Air Emissions Risk Assessment

Medium Combustion Plant: Existing

Vital Energi for SAICA Pack UK Limited

Prepared by:

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SLR Project No.: 410.065367.00001

24 October 2023

Revision: v2

Revision Record

Revision	Date	Prepared By	Checked By
V1.0	20 October 2023	Ben Turner	Matt Mitchell
V2.0	24 October 2023	Ben Turner	Matt Mitchell

Basis of Report

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1.0 Introduction

SLR Consulting Limited has been commissioned by Vital Energi for SAICA Pack UK Limited on behalf of SAICA Pack UK Limited to undertake an Air Emissions Risk Assessment (AERA) for an existing 6MWth fuel input, 5.642MW heat output single steam boiler at SAICA Pack, Alexandra Docks, Newport (the Site). The boiler will use liquefied petroleum gas (LPG) as its main fuel source. The burner will have a backup gas oil supply in case of LPG disruption (used <500 hours).

The boiler constitutes an existing 5-50MWth Medium Combustion Plant (MCP) and will be regulated by Natural Resources Wales (NRW) under an Environment Permit.

The existing MCP application will be prepared in accordance with Environment Agency (EA) / NRW guidance[1]. The existing MCP will require a complex bespoke (high risk) permit application, as habitat sites are within the minimum screening distances.

An initial screening assessment has been conducted by Vital Energi for SAICA Pack UK Limited, using the Simple Calculation of Atmospheric Impact Limits (SCAIL) tool. The outcomes indicates a dispersion modelling assessment is needed.

The Site location is illustrated in Figure A.

1.1 Scope of Assessment

The scope of the assessment is to quantitatively assess potential air quality impacts associated with the operation of the LPG boiler on the receiving environment.

To support the assessment, a dispersion modelling exercise has been undertaken based on the approach prescribed within the EA's Air Emissions Risk Assessment guidance[2] (herein referred to as the AERA guidance), adopted by NRW.

[1] https://www.gov.uk/guidance/medium-combustion-plant-apply-for-an-environmental-permit

[2] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Figure A: Site Context

2.0 Regulation of Industrial Emissions

2.1 Environmental Permitting

In Wales, the 2016 Environmental Permitting Regulations (EPR) transpose the EU's Industrial Emissions Directive into UK legislation. The Environmental Permitting (England and Wales) (Amendment) Regulations 2018 transpose the requirements of the MCP Directive (MCPD) EU/2015/2193 into domestic law.

The EPR is designed to ensure the competent authority regulates emissions from processes, including emissions to air, to minimise adverse impacts. The combustion process and associated emissions will be regulated by NRW under an Environmental Permit.

2.1.1 Medium Combustion Plant

The boiler constitutes an existing 5-50MWth MCP and will be regulated by NRW under an Environment Permit.

NRW will issue an Environment Permit which will specify operating conditions, monitoring requirements and Emission Limit Values (ELVs). The appropriate MCPD ELVs are detailed in Table 2-1. Emission releases will comply with the MCPD ELVs.

LPG will be classed as a gaseous fuel other than natural gas. Gas oil will only be used in case of LPG disruption (<500 hours) – and can therefore be excluded.

Table 2-1: ELVs for Existing MCP >5MWth (Excluding Engines and Gas Turbines)

Pollutant	MCPD ELV (mg/Nm^3)
	Gaseous Fuels Other Than Natural Gas
SO_2	35
NOx	250
Table Notes: Reference Conditions: Temperature: 273.15K, Moisture Content: Dry (0%), Oxygen Content: 3%.	

3.0 Environmental Standards

The environmental standards applied in this assessment are primarily based on the EA's AERA guidance.

3.1 Human Health

The AERA guidance provides environmental ambient thresholds for the protection of health. These are based on relevant legislation and environmental assessment levels (EALs) defined by the EA. These are collectively termed Air Quality Assessment Levels (AQAL) throughout this report.

