposition on Land

The proposed permit variation activities will generate potential sources of pollution from the PFA to be re-deposited including landfill gas and leachate.

PFA is not anticipated to produce contaminated vapours. PFA is also not biodegradable so cannot produce landfill gases. There is untreated domestic waste within the historical landfill, but this waste will not be excavated as part of these works. Therefore, there is not anticipated source or hazard from ground gas.

Asbestos waste is also not proposed to be excavated and re-deposited as part of the proposed activities.

### 3.2 Discharge to Surface Water

The final landfill will discharge surface water run-off via attenuation ponds to the toe drains under the site's existing discharge consents. Reference should be made to the Environmental Setting and Installation Design (ESID) report<sup>2</sup>.

### 3.3 Accidents

Examples of possible accidents include:

- Plant or equipment failure;
- Blocked drainage;
- Release of surface water drainage prior to testing;
- Vandalism;
- Localised flooding due to ponding of surface water;
- Uncontrolled release of waste materials (i.e. office/general waste from construction activities); and
- Inadequate secondary containment of fuel storage for mobile plant;

### 3.4 Fire

Large scale fires are unlikely as the PFA is not readily ignitable/flammable and has already been subject to combustion processes. Small fires relating to plant machinery/general waste storage are considered to be unlikely.

Although potential risks from the site's future use as a BESS are not a permit related activity, battery fires are considered in this risk assessment in the context of potential effects on the integrity of the new landfill cell that underlies the BESS and its associated infrastructure including surface water drainage.

### 3.5 Odour

The proposed activities are unlikely to generate significant sources of odour as the PFA does not contain degradable waste and is odour free. Construction waste will be present though is unlikely to generate significant odours.

### 3.6 Noise and Vibration

Sources of noise and vibration are excavators, dumper trucks and other plant machinery used to excavate and re-deposit the PFA. In addition, some PFA will be compacted after its laid which

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<sup>2</sup> Ramboll UK Ltd. Thorpe Marsh Landfill (EPR/CP3091SC/V002) Environmental Setting and Installation Design. Dated June 2021. Ref. 1620016237-012-RAM-RP-SS-00004.



may involve vibration compaction from rollers, although heavy duty compaction using drop weights etc will not occur.

Some small ancillary equipment will also be used including water bowsers, construction plant and generators though this is not expected to generate significant noise.

### **3.7 Flooding**

Localised flooding of the site may occur due to ponding of rainfall. Surface waters may contain elevated suspended solids.

### **3.8 Fugitive Emissions**

#### **3.8.1 Dust**

Excavation, movement and re-deposition of PFA has the potential to generate dust during dry conditions.

#### **3.8.2 Mud**

Mud on vehicles travelling off-site is unlikely as the majority of site activities include movement of existing waste only, with no additional waste to be brought on to site. There is limited potential for mud to be generated.

#### **3.8.3 Litter**

Litter is unlikely due to the waste to be excavated and re-deposited. Locally waste associated with the construction activities will be present and stored in discrete areas, most likely the construction compound.

#### **3.8.4 Pests**

Pests such as birds and vermin are unlikely as the PFA is non-biodegradable. Domestic waste is not to be excavated and re-deposited as part of the proposed permitted activities. There is a limited potential for pests to be attracted to construction general waste storage.

#### **3.8.5 Unexpected Pollutants in Surface Water Discharge**

Storage of chemicals and fuels will include those for mobile plant only and are likely to be of small volume stored centrally at the construction compound under controlled conditions.

No other potential sources of pollutants in surface water run-off have been identified.

### **3.9 Visible Emissions**

No visible emissions are anticipated as part of the proposed activities.

### **3.10 Bioaerosols**

Bioaerosols are not anticipated as part of the proposed activities.

### **3.11 Unexpected Ground Conditions**

The landfill has been subject to intrusive investigation, and this has consistently identified the presence of PFA across the area and the horseshoe bund. There are reported to be discrete areas of asbestos waste in the north-east of the site, though the scheme will not disturb this ground, nor will it disturb the areas where commercial power station waste was disturbed in the south of the site.

### **3.12 Summary**

The hazards identified above have the potential to escape beyond the site boundary and cause an amenity nuisance to sensitive receptors or harm the environment and human health. For each possible hazard, an assessment of the risk that it poses to potential sensitive receptors has been carried out, considering the control measures that will be in place.

## 4. POTENTIAL RECEPTORS

A search for possible sensitive receptors within a 1km radius of the site has been undertaken using publicly available information sources and the Phase I Geotechnical & Contaminated Land Desk Study dated October 2023. Distances are provided from the boundary of the waste permit (excluding the Thorpe Marsh Nature Reserve, as although within the permit boundary, no waste has been deposited in this area). The findings of this search are summarised below and presented on Figure 3, Appendix 1.

### 4.1 Human Health

- Onsite: Future on-site users, such as the maintenance and security workers;
- Off-site: Members of the public on footpaths (located along the southern boundary);
- Residential properties: Small farmhouses located between 190m and 540m north. These locations also include commercial buildings associated with the respective farm operations;
- A National Grid compound is located 540m to the east; and
- Members of the public, walking on footpaths or at Thorpe Marsh Nature Reserve.

### 4.2 Groundwater

The underlying Hemingbrough Glaciolacustrine Formation is designated as an Unproductive Strata and is not considered to be a sensitive groundwater receptor. The underlying Hemingbrough Glaciolacustrine Formation is designated as an Unproductive Strata and therefore not considered to be a sensitive groundwater receptor.

The Alluvium (located immediately east of the site) is designated as a Secondary A Aquifer which comprises permeable layers that can support local water supplies and may form an important source of base flow to rivers. However, this is likely to be of limited thickness and extent. The Secondary A Aquifer is unlikely to be used for potable or commercial water supply due to limited lateral extent and thickness.

The bedrock geology comprising the Chester Formation is designated as a Principal Aquifer which has a high intergranular and / or fracture permeability meaning it is highly likely to provide a high level of water storage and may also support water supply and / or river base flow on a strategic scale.

The site is located within Zone III (Total Catchment) of an EA designated groundwater Source Protection Zone. This is the total catchment area around the source (point of abstraction), where pollutant travel times are greater than 400 days.

