

APPLICATION FOR AN ENVIRONMENTAL PERMIT - THURROCK FLEXIBLE GENERATING FACILITY

Environmental Risk Assessment

794-ENV-EPC-20502

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1 INTRODUCTION

1.1.1 This Environmental Risk Assessment (ERA) has been carried out in support of an application for an environmental permit for a gas-fired flexible generating facility, Thurrock Flexible Generating Facility (TFGF) at land southwest of Station Road, Tilbury, Essex, RM18 8UL.

1.1.2 The TFGF will comprise:

- 96 x 9.896 MW_{th} gas-fired reciprocating engines,

Note: The engines may operate in high power mode for up to 15 hours per year. In high power mode the thermal input of each engine is 10.8 MW_{th}.

1.1.3 Emissions from the generators will discharge to atmosphere via 48 x 20m stacks., each housing two flues.

1.1.4 There will be no process water discharges to sewer or surface water.

1.1.5 The assessment considers the potential risk to the environment and human health from the operation of the gas fired generating facility.

1.1.6 The Environment Agency's Risk Assessments for your environmental permit¹ covers a range of environmental risks. Those aspects relevant to the operation of the proposed TFGF are covered within the following sections:

- Section 2 identifies sensitive receptors in proximity to the facility.
- Section 3 provides the environmental risk assessment of 'Amenity and Accidents' hazards associated with the variation.
- Section 4 provides a summary of the screening assessment of point source emissions to air associated with the proposed new TFGF using the H1 Risk Assessment tool, which can be found in Appendix A to this ERA.

¹ Environment Agency, Risk assessments for your environmental permit, <https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit>

2 SENSITIVE RECEPTORS

2.1 The Site

- 2.1.1 The TFGF site occupies approximately 20 hectares approximately 1000 m east of Tilbury, Essex, centred on National Grid Reference TQ662766. The nearest existing postcode is RM18 8UL.
- 2.1.2 The site comprises open fields crossed by pylons and above ground electricity cables. The immediate surroundings are agricultural, with the exception of the existing National Grid Tilbury Substation and the site of the decommissioned Tilbury Power Station to the south, as well as a battery storage facility under construction, beyond which lies the River Thames. Other minor water bodies lie on and adjacent to the proposed site. A railway line passes to the north. Drawing 1 identifies the location in relation to its surroundings.
- 2.1.3 The closest residential property to the site is Walnut Tree Farm, 600m north of the proposed site, in the village of West Tilbury. The closest industrial receptor is Tarmac, Tilbury, around 775 m southwest of the plant.
- 2.1.4 The Air Quality Impact Assessment (Appendix E to the Supporting Information document) modelled the impact of emissions at the sensitive receptors identified at the planning consent stage. These, and any additional receptors identified in an EA Nature and Heritage Screening Report included as Appendix B to this report, are presented in Table 2-1. All SPA, Ramsar and SSSI sites within a 15km screening radius are included.
- 2.1.5 An Environment Agency Nature and Heritage Conservation report identified the following ecological receptors within the relevant screening distances:

Table 2-1: Protected Habitats within Relevant Screening Distances of the TFGF Site

Designation	Site
SPA, Ramsar, SSSI	Thames Estuary and Marshes
SPA Ramsar, SSSI	Mucking Flats and Marshes
SPA, Ramsar	Medway Estuary and Marshes
SPA, Ramsar	Benfleet and Southend Marshes
SAC	Peter's Pit
SAC	North Downs Woodland
SSSI	Basildon Meadows
SSSI	Canvey Wick
SSSI	Chattenden Woods and Lodge Hill
SSSI	Cobham Woods
SSSI	Darenth Wood
SSSI	Grays Thurrock Chalk Pit
SSSI	Great Crabbles Wood
SSSI	Halling to Trottscliffe Escarpment
SSSI	Hangmans Wood and Deneholes
SSSI	Holehaven Creek
SSSI	Northward Hill
SSSI	Pitsea Marsh
SSSI	Shorne and Ashenbank Woods
SSSI	South Thames Estuary and Marshes
SSSI	Thorndon Park
SSSI	Tower Hill to Cockham Wood
SSSI	Vange and Fobbing Marshes
SSSI	West Thurrock Lagoon and Marshes
SSSI	Langdon Ridge
Local Wildlife Site	Tilbury Power Station