Table 3-1 sets out those AQALs that are relevant to the assessment of human health impacts.

Table 3-1: Relevant Human AQALs

Pollutant		AQAL (µg/m^3)	Averaging Period
Nitrogen Dioxide	NO_2	40	Annual Mean
		200	1-Hour Mean (18 permitted exceedances)
Sulphur Dioxide	SO_2	125	24-Hour Mean (3 permitted exceedances)
		350	1-Hour Mean (24 permitted exceedances)
		266	15-Minute Mean (35 permitted exceedances)

3.1.1 Relevant Exposure

In accordance with Defra's technical guidance on Local Air Quality Management (LAQM.TG(22))[3], the AQALs presented in Table 3-1 should only be assessed at locations of relevant exposure i.e. where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period. These AQALs do not apply to exposure at the workplace.

A summary of the typical relevant locations associated with each applicable AQAL assessed is detailed below in Table 3-2.

Table 3-2: Relevant Public Exposure

AQAL Averaging Period	Locations AQALs Should Apply At	Locations AQALs Should Not Apply At
Annual mean	Building facades of residential properties, schools, hospitals etc.	Facades of offices, hotels, gardens of residences and kerbside sites
24-hour mean	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

[3] Local Air Quality Management Technical Guidance 22, Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. August 2022.

AQAL Averaging Period	Locations AQALs Should Apply At	Locations AQALs Should Not Apply At
15-minute mean	All locations where members of the public might reasonably be exposed for a period of 15-minutes or longer	-

3.2 Ecosystems and Vegetation

In the UK, sites of ecological importance are provided environmental protection from activities through the application of standards known as Critical Levels and Critical Loads.

3.2.1 Critical Levels

Critical Levels are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.

Critical Levels for the protection of vegetation and ecosystems apply irrespective of habitat type and are based on the concentration of the relevant pollutants in ambient air. The Critical Levels of relevance to this assessment are provided in Table 3-3.

Table 3-3: Critical Levels

Pollutant	Critical Level (µg/m^3)	Averaging Period	Habitat
SO_2	10	Annual mean	Where lichens or bryophytes are present
	20	Annual mean	All other
NO_X	30	Annual mean	All
	200	Daily mean	Where a) ozone is below the AOT40 Critical Level and b) SO_2 is below the lower Critical Level of 10µg/m^3
	75	Daily mean	All other

Publicly available data has been used to identify the appropriate Critical Level at each designation. In the absence of data, a worst-case approach has been adopted.

3.2.2 Critical Loads

Critical Loads are a quantitative estimate of exposure to deposition of one or more pollutants, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.

The Critical Loads of relevance to this assessment are provided in Table 3-3. This includes nutrient nitrogen and acidification.

Table 3-4: Critical Loads

Pollutant	Environmental Standard	Averaging Period
Acidification	Depends on location - APIS	Annual Mean
Nutrient Nitrogen	Depends on location - APIS	Annual Mean

Nutrient nitrogen and acidification Critical Loads are site specific. Critical Loads for the habitats and species of relevance to this assessment have been obtained from the Air

Pollution Information System (APIS) website[4]. The most sensitive habitat listed (that is present in the study area) has been used / provided to facilitate a worst-case assessment. These are presented in Section 6.0.

[4] Air Pollution Information System http://www.apis.ac.uk/

4.0 Emission Quantification

Table 4-1 details the emission source considered within the dispersion modelling assessment. Figure D provides an illustration of the dispersion model set-up.

Table 4-1: Emission Sources

Reference	Name	NGR	
		X	Y
A1	Existing LPG Boiler	332013.1	184315.9

Table 4-2 details the emission release input parameters used in the assessment.