There are five licensed groundwater abstractions within a 2 km radius of the site, with the nearest located approximately 370 m east of the site and utilised for general industrial use (by National Power Plc); and 890 m to the north-east of the site utilised for general farming and domestic purposes with abstractions taken from the underlying Sherwood Sandstone.

### 4.3 Surface Water

Potential surface water receptors include:

- Thorpe Marsh Drain (Ea Beck) (surface water to south and east of the site). Although the drain is not in hydraulic connectivity with groundwater beneath the site as it is topographically higher, this is considered as a receptor as it's the location of the recorded discharge consent for surface water run-off from the landfill. This is located approximately 30m to the south-west of the WML permit boundary and c.250m south-west from the new landfill cell, albeit there is no clear pathway to the EA beck as the toe drains appear silted up;
- The land drain beyond the EA Beck; and

- The adjacent Thorpe Marsh Nature Reserve and Thorpemere Pond is located within the wider WML permit boundary.

The two inner surface water toe drains for the existing landfill are not considered to be sensitive surface water receptors.

#### 4.4 Ecological Designations

Vegetation is present on-site over the existing PFA landfill, but is generally of limited ecological value. The vegetation will be cleared prior to the works commencing and will be managed through the planning system, including achieving Biological Net Gain (BNG) targets.

An Ecological Impact Assessment<sup>3</sup> undertaken for the proposed BESS development identified protected species on site including badger setts, Great Crested Newts, bats and breeding birds. The protection of ecology will be managed in accordance with the requirements of the planning permission for the site.

Thorpe Marsh Nature Reserve Local Wildlife Site is located within the permit boundary and adjacent to the west of the landfill and extends to approximately 70ha and includes waterbodies, diverse grasslands, hedgerows and small woodlands. This site will not be significantly disturbed by the potential development.

#### 4.5 Summary of Receptors

A summary of the identified sensitive receptors is provided in Table 4.1 below. Distances provided are from the proposed new landfill cell.

**Table 4-1 – Sensitive Receptors**

Name	Receptor Type	Distance (m)	Direction from Site
Chester Formation Principal Aquifer (SPZ III Outer Zone)	Groundwater	0	na
Protected species (bats, birds, Great Crested Newts and badgers)	Ecology and habitat	0	na
Secondary A Aquifer in alluvium	Groundwater	0	East
Walkers on public footpaths and nature reserve	Human health	Adjacent	North, south and west
Thorpe Marsh Drain (Ea Beck)	Surface water	c.250	South, south-east and east
Land drain	Surface water	c.350	South, south-east and east
Thorpe Marsh Nature Reserve	Surface water and habitat	c.140-200	West
Sickle Croft Farm	Residential	190	North

<sup>3</sup> Ecological Impact Assessment, Thorpe Marsh Green Energy Hub, Rocket Ecology Ltd, reference RE23/046/05 dated June 2024

Railway	Property	230	North
National Grid Compound	Industrial	540	East
Ash Tree Farm	Residential	540	North
Winteringham Farm	Residential	635	North
Thorpe in Balne	Residential	880	North
Barnby Dun	Residential	950	East
Almholme Farm	Residential	830	South-west

## 5. RISK SCREENING

The following table provides an assessment of each hazard source, pathway and sensitive receptor, the risk management measures to be implemented, probability of exposure, consequences of exposure and an overall risk rating from Low (little or no risk) to High (high risk) once all risk management measures have been taken into account.

**Table 5-1 – Pollutant Linkages Risk Assessment**

Source / Hazard	Pathway	Receptor	Risk Management	Probability	Consequence	Overall Risk
Deposition on land	Leaching	Principal Aquifer in the Chester Formation and SPZ III Secondary A Aquifer (alluvium)	PFA is already of a relatively low permeability and relocated PFA will be compacted to further reduce permeability. Further assessment provided in the hydrogeological risk assessment, with management included in the Environmental Setting and Installation Design Report.	Low	High	Low - if control measures / landfill design implemented
	Leaching	Thorpe Marsh Nature Reserve & Thorpmere Pond Thorpe Marsh Drain (Ea Beck) and Toe Drains	PFA is already of a relatively low permeability providing a restricted migration pathway. Further assessment provided in the hydrogeological risk assessment, with management included in the Environmental Setting and Installation Design Report.	Low	High	Low - if control measures / landfill design implemented
	Disturbance of on-site ecological receptors during landfill operation	Wildlife and habitats	Landscape and Habitats Management Plan to be followed during the lifetime of the permit. Requirement for Biodiversity Net Gain to be implemented as part of the planning regime for the development as a positive aspect of the work.	Low	Medium	Low - if control measures implemented
Discharge to Surface Water	Entrainment of sediment into surface water run-off, followed by direct discharge under consent	Thorpe Marsh Drain (Ea Beck)	Construction Environmental Management Plan produced (appended). An initial drainage design has been developed for the scheme and surface water will be directed to a series of attenuation ponds at the southern end of the site and then discharged through the existing discharge consent. Further detailed design stage to be undertaken addressing surface water management.	Low	Medium	Low - if control measures implemented following detailed design stage.

Source / Hazard	Pathway	Receptor	Risk Management	Probability	Consequence	Overall Risk
Accidents: Plant or equipment failure, blocked drainage, release of drainage prior to testing, vandalism, and inadequate secondary containment of fuel storage for mobile plant	Spillages, release of pollutants and ponding of water	Humans, wildlife and local watercourses	Appropriate selection of plant. Regular site, equipment and storage inspections. Drainage systems to be regularly inspected and managed to avoid blockages. Site security maintained. Construction Environmental Management Plan produced.	Low	Low	Low - if control measures implemented
Fire	Aerial dispersion Use of water to suppress fires.	Humans, wildlife, groundwater and surface water	Follow manufacturer guidance and instructions on plant maintenance. Site inspections to identify faulty equipment and other fire hazards. Maintain site security to prevent deliberate fires caused by trespassers. Fire management plan and basic controls (e.g. fire extinguishers stored at construction cabins or at work areas). Site is located within a rural area with low numbers of human receptors. BESS containers have in-built fire detectors and chemical fire suppression.	Low	Medium	Low
Noise and vibration	Aerial dispersion / ground movement	Human and wildlife disruption	Construction Environmental Management Plan produced. The equipment required to transport and handle the waste generates low noise. The distance between the site and the nearest sensitive receptors will mitigate	Low	Low	Low