Designation	Site
Local Wildlife Site	West Tilbury Hall
Local Wildlife Site	West Tilbury Church
Local Wildlife Site	Low Street Pit
Local Wildlife Site	Tilbury Centre
Local Wildlife Site	Tilbury Marshes
Local Wildlife Site	Broom Hill
Local Wildlife Site	Hob Hill & Sandy Lane Pit, Chadwell St. Mary
Local Wildlife site	Lyttag Brownfield
Local Wildlife Site	Goshems Farm

- 2.1.6 The Nature and Heritage Conservation Screening Assessment is appended as Appendix B to this report.
- 2.1.7 Drawings showing receptors within 2 km and sensitive habitats within 15 km of the site are included as Drawing 2 and Drawing 3 respectively.

3 ENVIRONMENTAL RISK AND EFFECTS

3.1.1 The scope of the assessment has covered the following aspects:

- Odour,
- Noise and vibration,
- Fugitive emissions,
- Visible emissions,
- Accidents.

3.1.2 For each of the above, the approach to the assessment has followed the following four stage process:

1. Identify the hazards,
2. Assess the risks (assuming that any control measures proposed are in place),
3. Choose appropriate further measures to control these risks (if required),
4. Present the assessment of overall risk.

3.1.3 Results of the assessment are provided in the following tables.

- Table 3-2 Assessment of odour risks,
- Table 3-3 Assessment of noise and vibration risks,
- Table 3-4 Assessment of fugitive emission risks,
- Table 3-5 Visible emissions,
- Table 3-6 Accidents risk assessment and management plan.

3.1.4 The risk assessment methodology has used a scoring mechanism whereby scores are assigned to:

- the likelihood of the hazard occurring; and
- the consequence of the hazard to the environment or human health.

3.1.5 Scores are assigned as low, medium or high.

3.1.6 The risk assessment has been completed by scoring the hazard areas outlined above using a risk matrix as shown in Table 3.1 below:

3.1.7 In completing the assessment, prevention and control measures proposed by the operator are assumed to be in place. Where relevant, details of these measures are identified within the assessment.

Figure 3-1: Risk Matrix

Consequence	Probability			
	High	Medium	Low	Very Low
High	High	Medium	Low	Low
Medium	Medium	Medium	Low	Very Low
Low	Low	Low	Low	Very Low
Very Low	Low	Very Low	Very Low	Very Low

3.1.8 The environmental risk assessment for the site is set out below:

Table 3-1: Odour risk assessment and management plan

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
Odour emissions from operation of the TFGF	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Tilbury Marshes LWS	Air	The operations at the TFGF are not anticipated to be odorous. The natural gas to be used within the TFGF will not be odourised and will be handled in fully enclosed pipework with no storage onsite, therefore minimising the potential for odour. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Very Low	Very Low	Very Low

Table 3-2 Noise and vibration risk assessment and management plan

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
Noise from vehicle movements onsite	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Tilbury Marshes LWS	Air	There will be no deliveries associated with the transmission of natural gas fuel. The TFGF will be remotely operated, hence staff vehicle movements will be low. Additional vehicle movements will be associated with planned servicing, maintenance campaigns and deliveries, e.g., infrequent deliveries of lubricating oil and collections of waste oil, which will take place during normal working hours. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Low	Very Low	Very Low
Noise from operation of the TFGF, including gas engines, air-intake, fin-fan coolers etc.	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Local Wildlife Sites identified in Table 2-1, the closest being	Air	The TFGF is designed to operate when demand is high and will not operate continuously. Operating hours will be limited to 1,500 hours per annum on a rolling 5-year average and no more than 2,250 hours in any one year. Typically, the facility would be required to operate between 1 and 7 hours per day, between 8 am and 8 pm. Operation during night time, although not impossible, is less likely as peak demand hours are outside of night time periods. Engines and associated plant will be enclosed within individual cells. A silencer will be incorporated on each exhaust stack, and other mechanical equipment will be housed within acoustic enclosures. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and	Low	Low	Low