Table 4-2: Emission Characteristics

Parameter		A1
Stack Internal Diameter (m)		0.87
Stack Exhaust Height AOD (m)		14.5
Volumetric Flow Rate	Normalised (Nm^3/s)	1.58
	Actual (Am^3/s)	2.80
Exit Temperature (^oC)		138.0
Oxygen Content (% O_2 dry gas)		3.2
Moisture content (% H_2O)		13.7
Efflux Velocity (m/s)		4.76
Table Notes: Actual Conditions: Stack conditions (wet). Reference Conditions: Temperature: 273.15K, Moisture Content: Dry (0%), Oxygen Content: 3%.		

Emission rates have been calculated with use of the emission release characteristics detailed in Table 2-1. These are presented Table 4-3.

Table 4-3: Pollutant Emission Rates

Parameter	Emission Concentration (mg/Nm^3)	Emission Rate (g/s)
SO_2	35	0.0554
NOx	250	0.3959
Table Notes: Reference Conditions: Temperature: 273.15K, Moisture Content: Dry (0%), Oxygen Content: 3%.		

Use of the maximum MCPD ELVs assumes the Site is operating continuously at the maximum permissible conditions.

Furthermore, the LPG boiler is an existing installation that is already operational; it now requires a MCPD Existing Environmental Permit. These emission releases may already be represented within the applied background datasets (Section 6.0). Quantification of these emissions could introduce double-counting of emissions – whilst considering background datasets.

5.0 Dispersion Modelling Methodology

5.1 Dispersion Model

ADMS v6 modelling software has been used to quantify potential impacts. ADMS v6 is an advanced atmospheric dispersion model that has been developed and validated by Cambridge Environmental Research Consultants (CERC).

CERC's ADMS suite of software has been used extensively throughout the UK for regulatory compliance purposes and is accepted as an appropriate air quality modelling tool by NRW.

5.2 Receptors

The modelling has been undertaken using a nested receptor grid (titled gridded receptors). This method allows the maximum ground level concentration outside the Site boundary to be assessed.

A nested receptor grid of 5km by 5km centred upon the Site was applied as follows:

- 100m x 100m at 5m grid resolution;
- 250m x 250m at 10m grid resolution;
- 500m x 500m at 25m grid resolution;
- 1,000m x 1,000m at 50m grid resolution;
- 2,000m x 2,000m at 100m grid resolution; and
- 5,000m x 5,000m at 250m grid resolution.

The spatial extent of the grid has been selected to ensure that all local receptors are within the gridded area and the resolution is such that the maximum impact will be identified.

5.2.1 Human Receptors

Human receptors considered in the modelling assessment are detailed in Table 5-1 and their locations are illustrated in Figure B (titled discrete human receptors). These receptor locations are considered to capture worst-case relevant exposure relative to the Site, in accordance with LAQM.TG(22) presented in Table 3-2. Consideration has also been given to land uses with sensitive populations for inclusion within the model (e.g. elderly care home, schools etc.). Furthermore, sensitive human receptors located within surrounding AQMAs have been included for completeness.

Table 5-1: Modelled Discrete Human Receptor Locations

Receptor	Details	Exposure Period	NGR		Within AQMA?	Height (m)
			X	Y		
HR1	Residential	All	330154.3	183854.6	-	1.5
HR2	Residential	All	329982.6	184471.3	-	1.5
HR3	John Frost School	All	330045.5	184807.0	-	1.5
HR4	Residential	All	330126.9	185739.1	-	1.5
HR5	Residential	All	330261.5	185857.5	-	1.5
HR6	Residential	All	331486.6	186196.6	-	1.5
HR7	Residential	All	331390.2	187466.7	Yes	1.5

Receptor	Details	Exposure Period	NGR		Within AQMA?	Height (m)
			X	Y		
HR8	Residential	All	332710.6	186563.8	-	1.5
HR9	Residential	All	333814.8	186268.3	-	1.5
HR10	Residential	All	334285.1	185084.3	-	1.5
HR11	Residential	All	334756.5	184093.2	-	1.5
HR12	Residential	All	333663.2	183459.4	-	1.5
HR13	Residential	All	331078.9	182944.7	-	1.5