Source / Hazard	Pathway	Receptor	Risk Management	Probability	Consequence	Overall Risk
			<p>the noise and vibrations. Heavy duty compaction is not anticipated to be required.</p> <p>Regular maintenance of plant and equipment.</p> <p>Work only within standard day time construction hours.</p>			
Flooding of site	Ponding of rainfall and surface run-off	Human health and wildlife	<p>Construction Environmental Management Plan produced.</p> <p>The existing parts of the landfill which will not be re-profiled to the south, east and west of the new landfill cells are likely to form a bund to prevent flood water moving off-site.</p> <p>If localised flooding occurs this will be pumped to surface water courses under the existing discharge consents following laboratory analysis for pollutants.</p>	Low	Low	Low
Dust	Aerial dispersion	Humans, wildlife and surface waters	<p>Dust and Emission Management Plan (DEMP) produced including proposed mitigation.</p> <p>PFA does not contain contaminants which would be a potential risk to human health from dust emissions.</p>	High	Medium	Low - if control measures implemented in line with the DEMP
Unexpected pollutants in surface water discharge	Spillages	Groundwater and surface water	<p>Small volume fuel storage only on site.</p> <p>All fuel storage tanks will have secondary containment and small refuelling containers will be placed on drip trays in areas of bunded hardstanding when not in use.</p>	Low	Low	Low
Unexpected conditions in the ground	Aerial deposition or contamination of surface water	Humans, wildlife and surface waters	<p>Solely PFA is expected to be disturbed, other localised and discrete areas of waste disposal (including the asbestos disposal area) are not intended to be disturbed by the work based on the design. If unexpected materials are identified locally in the</p>	Low	Medium	Low



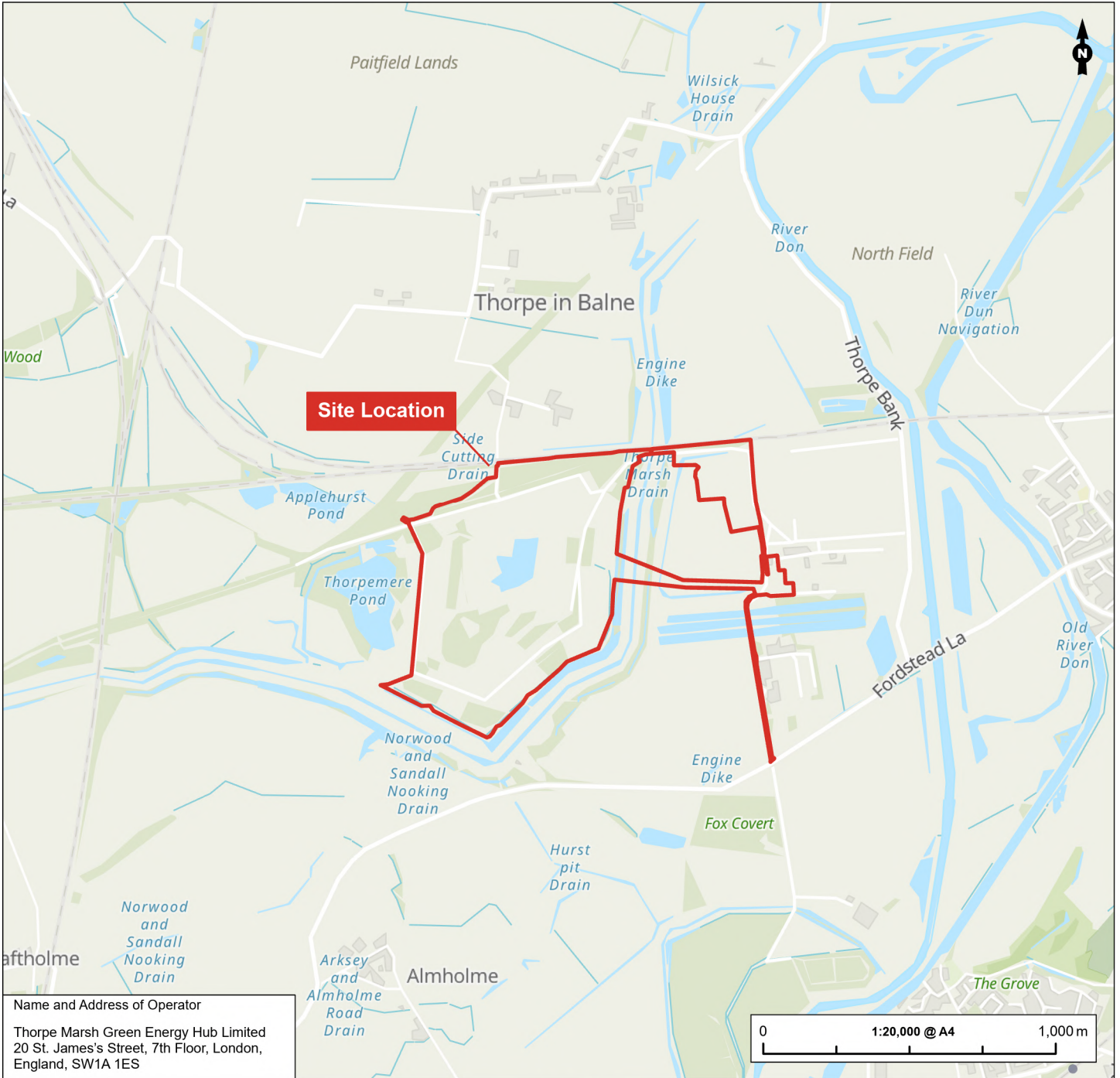
Source / Hazard	Pathway	Receptor	Risk Management	Probability	Consequence	Overall Risk
			ground these will be managed as an 'unexpected find' and further risk assessment take place to determine the nature of the controls that are required. In general terms the use of dust suppression techniques in accordance with the DEMP will reduce the potential for diffuse contaminants associated with the PFA to be released into the air.			

## 6. CONCLUSIONS AND RECOMMENDATIONS

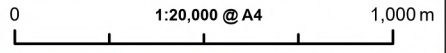
This report was prepared by Ramboll, on behalf of Thorpe Marsh Green Energy Hub Ltd, and presents the objectives, scope, findings and conclusions of an amenity risk assessment undertaken for the proposed Thorpe Marsh Green Energy Hub, Battery Energy Storage System development.