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
	Tilbury Marshes, on site.		take appropriate action or provide further monitoring as necessary. A Noise Impact Assessment is included as Appendix F of the supporting information document. The NIA found that the design incorporates mitigation measures to minimise noise to the lowest reasonably practicable level, and that noise will be mitigated such that it does not cause a significant impact.			
Vibration from the operation of the TFGF	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Local Wildlife Sites identified in Table 2-1, the closest being Tilbury Marshes, on site.	Land	Significant vibration effects are not anticipated for the plant. Engines will be mounted to their frames by means of anti-vibration mounts. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Very Low	Very Low	Very Low

Table 3-3 Fugitive emissions risk assessment and management plan

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
To Air						
Dust	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant) Local Wildlife Sites identified in Table 2-1, the closest being Tilbury Marshes, on site.	Air	There are no significant dust-generating activities or dusty materials used or stored within the installation. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Very Low	Very low	Very Low
Leaks within natural gas pipework.	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations nearest receptor is Tarmac, Tilbury, around 775 m	Air	The gas supply system will be designed, installed and tested as to comply with the requirements of EN 14161, ATEX and other local regulations applicable, as well as complying with relevant National Fire Protection Association (NFPA) or equivalent standards to ensure increased safety and reduced hazard from fuel gas handling. Gas detection and alarm equipment will be in place. Scheduled inspections of natural gas containment/pipework will help to prevent a risk from leakage of unburned natural gas.	Low	Medium	Low

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
	southwest of the plant). Tilbury Marshes LWS,					
Fumes (VOCs) from delivery and storage of Lubricating oils (and collection of waste oil.	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Tilbury Marshes Local Wildlife Site	Air	Bulk storage of oils is limited to the lubricating oil and waste oil tanks. These tanks are fully bunded and will be subject to routine inspection during routine site maintenance visits. Usage of oils will be minimal.	Low	Low	Low
To Water						
Leakage of clean and waste lubricating oils from delivery and storage	Site drainage system and on-site attenuation pond. Tilbury Marshes Local Wildlife Site.	Surface water drainage systems	Oil is stored in 6 No. clean lubricating oil tanks of 7000 litre capacity and 6 No. waste oil tanks, each of 5,000 l capacity. These tanks are double skinned, with a capacity of at least 110% of the oil storage tanks, and held within six bunded areas, each holding a clean oil and waste oil tank. Tanks will be subject to routine inspection during routine site maintenance visits. Spill kits will be provided in areas where oil is delivered, stored and collected. The operational part of the site will be laid to a concrete base and, therefore, the opportunity for direct contact to surface water is minimal.	Very Low	Low/Medium	Very Low

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
			Surface water run-off will be retained in the site attenuation pond pending discharge as necessary, following a visual assessment.			
Litter						
Litter from waste storage and removal from site.	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Tilbury Marshes Local Wildlife	Windblown to air	Minimal solid waste generation is anticipated on site. The main source of general waste will be packaging from maintenance materials. All staff will be trained in waste management procedures.	Very Low	Very Low	Very Low
Pests						
Flies, and other pests or vermin.	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m	Land/air	Not relevant to the operation, operational activities have very limited potential to attract flies, pests and vermin.	Very Low	Very Low	Very Low

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
	southwest of the plant). Local Wildlife Sites identified in Table 2-1, the closest being on site.					

Table 3-4 Visible emissions

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
Plume from emission stacks	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Protected habitats and Local Wildlife sites identified in Table 2-1, the closest being Tilbury Marshes LWS, on site	Visual	Visible plumes are not anticipated to occur for the majority of operational time due to the natural gas being combusted, resulting high exhaust gas temperatures.	Low	Low	Low