Figure B: Modelled Human Receptors

5.2.2 Ecological Receptors

The MCP Guidance states that the following ecological sites need to be considered (gas other than natural gas 5-10MWth):

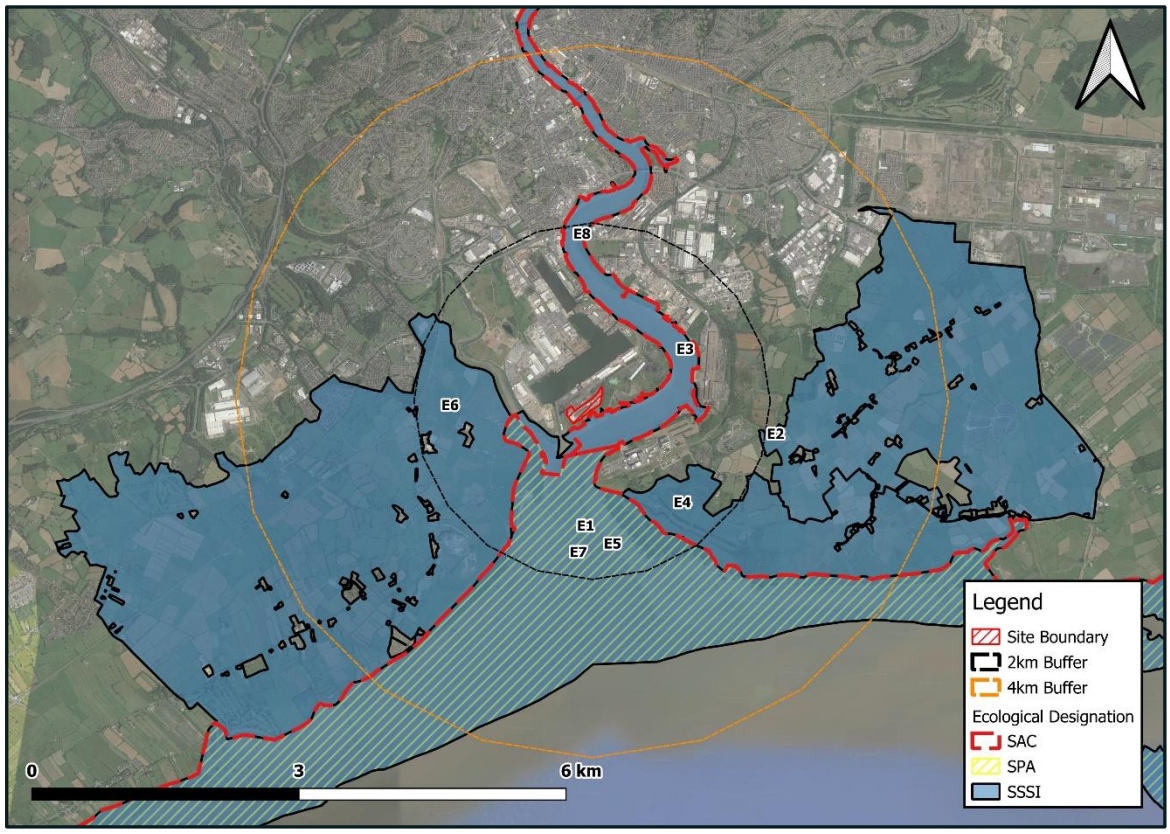
- SPAs, SACs and Ramsar sites (protected wetlands) within 4km of the Site; and
- SSSIs within 2km of the Site.

Following application of these distance thresholds, Table 5-2 provides details of ecological receptors considered within this assessment (illustrated in Figure C). All receptors have assumed a height of 0m and represented in the model using gridded and polygon boundary receptors.