Contractors undertaking work on the site must undertake the work in accordance with the measures and requirements set out herein, and in the DEMP, to ensure that nearby receptors are not significantly affected by the work.

## **APPENDIX 1 FIGURES**



Name and Address of Operator  
 Thorpe Marsh Green Energy Hub Limited  
 20 St. James's Street, 7th Floor, London,  
 England, SW1A 1ES



	Figure Title <b>Site Location</b>	Project Name <b>Thorpe Marsh Landfill (EPR/CP3091SC/V002)</b>	Date <b>May 2024</b>	
	Client <b>Thorpe Marsh Green Energy Hub Limited</b>	Project No./Filey ID <b>1620016237 / REH2023N03018</b>	Prepared By <b>PH</b>	Figure No. <b>1</b>
			Scale <b>As Shown</b>	Revision <b>1.0</b>



### Legend

- Planning Boundary
- Environmental Permit Boundary
- New PFA Cell Boundary

#### Name and Address of Operator

Thorpe Marsh Green Energy Hub Limited  
 20 St. James's Street, 7th Floor, London,  
 England, SW1A 1ES

#### Figure Title

Site Layout

Project Name  
**Thorpe Marsh Landfill**  
 (EPR/CP3091SC/V002)

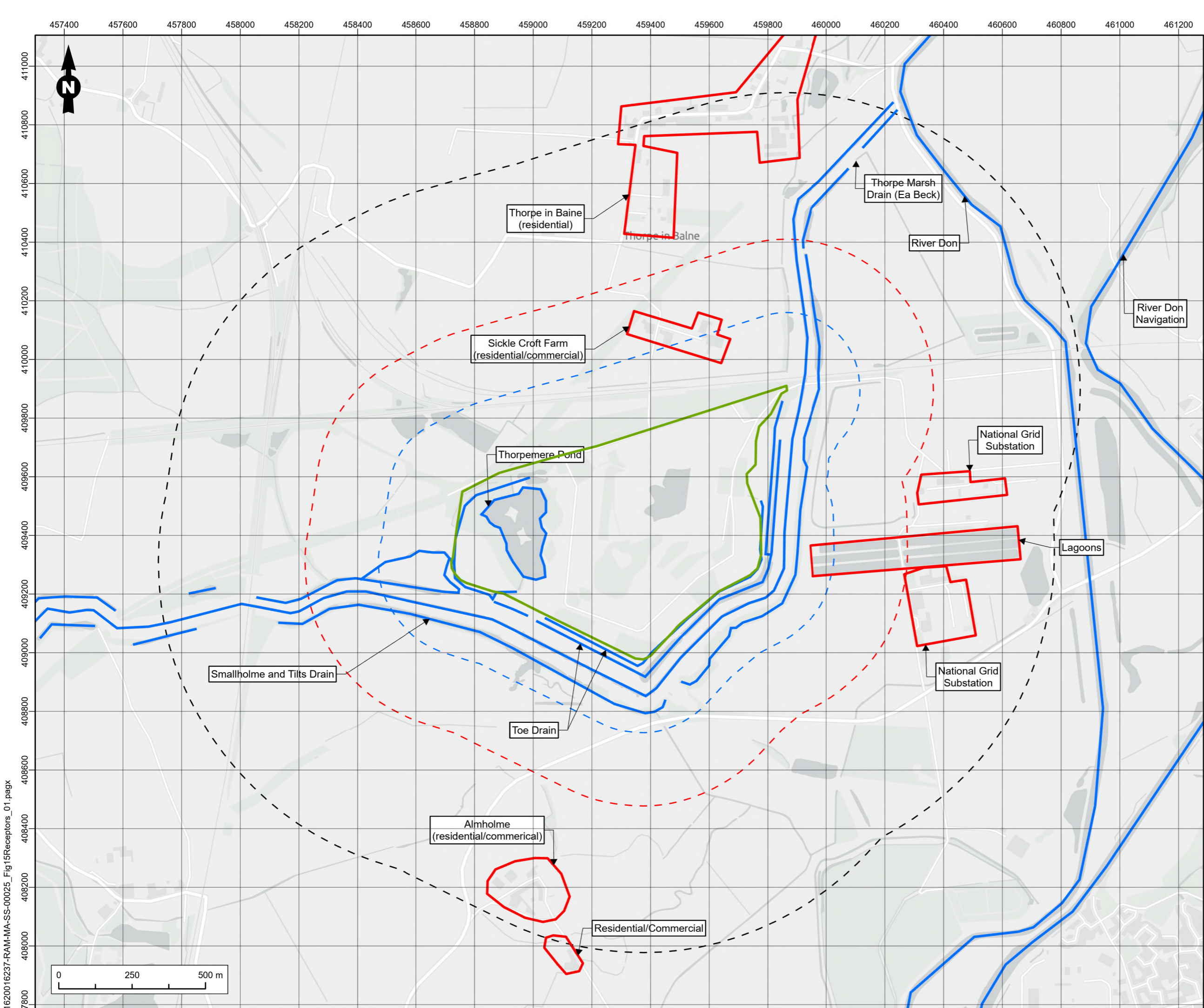
Project No./Filey ID  
 1620016237 / REH2023N03018

Date	Figure No.	Revision
May 2024	2	1.0

Prepared By PH	Scale 1:10,000 @A4
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Client  
**Thorpe Marsh Green  
 Energy Hub Limited**





**Legend**

- Environmental Permit Boundary
- Distance from Permit Boundary**
- 250 m
- 500 m
- 1 km

Name and Address of Operator		
Thorpe Marsh Green Energy Hub Limited 20 St. James's Street, 7th Floor, London, England, SW1A 1ES		
Figure Title		
Conceptual Site Model (CSM) Receptors		
Project Name		
Thorpe Marsh Landfill (EPR/CP3091SC/V002)		
Project No./Filey ID		
1620016237 / REH2023N03018		
Date	Figure No.	Revision
May 2024	3	1.0
Prepared By	Scale	
PH	1:12,000 @A3	
Client	Thorpe Marsh Green Energy Hub Limited	



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## **APPENDIX 2**

### **CEMP**



## THORPE MARSH GREEN ENERGY HUB

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# CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN



### DOCUMENT HISTORY

Rev.1



## **Executive Summary**

This Construction Environmental Management Plan (“CEMP”) document advises how potential risks associated with the development and construction at the Thorpe Marsh Green Energy Hub (“TMGEH”) will be managed, thus avoiding impacts.