Table 3-5: Accidents risk assessment and management plan

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
Operator error	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Protected habitats and Local Wildlife sites identified in Table 2-1, the closest being Tilbury Marshes LWS, on site	Variable - dependent on nature of the error	The facility will be automatically controlled which will minimise potential for operator error on site. The automatic control system will include alarms and warning lights in the control centre to alert of potential operational problems. Any manual tasks will be undertaken within banded areas by trained operators. All staff (including contractors) will be qualified for the role to be carried out and trained specifically to carry out their responsibilities in relation to the TFGF.	Low	Low	Low
Loss of power	None	N/A	During operational periods plant will be powered by electricity generated onsite. In the event of a loss of power to the site during non-operational periods the plant may not be able to start-up and therefore no operations can commence.	N/A	N/A	N/A
Loss of containment during storage or transfer of oil (transformer and lubricating oil)	Water and land. Protected habitats and Local Wildlife sites identified in Table 2-1, downstream of the site,	Surface water drainage system or direct contact with land.	Bulk storage tanks will be banded, with a capacity of 110% of the stored volume of the largest tank within the bund, and will be subject to routine inspection and maintenance. All tanks will be compliant with the Oil Storage Regulations.	Very Low	Low/Medium	Very Low

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
	the closest being Tilbury Marshes LWS, on site		<p>Spill kits will be provided, and all maintenance staff will be trained in the actions to take in the event that an oil spill is detected. Anyone using spill kit materials will be required to ensure replacement materials are ordered.</p> <p>Leaks and spills will be recorded as part of the site incident procedures and will be subject to follow-up and review to ensure any further actions are instigated, as appropriate.</p> <p>Inspections and maintenance will be carried out to ensure the integrity of plant and infrastructure is maintained.</p> <p>The operational part of the site will be laid to concrete with run-off contained by the site drainage system.</p>			
Fire causing emissions to air	<p>Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site)</p> <p>Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant).</p> <p>Protected habitats and Local Wildlife sites identified in Table 2-1, the closest being Tilbury Marshes LWS, on site</p>	Direct release of combustion gases to air	<p>Fire detection and protection systems will be in place. This will include smoke and gas detectors and gas / electrical isolation. Further fire management procedures will be set out in the AMP.</p> <p>There will be an automatic link between fire detection systems on site and the control centre.</p> <p>In the event of a fire, a local engineer will be alerted, will respond directly and will then call the local fire and rescue service (FRS) to attend if necessary. Fire procedures will be held onsite, and copies will also be made available to the FRS and maintenance contractor, as well as centralised copies being held at the control centre.</p>	Low	Low - Medium	Low

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
Fire causing emissions to water	Protected habitats and Local Wildlife sites identified in Table 2-1, the closest being Tilbury Marshes LWS, on site.	Surface water drainage system	It is unlikely that firefighting using water/foam would be used to tackle a fire at the TFGF. Should a fire occur in one of the engines then the likely approach would be to stop the gas feed and allow the fire to burn out residual fuel. There are no fire hydrants in proximity to the site. The only potential for firewater/foam would be from supplies on a fire appliance and site attenuation pond, which, if used, would collect within the site drainage system and discharge back into the attenuation pond which will be fitted with a penstock valve to enable surface water run-off to be contained.	Low	Medium	Low
Failure of combustion control system	Local residents (nearest residential receptor is Walnut Tree Farm and Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Protected habitats and Local Wildlife sites identified in Table 2-1, the closest being Tilbury Marshes LWS, on site	Stack/Air	The combustion control system will link to automatic alarm systems in the control room to alert the remote operators and enable appropriate action to be taken to prevent a system failure, where possible, or to trigger a safe plant shutdown. Operational staff (including contractors) will be trained in the actions to take in the event of control system alarms being triggered.	Low	Low	Low
Vandalism	Local residents (nearest residential receptor is Walnut Tree Farm and	Various	A 3 m security fence will be in place around the facility. CCTV surveillance (including infrared CCTV) will be provided to monitor the perimeter fence	Low	Low to Medium - depending on nature of the event.	Low