Table 5-2: Designated Ecological Sites of Relevance

Receptor ID	Site Name	Designation	Distance to Site (km)
E1	Severn Estuary (Wales)	SPA/Ramsar	0.3
E2	Gwent Levels - Nash and Goldcliff	SSSI	1.8
E3	River Usk / Afon Wysg	SAC	<0.1
E4	Gwlyptiroedd Casnewydd / Newport Wetlands	SSSI	0.9
E5	Severn Estuary (Wales)	SAC	0.3
E6	Gwent Levels - St. Brides	SSSI	0.6
E7	Severn Estuary	SSSI	0.2
E8	River Usk (Lower Usk) / Afon Wysg (Wysg Isaf)	SSSI	<0.1

Figure C: Ecological Designations of Relevance



5.3 Terrain

The ADMS modelling guidance indicates it is generally unnecessary to include terrain where gradient in slopes is less than 10%.

An evaluation of the terrain covering the extent of the model domain suggests that the area is generally flat with little to no significant terrain features. Therefore, terrain has not been included within the dispersion model.

5.4 Building Downwash

The Buildings Module within the ADMS model has been used to incorporate buildings within the model, in line with EA guidance, where:

- The maximum height of the building is equivalent to at least 40% of the emission height; and
- Are within a distance defined as five times the lesser of the height or maximum projected width of the building (referred to as 5L)).

Details of the buildings are provided in Table 5-3, whilst their locations are illustrated in Figure D.

Table 5-3: Modelled Buildings

Name	Centre Easting (m)	Centre Northing (m)	Height (m)	Length / Diameter (m)	Width (m)	Angle (°)
Building004	331947.6	184243.5	14.0	97.4	253.4	326.0
Building001	331816.4	184132.2	9.0	88.8	81.7	55.3
Building007	332082.6	184345.8	9.0	45.6	31.9	55.6

Figure D: Modelled Buildings

5.5 Meteorological Data

Details of the five nearest meteorological stations in proximity to the Site are presented in Table 5-4. The Site is located on the River Usk estuary, in an industrial setting.

There is no clear representative meteorological station in close proximity to the Site. The nearest coastal meteorological station is 30.4km away (Cardiff) – and may not fully reflect estuarine conditions.

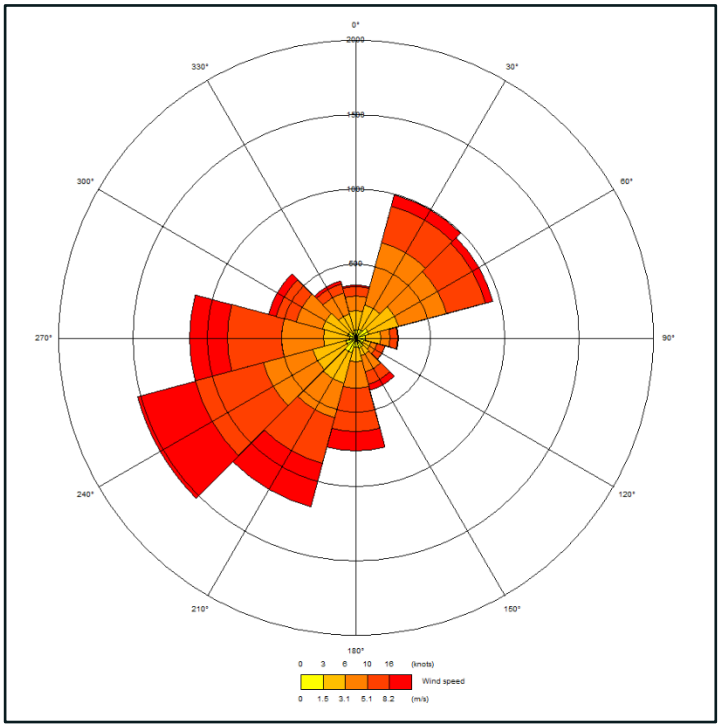
Numerical Weather Prediction (NWP) meteorological data was consequently utilised for the assessment, for the grid square centred at the Site. This is consistent with advice prescribed within LAQM.TG(22) for coastal areas.