The CEMP sets the standards of environmental performance for the site and the criteria contained in this document forms the basis against which the site will be audited during construction.

The primary purpose of this document is to outline the various working practices that will be involved throughout the construction and operational life of the site. The CEMP is site-specific enabling factors unique to the TMGEH operation to be addressed.

The document describes how the site will be developed in an environmentally suitable manner through managing the site’s environmental aspects. The scope of this CEMP covers all activities, whether conducted directly by TMGEH or indirectly by contractors and suppliers.

The CEMP is a live document and shall be reviewed and updated regularly during the project to record and manage any changes as they develop.

The TMGEH Environmental Management System (EMS) will be subject to regular audits to ensure that the management system process is implemented correctly and effectively.

## Table of Contents

1.0 Introduction .....	4
1.1 Planning Reference Number .....	4
1.2 Development Site Address .....	4
1.3 Project Description .....	4
2.0 Construction Site Management.....	4
2.1. General Management.....	4
2.2 Site Management Responsibilities .....	4
2.3 Environmental Documentation.....	5
2.4 Welfare Facilities .....	5
2.4.1 Site Offices .....	5
2.4.2 Site Welfare .....	5
2.4.3 Visitor Parking.....	6
2.4.4 Welfare Services .....	6
2.4.5 Site Lighting .....	6
2.4.6 Site Security .....	6
2.5 Site Operations.....	6
2.5.1 Working Hours .....	6
2.5.2 Traffic Management .....	7
2.5.3 Wheel Wash Facilities .....	7
2.5.4 Oil, Fuels, and Chemicals .....	7
2.5.5 Deliveries .....	7
2.5.6 Noise and Vibration.....	7
3.0 Prevention of Dust and Air Emissions. ....	10
3.1 Cut and Fill of Earthworks Phase. ....	10
4.0 PFA Management .....	11
4.1 PFA Handling.....	11
4.2 PFA Storage .....	11
5.0 Concrete Washout .....	12
6.0 Waste Management .....	12
7.0 Drainage and Water Treatment .....	13
8.0 Ecology.....	13
9.0 Complaints and Incidents.....	14

## 1.0 Introduction

### 1.1 Planning Reference Number

1.1.1 The planning application for this project was submitted to the City of Doncaster Council in March 2023. The planning reference for this project is 23/00537/FULM.

### 1.2 Development Site Address

1.2.1 Thorpe Marsh Green Energy Hub (TMGEH) project is located at Ash Fields Road, Thorpe-in-Balne, Doncaster, South Yorkshire. DN6 0EA. The Grid reference is SE 59479 09658.

1.2.2 The access to the TMGEH site is via: Fordstead Lane transiting adjacent to the National Grid substation on to West Circuit and then to Ashfield Road.

### 1.3 Project Description

1.3.1 TMGEH is a 1.45GWe Battery Energy Storage System (BESS) project.

1.3.2 The proposed project shall be constructed on brownfield land which was used to stockpile Pulverised Fuel Ash (PFA) produced from the former Thorpe Marsh Power Station, which was de-commissioned in 1994. Demolition of the power plant site commenced in 1995 and was completed in 2012.

1.3.3 The main project shall consist of 5 x 280MWe BESS arrays. Each array will connect into a 400kV banking station before connecting via an underground 400kV cable, which connects into National Grid's Thorpe Marsh sub-station.

In addition to the main project, it is proposed to construct a 50MWe BESS plant located within the fence line of the main facility.

## 2.0 Construction Site Management

### 2.1. General Management

2.1.1 It is the joint responsibility of the TMGEH site management team and their contractors to ensure the requirements of this CEMP are implemented and always maintained.

The environmental standards set out in the CEMP are key to the success of the TMGEH project and site management.

### 2.2 Site Management Responsibilities

2.2.1 The TMGEH site management team shall be responsible for ensuring compliance with the CEMP.

2.2.2 The TMGEH site management team will carry out inspections of working areas and surrounding areas to ensure that the requirements of the CEMP are endorsed. All anomalies shall be recorded and immediately rectified where practicable.

## 2.3 Environmental Documentation

2.3.1 All site related documents will be available on site and will be kept up-to date by the site management team.

2.3.2 Site environmental audits shall be undertaken to assess the site's environmental performance against the CEMP. All observations and actions shall be recorded and close out actions will be implemented.

## 2.4 Welfare Facilities

### 2.4.1 Site Offices

2.4.1.1 The site offices shall be located within a fenced area. The site office compound will be locked and patrolled by the security team during out of business hours.

2.4.1.2 There will be information signage for muster points in the eventuality of an emergency. The signage will include management contact information providing instructions on how the Site manager may be contacted if the office is unattended. The signage boards shall be located on the site access road, site office compound entrance and at strategic points around the construction site perimeter fence.

2.4.1.3 The internal and external condition of site offices will be maintained in good repair.

### 2.4.2 Site Welfare

2.4.2.1 The welfare facility shall be compliant with Construction and Design Management (CDM) Regulations 2015 i.e.

- a) **Sanitary Conveniences** - Suitable and sufficient sanitary conveniences will be provided. Separate conveniences will be provided for both Male & Female personnel and the facilities will be made available at readily accessible places.
- b) **Washing Facilities** - Washing facilities will be equipped with soap or other suitable means of cleaning, and towels or other suitable means of drying. The facility will have a supply of clean hot and cold, or warm water and will be located local to the sanitary facilities.
- c) **Drinking Water** - An adequate supply of drinking water must be provided or made available at readily accessible and suitable places. Where necessary for reasons of health or safety, every supply of drinking water must be conspicuously marked by an appropriate sign.
- d) **Changing Rooms and lockers** - Suitable and sufficient changing rooms will be provided or made available at readily accessible. Where necessary for reasons of propriety, there will be separate changing rooms for, or separate use of rooms, for men and women. Changing rooms will be provided with seating and adequate means of drying any special clothing and any personal clothing or effects. The facility shall, where necessary, make available a place for persons to lock away any special clothing which is not taken home, their own clothing which is not worn during working hours and their personal effects.
- e) **Facilities for rest** - Suitable and sufficient rest rooms or rest areas will be provided or made available at readily accessible places. The facility be equipped with an adequate number of tables and adequate seating with backs for the number of persons at work likely to use them at any one time. The facility will

include suitable arrangements to ensure that meals can be prepared and eaten, including the means for boiling water.