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
	Low Street, 600 m north of the site) Nearby industrial and commercial installations (nearest receptor is Tarmac, Tilbury, around 775 m southwest of the plant). Protected habitats and Local Wildlife sites identified in Table 2-1, the closest being Tilbury Marshes LWS, on site		for intruders and also to provide coverage within the main plant areas. The CCTV system will feed back to the control centre and the on-site office. An intruder alarm system is in place which, if triggered, will alert the control centre and the Security Contractor.			
Flooding	Buildings and structures on site; neighbouring land. Protected habitats and Local Wildlife sites identified in Table 2-1, downstream of the site, the closest being Tilbury Marshes LWS.	Surface water drainage system; local surface watercourses	Flood risk has been addressed in a Flood Risk Assessment, which was prepared to support the DCO application. The site lies in a flood zone 3a, meaning there is a high risk of flooding prior to considering any flood protection measures. The Thames has tidal flooding defences designed to defend against 1 in 1,000 year flood events. The risk of tidal flooding is, therefore, low. The site is at risk from surface water flooding, but mitigation measures will be incorporated into the design. Potentially polluting materials will be stored in accordance with the Environmental Permit and regulatory requirements, including secondary containment to capture any leaks. No significant adverse effects on surface water contamination from run-off are predicted.	High	Medium	Medium

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
			Emergency procedures will be developed within the Accident Management Plan and will describe actions to take should a flood event occur.			

4 EMISSIONS TO AIR

4.1 Introduction

- 4.1.1 This section provides a screening assessment of point source emissions to air from the installation. The assessment has been completed in accordance with the Environment Agency's *Risk Assessments for your environmental permit* using the latest version of the Environment Agency's H1 software (version 9).
- 4.1.2 The scope of the assessment has covered the following aspects:
- Release point characteristics,
 - Air emissions screening,
- 4.1.3 Air emissions screening using the H1 software has identified emissions that warrant further modelling. The H1 tool can be found in Appendix A to this Environmental Risk Assessment. The results of the additional detailed modelling for the emissions identified are presented in the air quality report in Appendix E of the main application supporting information.

4.2 Emissions Release Points

- 4.2.1 Emissions to air will result from the combustion of natural gas within 96 x 9.896 MWe gas engines, which will be released into the atmosphere via dedicated 48 “grouped” exhaust stacks.
- 4.2.2 The primary air pollutants of concern with the potential to impact on human health and/or the environment from these emission points are Nitrogen oxides (NO_x expressed as NO₂) and Carbon monoxide (CO).

Table 4-1: Stack Characteristics (per stack)

Parameter	Unit	Value
Stacks	No.	96
Stack height	m	20
Efflux velocity	m.s ⁻¹	20.2
Normalised volumetric flow (dry, 0°C, 15% O ₂)	Nm ³ .s ⁻¹	8.30
NO _x emission concentration (dry, 0°C, 15% O ₂)*	mg.Nm ⁻³	95
CO emission concentration (dry, 0°C, 15% O ₂)*	mg.Nm ⁻³	390

- 4.2.3 The new H1 tool would not work when 96 discrete emission points were input. The assessment has been carried out on the basis of 48 emission points each with double the normalised flow rate i.e. 16.6 Nm³.s⁻¹ for each of the 48 emission points.
- 4.2.4 The H1 screening assessment has considered long and short-term emissions of NO_x at the maximum predicted Process Contribution (PC) of modelled sensitive receptors located at Cooper Shore and Walnut Tree Farm.
- The maximum long-term PC at this receptor is 4.70 µg.m⁻³ (1 hour 99.79th percentile) – Walnut Tree Farm.

- The maximum short-term PC at this receptor is $118.90\mu\text{g.m}^{-3}$ (1 hour 99.79th percentile) – Cooper Shore.

4.2.5 For CO as there is no long term EAL, the modelled short-term concentration is highest at receptor Walnut Tree Farm with a PC of $1,820\mu\text{g.m}^{-3}$ (8-hour).

4.3 Emissions Screening

4.3.1 Estimated emissions have been screened for significance against appropriate environmental standards for long-term and short-term exposure. Emissions standards are based on statutory air quality objectives where available, and upon human health protection Environmental Assessment Levels (EALs) as given in H1 guidance.

4.3.2 Process contributions (PCs) have been calculated using atmospheric dispersion modelling, details of which are given in the Air Quality Impact Assessment (AQIA) in Appendix E to the Supporting Information document. It should be noted that the H1 Screening Assessment whilst the H1 tool has recognised the long-term modelled PC, the tool only recognises the H1 predicted PC for the short-term calculation. If the short-term modelled PC for NO_x was used the %PC/EAL would be $118.90/200 = 59.45\%$. Similarly for CO using the short-term modelled PC %PC/EAL would be $1,820/10,000 = 18.2\%$. Emissions which are lower than 1% of the relevant emissions standard for long-term exposure and lower than 10% of the relevant limit for short-term exposure are screened out as insignificant. Figure 4-1 below shows the emissions screening results at Stage One.