Table 5-4: Details of Meteorological Stations in Proximity to the Site

Station Name	Station Elevation (m)	Distance from Site (km)	Summary of Location
Site	*11*	-	*Coastal, Industrial*
Bristol	190	26.3	Inland, Rural
Cardiff	67	30.4	*Coastal, Rural*
Cwmbargoed	372	32.6	*Coastal, Rural*
St Athan	68	35.4	Coastal, Rural
Ross-on-wye	21	49.0	Inland, Rural
Details of the Site are provided for comparison purposes			

Five consecutive years of hourly-sequential NWP data was acquired based on the Site location and applied in the assessment (2018-2022 inclusive). A wind rose for the period 2016-2020 is presented in Figure E.

Figure E: NWP Data (2018-2022) Wind Rose



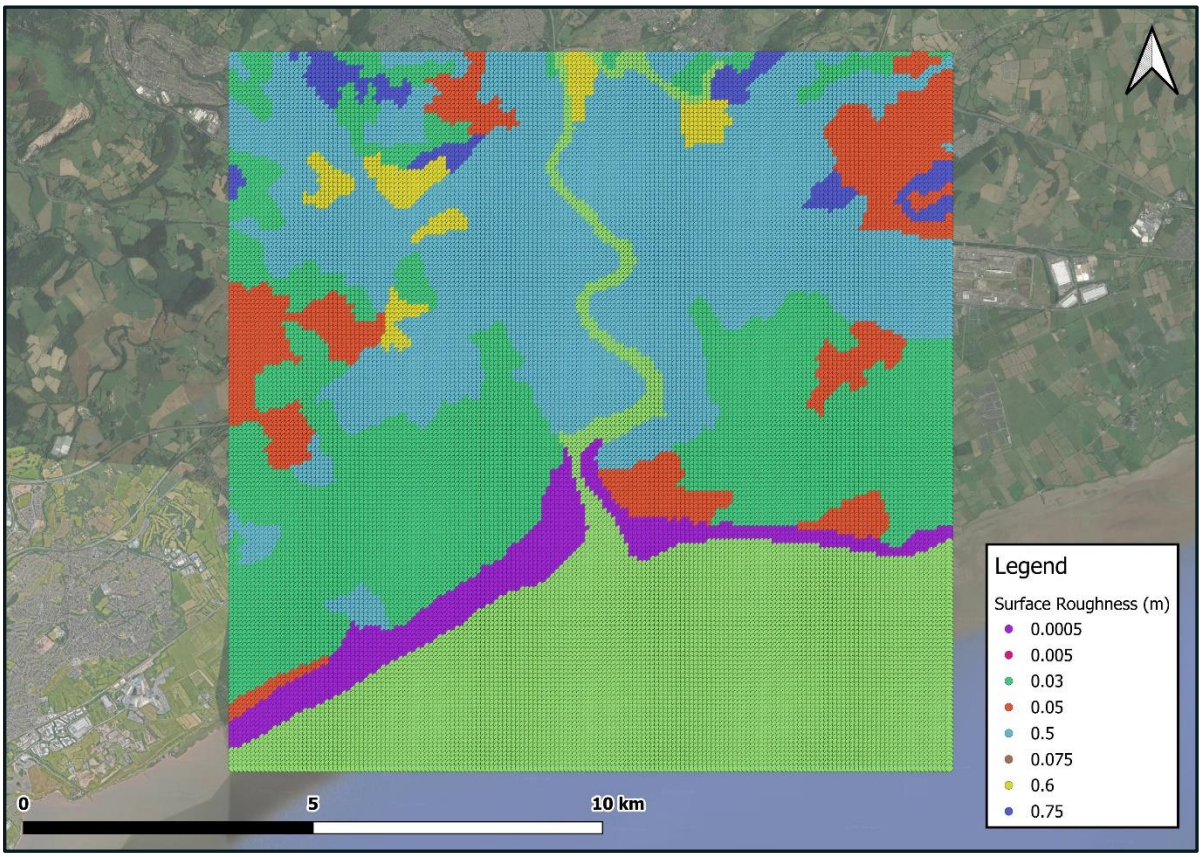
5.6 Advanced Dispersion Parameters

5.6.1 Surface Roughness

The Site is surrounded by rural and urban land uses. Given the variance in land use types across the modelled domain, a variable surface roughness file has been used. A visualisation of the surface roughness file used in the modelling is presented in Figure F.