2.4.2.2 Lavatories, washing, shower and messing facilities will be maintained in a clean and hygienic condition. A cleaning resource shall be engaged throughout the project to service and maintain this requirement.

### 2.4.3 Visitor Parking

2.4.3.1 The TMGEH site car park will be physically separated from areas where mobile plant or lorries are operated or parked by installing demarcation barriers.

2.4.3.2 The car park will be surfaced with either crushed stone, hard core or similar material that is fit for purpose.

2.4.3.3 Suitable visitor car parking will be provided.

2.4.3.4 All site plant will be prohibited from entering the site car park. A separate area will be provided for parking plant and site vehicles.

2.4.3.5 Bicycle racks and a number of electrical vehicles charging facilities will be provided within the car parking area.

### 2.4.4 Welfare Services

2.4.3.1 All drainage from sinks, showers and lavatories will be connected to a septic tank. Drainage effluent will be removed on a periodical basis via a licenced environmental waste removal company.

### 2.4.5 Site Lighting

2.4.5.1 All lighting rigs used on the TMGEH project site will be LED downward facing to minimise light pollution.

2.4.5.2 All floodlights on the TMGEH project site will be switched off during daylight hours. The exception to this will be any lighting required for security or safety purposes.

### 2.4.6 Site Security

2.4.6.1 During the construction phase Security staff will monitor the site 24/7, 365 days per year.

2.4.6.2 Security staff shall be provided with emergency and out of hours contact details.

2.4.6.3 The welfare compound will be surrounded by a security fence and warning signs; regular patrols shall be conducted.

## 2.5 Site Operations

### 2.5.1 Working Hours

2.5.1.1 The working hours for the development and construction site (including equipment and material deliveries) are forecast to be 07.00 to 18.00 hours Monday to Friday and 07.00 to 13.00 hours Saturdays. The project working hours will be subject to LPA approval.

## 2.5.2 Traffic Management

2.5.2.1 During construction, a traffic management plan will be agreed with the Local Planning Authority minimising the potential impact of construction traffic. Vehicle traffic routes and vehicle HGV numbers will be subject to LPA approval.

2.5.2.2 Abnormal Indivisible Loads (AIL)s may need to be brought into the proposed development site during the construction phase.

These types of movements can usually be planned, and the contractor will liaise with the Local Highway Authority to ensure that all required procedures and agreements are complied with.

Details of the routing strategy and procedures for the notification and conveyance of AIL, including agreed routes, and the number of abnormal loads to be delivered by road and measures to mitigate traffic impact will be agreed with City of Doncaster Council (CDC) and where relevant, National Highways (NH) abnormal loads officers.

## 2.5.3 Wheel Wash Facilities

2.5.3.1 A wheel wash facility will be supplied. The TMGEH site management team or their contractor will facilitate and manage this requirement.

## 2.5.4 Oil, Fuels, and Chemicals

2.5.4.1 Any oils, fuels and chemicals will where possible not be stored on site. If necessary, they will only be in relatively small amounts and for short time periods. These materials will be used on site within the construction machinery and any generators and stored and used in accordance with relevant (COSHH) Regulations 2002.

2.5.4.2 All oils, fuels and chemicals shall be stored in twin bunded tanks, bowsers, or acceptable containers. Specifically, ensuring that any tanks storing more than 200 litres of oil on-site, would have secondary bunding. Bunding would be specified as having a minimum capacity of “not less than 110 % of the container's storage capacity or, if there is more than one container within the system, of not less than 110 % of the largest container's storage capacity or 25 % of their aggregate storage capacity, whichever is the greater. Spill kits will be located local to each storage area and drip trays will be implemented during refuelling operations. The TMGEH site management team and their contractors will ensure competent suitably trained personnel undertake refuelling operations. Personnel will be adequately trained to deal with any potential environmental spills incurred during the filling and usage requirements.

2.5.4.3 All materials will be stored according to the Control of Substances Hazardous to Health (COSHH) Regulations 2002.

## 2.5.5 Deliveries

2.5.5.1 All deliveries of materials, plant, machinery, equipment, and apparatus shall be pre planned prior to arrival at site. Designated laydown and storage areas will be assigned for all deliveries.

## 2.5.6 Noise and Vibration

A noise impact assessment for the proposed Thorpe Marsh Green Energy Hub has been undertaken by Miller Goodall Ltd to accompany a planning application to the Local Planning Authority

The proposed Development involves reclamation through earthworks of existing material (the excavation, relocation and re-profiling of Pulverised Fuel Ash 'PFA') to facilitate the installation of battery storage units with associated infrastructure including inverters, transformers, access tracks and substation compound as well as ancillary infrastructure including fencing, security cameras, lighting and cabling.

The assessment includes estimation of site noise from the temporary earthworks that will involve the excavation, relocation and re-profiling of PFA and BESS groundworks and enabling infrastructure using the limits recommended in BS5228:2009+A1:2014 that have been adopted and the impact judged against National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE) and Noise Exposure Hierarchy. For the operational noise from the BESS infrastructure the impact assessment has been undertaken using the methodology in BS4142:2014+A1:2019 and judged against NPPF, NPSE and Noise Exposure Hierarchy.

During the temporary earthworks phase it is estimated that the noise level will not exceed the 55dB LAeq,T upper limit during daytime working hours, which has been set only if the works are to occur in excess of six months. It will also not exceed the 65dB LAeq,T upper limit if the works can be completed in less than six months. Therefore, this complies with BS5228, and the impact is not considered to be adverse.

During the construction for the ground works for the BESS, The construction noise levels are not expected to exceed 65dB LAeq,T during the daytime (7am-7pm) at the nearest noise sensitive premises. When compliance with this limit is judged against NPSE and the Noise Exposure Hierarchy the impact is at the No Observed Adverse Effect Level (NOAEL) and complies with policy position in Paragraph 185 in the NPPF which states significant adverse impacts should be avoided and adverse impacts should be mitigated and minimised.