4.3.3 The impact of long and short-term NO_x emissions has not screened out as insignificant at the stage one assessment. Short-term impacts of CO have also not screened out. Therefore, a second stage of screening is required.

4.3.4 The second stage of screening assesses the predicted environmental concentration (PEC) against EALs. Background concentrations have been obtained from the AQ assessment provided in Appendix E and a description of the data sources is provided in that document. Note that the highest background concentration with cumulative developments has been used, however the value used is significantly higher than the background data at the receptor with the highest PC and therefore the assessment is conservative and will have over predicted the impacts from the facility. PECs which are lower than 70% of the relevant long-term emissions standard and lower than 20% of the relevant short-term standard minus 2 * the background concentration are screened out as insignificant. Those not screened out as insignificant are recommended for further detailed assessment. Figure 4-2 below shows the emissions screening results at Stage Two. It should be noted that if the modelled short-term PC for NO_x was used in the stage 2 screening calculation would be $118.90/(200-2 \times 40) = 99.1\%$ and with the modelled PC for CO this would calculate as $1,820/(10,000-2 \times 322) = 19.45\%$.

4.3.5 The stage two screening assessment indicates that both long and short term NO_x impacts fail the assessment. Consequently further assessment is required. Using the modelled CO PC, the short term PC as a percentage of the EAL-2x background concentration is less than 20%. On this bases CO would screen out from further assessment. Detailed modelling is presented in an Air Quality Impact Assessment, details of which are given in Appendix E of the main application supporting information.

Figure 4-1: Air Impact Screening Stage One

Environmental Assessment										
Test 1	Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
	1	Nitrogen dioxide	40	4.7	11.75%	fail	200	36094.376	18047.19%	fail

Environmental Assessment										
Test 1	Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
	1	Carbon monoxide	0	2276.879904			10000	207447.6768	2074.48%	fail

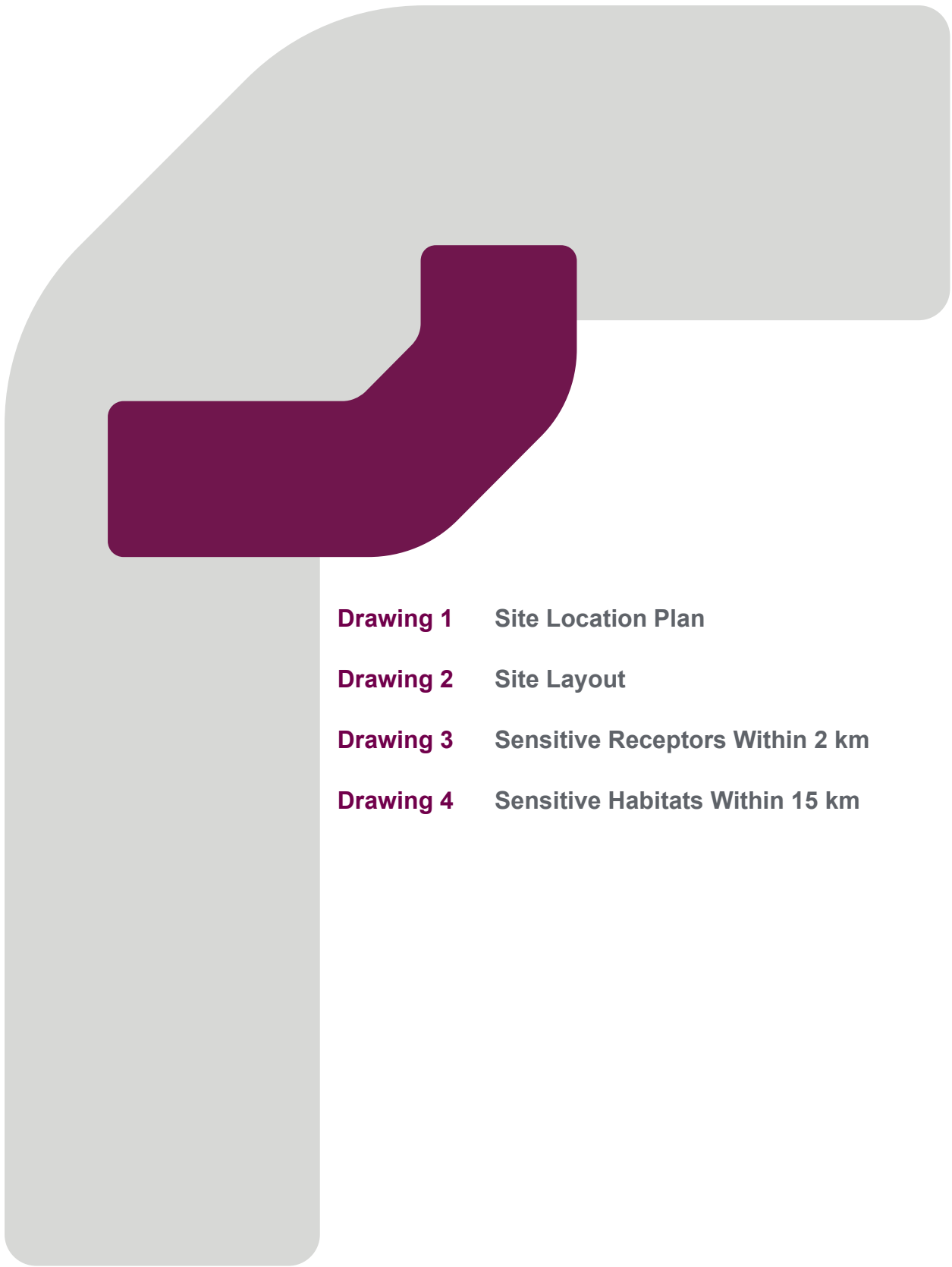
Figure 4-2: Air Impact Screening Stage Two