A variable surface roughness file spanning 12.0km x 12.0km at a 75m grid square resolution centred on the Site was used. Values are interpolated by ADMS v6 between points. Assignment of surface roughness values derive from the 2018 European Commission CORINE (Co-Ordinated Information on the Environment) GIS dataset.

Figure F: Variable Surface Roughness File Visualisation



5.6.1 Minimum Monin-Obukhov Length

A minimum Monin-Obukhov length of 30m has been used in relation to the study area, which relates to 'mixed urban/industrial' and 'cities and large towns'. This is reflective of the wider area.

5.7 Model Outputs

Predicted pollutant concentrations are summarised in the following formats:

- Process contribution (PC) – the predicted contributions from the existing source alone, as output from ADMS v6; and
- Predicted environmental concentration (PEC) – the resultant predicted concentration (i.e. PC + ambient background concentration value).

Table 5-5 presents the treatment of averaging periods of relevance to this assessment.

Table 5-5: Model Outputs

Averaging Period	PC [(a)]	PEC
1-Hour maximum	Maximum 1-hour mean	PC + 2 x Annual mean background
1-Hour mean (18 permitted exceedances)	99.79%ile of 1-hour means	PC + 2 x Annual mean background
15-Minute mean (35 permitted exceedances)	99.9%ile of 15 minute means	PC + 2 x Annual mean background

Averaging Period	PC [(a)]	PEC
1-Hour mean (24 permitted exceedances)	99.73%ile of 1 hour means	PC + 2 x Annual mean background
24-Hour mean (3 permitted exceedances)	99.18%ile of 24 hour means	PC + 2 x Annual mean background
24-Hour maximum	Maximum 24-hour mean	PC + 2 x Annual mean background
Annual mean	Annual mean	PC + Annual mean background

5.7.1 Operational Envelope

The assessment has assumed that all regulated plant equipment will be operational for 8,760 hours per year (i.e. continuously), whereby no adjustment has been made to the model output.

This ensures the worst case meteorological conditions for dispersion are assessed in-combination with the maximum emission release conditions (i.e. worst case impacts).

5.7.2 Conversion of NO_x to NO_2

In line with EA Air Quality Modelling and Assessment Unit (AQMAU) guidance[5], the assessment has used a NO_x to NO_2 ratio of:

- 70% for long-term average concentrations; and
- 35% for short-term average concentrations.

5.7.3 Calculation of PC to Deposition Rates

Deposition rates were calculated using empirical methods recommended by the EA in AQTAG06. Dry deposition flux was calculated using the following equation:

Dry deposition flux ($\mu g/m^2/s$) = ground level concentration ($\mu g/m^3$) x deposition velocity (m/s)

The applied deposition velocities for the relevant chemical species are as shown in Table 5-6.

Table 5-6: Applied Deposition Velocities

Chemical Species	Deposition Velocity (m/s)	
NO_2	Grassland	0.0015
	Woodland	0.003
SO_2	Grassland	0.012
	Woodland	0.024

5.7.3.1 Nutrient Nitrogen

The nutrient nitrogen Critical Loads are recorded in units of kgN/ha/yr.

Standard conversion factors detailed in Table 5-7 have been used to calculate the predicted nutrient nitrogen deposition rates from the dry deposition flux.