For the operational BESS the predicted sound levels from the battery container and inverter Heating, Ventilation and Air Conditioning (HVAC) plant as well as the 132kv and 400kv transformers has been undertaken. The predicted sound levels, using the embedded mitigation in the scheme which includes blast walls up to 9m high for the transformers. As the proposed transformer details are not yet finalised the guaranteed sound power level of the all the transformers should not exceed 87dB LwA which will be secured by design at the procurement stage by the appointed supplier. Self-screening from battery containers and assumptions as to the location of the HVAC inlet/exhaust openings<sup>1</sup> demonstrates that the impact using the BS4142:2014+A1:2019 methodology is adverse at the nearest noise sensitive premises without the implementation of further acoustic mitigation measures.

The proposed mitigation includes reductions in sound emissions from the battery container and inverter HVAC plant which will be secured by at the procurement stage. The minimum reductions required are specified as being 5dB in each octave band from 125Hz to 2kHz.

The mitigated sound levels have been further assessed according to BS4142:2014+A1:2019 and the impact is concluded to be between low impact and less likely for adverse impact in the evening and night-time and low impact in the daytime. When the absolute predicted sound level (36dB LAeq,T) is taken into account and the assuming for an open window with people being within the dwelling during the evening and night-time period the expected internal level will be between 21-26dB LAeq,T. This is a very quiet level and would result in a final impact of Low.

2.5.6.1 Best Practicable Means (BPM) will be applied, as far as reasonably practicable, during construction works to minimise noise (including vibration) at neighbouring residential properties, active badger sets and other sensitive receptors arising from construction activities:

As noted, working hours will be limited to the times set out in section 2.5.1

2.5.6.2 All equipment will be maintained in good working order. Noise control measures will be fitted where appropriate for example, broadband reversing alarms, silencers, mufflers, and acoustic hoods to reduce noise where possible and limit the spread of noise to off-site receptors. Machines in intermittent use to be shut down in the intervening periods between work or throttled down to a minimum noise and vibration.

In addition, the following standard best practice will be implemented regarding noise emissions for the consented development:

- Planning deliveries and removals out of peak hours;
- Parking construction traffic off the public highway;
- Controlling the discharge of trucks from site to avoid congestion;
- Implementing traffic management systems at the entrances to the site at all times to control the traffic into the site;
- Maintaining the 2.4 m site hoarding around the site boundary to screen noise from low level sources and/or street level receptors;
- Agreeing working hours with the LPA;
- Using ‘silenced’ plant and equipment wherever possible and maintaining plant on a regular basis;
- Selecting electrically driven equipment where possible in preference to internal combustion powered; hydraulic power in preference to pneumatic; and wheeled in lieu of tracked plant;
- Regularly maintaining plant;
- Operating plant at low speeds where possible and incorporating automatic low speed idling;
- Siting noisy activities away from sensitive receptors, where possible;
- Temporarily screening or enclosing static noisy plant to reduce noise emissions and certifying plant to meet relevant standards;
- Implementing noise monitoring to accord with maximum levels set out in the ES;
- Minimising disturbance from reversing beepers through measures such as site layout, provision of screening or use of broadband sound emitting reversing alarms;
- Switching off vehicle engines where vehicles are standing for an extended period of time;
- Lowering materials whenever practicable rather than dropping; and



- Making all contractors familiar with the guidance in BS 52288 which would form a pre-requisite of their appointment.

2.5.6.3 Pumps, generators and lighting sets will be located to ensure that they are inaudible at the nearest noise sensitive premises.

2.5.6.4 The quietest working equipment available will be utilised, e.g., electric/battery powered equipment where possible.

2.5.6.5 All construction activities will be undertaken in accordance with good practice as set out in BS 5228:2009 (amended 2014).

### 3.0 Prevention of Dust and Air Emissions.

#### 3.1 Cut and Fill of Earthworks Phase.

3.1.1 The cut and fill earthworks phase (including the excavation, relocation, and compaction of the existing PFA on site) has a potential for fugitive dust emissions , due to the mechanical action of separating the material using plant, machinery, and equipment.

3.1.2 Dust monitoring shall be reviewed by the TMGEH site management team and their assigned contractors throughout the duration of the project. Dust suppression measures will be employed via water dampening down systems if and as required.

3.1.3 All potential complaints on dust /air quality shall be recorded with the root cause being identified and appropriate measures taken to reduce emissions in a timely manner.

This shall include the following measures:

- Display name and contact details of responsible person for dust issues on site boundary in addition to head / regional office contact information;
- Display the head or regional office contact information;
- Record all complaints and incidents in a site log;
- Take appropriate measures to reduce emissions in a timely manner, and record the measures taken within the log;
- Make the complaints log available to the Local Authority if requested;
- Record any exceptional dust incidents on or off site;
- Hold regular liaison meeting with other high-risk construction sites within 500 m;
- Undertake daily on and off-site visual inspections where there are nearby receptors;
- Carry out regular inspections to ensure compliance with the contractors dust management plan and record results in the site log book;
- Increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather;
- Avoid run off water and mud

- Enforce an on-site speed limit of 15 mph on surfaced roads and 10 mph on unsurfaced areas;
- Ensure adequate water supply for effective dust and particulate matter suppression;
- Ensure vehicles entering and leaving the site are appropriately covered;
- Inspections of haul roads to be recorded in site log, including any remedial action taken;
- Implement a wheel washing system;
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit;
- Access gates to be located at least 10 m from the receptors where possible;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos; • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust;

The Developer's nominated representative will ensure that all necessary precautions are taken to prevent the occurrence of smoke emissions or fumes from site plant or stored fuel oils for safety reasons and to prevent such emissions or fumes drifting into sensitive receptor areas. Plant will be well maintained, and measures taken to ensure that it is not left running for long periods when not directly in use.

The Developer's representative will ensure that any process and or equipment that require an environmental permit under The Pollution Prevention and Control Act 1999 and The Environmental Permitting (England and Wales) Regulations 2016 are operated in accordance with the conditions of that permit.