Environmental Assessment													
Test 2	Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long term)	PEC Long term (ug/m3)	%PEC of EAL% (Long)	%PEC of EAL>70%?	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
	1	Nitrogen dioxide	40	4.7	42.4	100%	47.10	117.75%	fail	200	36094.376	31331.92%	fail

Environmental Assessment													
Test 2	Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long term)	PEC Long term (ug/m3)	%PEC of EAL% (Long)	%PEC of EAL>70%?	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
	1	Carbon monoxide	0	2276.879904	322	100%	2598.88			10000	207447.6768	2217.27%	fail

5 CONCLUSIONS

- 5.1.1 The following hazards from the operation of the proposed TFGF have been assessed:
- Odour,
 - noise and vibration,
 - fugitive emissions,
 - visible emissions, and
 - accidents.
- 5.1.2 The assessment has concluded that the overall risks associated with the identified hazards, including the proposed management measures are negligible to low.
- 5.1.3 Detailed assessments of potential air emission impacts and noise have been carried out. Air Quality Impact Assessment (provided in Appendix E of main application supporting documents) concluded that the impact remains unchanged since the DCO and the effects remain insignificant. The Noise Assessment (provided in Appendix F of main application supporting documents) concluded that significant adverse impacts would not occur.
- 5.1.4 The H1 risk assessment software tool has been used to support this Environmental Risk Assessment. The completed H1 software can be found within the Appendix 1 to this Environmental Risk Assessment. Stack emissions to air for relevant air pollutants have been subject to detailed modelling and it has been concluded that the resulting air quality effect of the proposed development is considered to be 'not significant' overall.



- Drawing 1** **Site Location Plan**
- Drawing 2** **Site Layout**
- Drawing 3** **Sensitive Receptors Within 2 km**
- Drawing 4** **Sensitive Habitats Within 15 km**



Appendix A
H1 RISK ASSESSMENT TOOL



Appendix B
**NATURE AND HERITAGE CONSERVATION SCREENING
ASSESSMENT**

APPLICATION FOR AN ENVIRONMENTAL PERMIT - THURROCK FLEXIBLE GENERATING FACILITY Environmental Risk Assessment

2024-08-16

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