## 4.0 PFA Management

### 4.1 PFA Handling

4.1.1 PFA material handling activities at TMGEH will occur at the active PFA relocation areas, associated with excavating and tipping of material into the dump trucks, and handling at the loading areas. Material will be deposited from the dump trucks and then handled by wheeled loading shovel.

4.1.2 Material handling can be suitably controlled using common dust control techniques and mitigation, such as: reduced drop heights, dampening of surfaces and material, covered lorries, avoidance of double handling and the number of plant and machinery required.

### 4.2 PFA Storage

4.2.1 There will be temporary stockpiles of PFA on the site prior to it being relocated to a permanent fill area. No PFA shall be removed from the site boundary.

4.2.2 The process of stockpiling PFA is prone to generate dust. To mitigate this water bowsers fitted with a rain gun will be used to spray the active working area to prevent dust arising.

In general terms PFA is pozzolanic and the formation of a cementitious crust on PFA from damping down is known to be effective at preventing dust-blow. The main

considerations in the prevention of dust-blow are that the surface must be wetted through a controlled application using artificial sprays as necessary i.e. typically during prolonged dry weather. However, it will be necessary to not excessively water the PFA and create a slurry. Detailed controls on the working methods and mitigation controls should be documented in the Earthworks Contractors Method Statements.

## 5.0 Concrete Washout

5.1 Cement, and concrete washout water can have a detrimental effect on watercourses. The following management will prevent washout water from entering watercourses.

- a) Lorries will deliver pre-mixed concrete to the site and pour the concrete directly into the prepared excavations.
- b) For concrete washout purposes a pit or skip lined with an impermeable sheet and granular fill to assist in the settling process for concrete washout will be located near the construction compound, away from water courses.
- c) Wastewater from this process shall be reused as much as possible to wash out additional loads and removed for offsite licenced disposal.

## 6.0 Waste Management

6.1 TMGEH may produce relatively small amounts of both municipal / general waste from the site offices and hazardous wastes from the items of machinery on site. Hazardous wastes that may be produced because of the construction phase include engine, hydraulic and transmission oils along with oil filters and absorbents.

6.2 The TMGEH site will be registered with the Environmental Agency as a producer of hazardous waste.

6.3 A labelled, double-skinned waste oil tank will be provided for the collection of any waste engine, hydraulic and transmission oils. The waste materials will be removed from site by registered waste carriers to a waste management facility licensed to receive such waste and hazardous waste consignment notes will be completed and retained.

6.4 All waste shall be stored more than 10 metres away from any ditch, water lagoon, watercourse, or pond.

6.5 Different types of hazardous waste shall be stored separately in labelled containers for example drained engine oil filters and oil absorbents.

6.6 All hazardous waste produced on site shall be removed from site by registered waste carriers to a waste management facility licensed to receive such waste and hazardous waste consignment notes will be completed and retained.

6.7 All controlled non-hazardous waste produced on site shall be stored in designated lidded skips, separate from the hazardous waste.

6.8 All controlled non-hazardous waste shall be removed from site by registered waste carriers to a suitable licensed waste management facility and duty of care waste transfer notes will be completed and retained.

6.9 Bonfires and the burning of waste in the open will be prohibited.

## 7.0 Drainage and Water Treatment

7.1 It is proposed that surface water would be managed via a below ground perforated pipe collection system (French Drain). The pipe work shall run into attenuation storage ponds with discharge volumes to surface waters into Thorpe Marsh Drain. The water volumes in the ponds shall be controlled via means of a Hyrdabrake system The works will comply with applicable construction guidance and the Environment Agency's Guidance on Pollution Prevention (GPP).

7.2 Runoff during the construction period will be managed appropriately in line with the Environment Agency's Guidance on Pollution Prevention (GPP) and good practice.

The Contractor will comply with BS6031: 2009 Code of Practice for Earthworks, regarding the general control of site drainage during the construction activities and develop a method statement for control of surface waters during construction.

The Developer's nominated representative will work with the Lead Contractor and others involved in the site to ensure, that flood risk is managed safely throughout the construction period including use of the Environment Agency flood warning system and alerts, managing access and egress points and controls regarding excessive surface water generation on-site, to be defined further in the contractor's method statements.

The Contractor will ensure that any water that has come into contact with contaminated materials will be disposed of in accordance with either the appropriate waste regulations (if locally contaminated and requiring segregation), or the Water Industries Act 1991 (if discharged to sewer) and the Water Resources Act (if discharged to controlled waters, including being subject to controls and testing to confirm suitability prior to discharge) and all other related regulations and to the satisfaction of the EA and local water company.

PFA will be placed and compacted in layers to form a development platform with sloped sections and perimeters. This may involve the construction of profiled earthwork gradients in conjunction with temporary grips (channels) to control run-off. PFA is pozzolanic; so that when moistened PFA is exposed to the air its surface hardens to form a cemented skin that helps stabilise and retain PFA particles within the earthworks structure.

The formation of the cementitious skin on deposits of PFA prevents a large percentage of surface water from infiltrating through the mass of PFA and leaching contaminants. The earthworks contractor should always take precautions to allow settlement and filtration of the surface water run-off from the site. In this regard earthworks contractors will be responsible for putting together approved Method Statement(s) including measures to manage the environmental impacts of surface water run-off.

## 8.0 Ecology

8.1 Ecological surveys for various species have been undertaken and completed prior to the submittal of the planning application. Any mitigation measures suggested by the ecology survey team for each species will be employed during the construction phase to avoid any potential impacts.

8.2 A pre-construction Site walkover will be undertaken in advance of mobilisation/any potential advance works to re-confirm the ecological baseline conditions and to identify any new ecological risks.

## 9.0 Complaints and Incidents

9.1 Any complaint received will be logged at the TMGEH site offices. Complaints and incidents will be investigated and any necessary corrective and/or preventative action will be taken and recorded.

### Actions:

- a) A contact email address will be distributed to occupants of neighbouring premises before site operations commence. This detail will be posted on the signage boards located at the site offices and at strategic locations around the perimeter fence of the construction site. The contact details are TBC and subject to final permit details.
- b) All complaints and incidents shall be investigated, resolved, and closed out by the TMGEH site management team.
- c) All complaint closed out actions shall be fed back to the originator of the complaint.