[5] Environment Agency, Air Quality Modelling and Assessment Unit, 'Conversion Ratios for NO_X and NO_2' (no date)

Table 5-7: Applied Nutrient Nitrogen Conversion Factors

Chemical Species	Conversion Factor
NO_2	95.9

5.7.3.2 Acidification

The acid Critical Loads are recorded in units of keq/ha/yr.

Standard conversion factors detailed in Table 5-8 have been used to calculate the predicted acid deposition rates from the dry deposition flux.

Table 5-8: Applied Acidification Conversion Factors

Chemical Species	Conversion Factor
NO_2	6.84
SO_2	9.84

PCs have been considered within the acid Critical Load function, in accordance with APIS guidance[6].

5.8 Assessment of Impact and Significance

5.8.1 Human Receptors

Emissions can be considered to be insignificant and not require further assessment if:

- The PC <1% the long term AQAL; and
- The PC <10% the short-term AQAL.

For PCs that cannot be considered insignificant, further assessment has been undertaken and the PEC has been determined for comparison as a percentage of the relevant AQAL.

5.8.2 Ecological Receptors

Table 5-9 details the significance criteria applied in the assessment of understanding impacts on ecological receptors. For impacts that cannot be classified as insignificant, further assessment has been undertaken.

Table 5-9: Significance Criteria: Ecological Receptors

Impact	Designation	PC % of Critical Load / Level	PEC % of Critical Load / Level	Outcome
Short Term Impact	Ramsar, SAC, SPA or SSSI	<10	-	Insignificant
		>10	<100	Insignificant
		>10	>100	Not Insignificant
Long Term Impact		<1	-	Insignificant
		>1	<100	Insignificant
		>1	>100	Not Insignificant

[6] https://www.apis.ac.uk/clf-guidance

5.9 Uncertainty

It is recognised that dispersion modelling is inherently uncertain, particularly in circumstances where verification of modelled predictions relative to real-world condition is not possible. The accuracy of modelled predictions is intrinsically reliant on assessment inputs (i.e. emission rates, exhaust temperatures etc.), and the ability of the dispersion model to replicate real-world conditions.

In respect to this, all operational inputs have been provided by Vital Energi for SAICA Pack UK Limited. Furthermore, the suite of ADMS software packages is well validated with observed concentrations for a number of scenarios by the model developers CERC and the NRW.

To provide certainty with respect to the assessment outcomes, wherever possible, this assessment has incorporated a number of conservative assumptions, which will result in an overestimation of predicted ground level concentrations. As such, the actual predicted ground level concentrations are expected to be lower than this and, in some cases, significantly lower, with the operation of the Site. Examples of these include (but not limited to):

- The assessment has assumed a continuous operational profile (i.e. 8,760 hours per year) at the maximum MCPD ELVs, to ensure all worst-case conditions are assessed; and
- Assumed 35% and 70% for short-term and long-term NOx to NO_2 conversion rates, respectively.

6.0 Baseline Environment

The characterisation of the existing environment has been undertaken using the latest publicly available data sources not impacted by the COVID-19 pandemic (2019). Pollutant concentrations monitored during 2020 and 2021 are expected to be atypical, and not representative of the local environment.

It is acknowledged that 2022 monitoring is available (Defra and NCC). However, the representativity of 2022 monitoring data is subject to central and local government advice / review, and has been excluded to limit the introduction of uncertainty.

As discussed in 4.0 the LPG boiler is an existing installation that is already operational. These emission releases may already be represented within the applied background datasets.

6.1 Human Receptors

6.1.1 Air Quality Management Areas

Newport City Council (NCC) has 11 operable AQMAs – all declared in relation to NO_2 concentrations. These AQMAs are >3km from the Site. Their locations are illustrated in Figure G.

The nearest AQMA is Newport - George Street AQMA 2018, located 3.2km from the Site in Newport (Table 6-1). This AQMA has been considered in the assessment. All other AQMAs are >4km form the Site.

Table 6-1: Nearby Relevant AQMAs

Name	Description	Year Declared	AQAL	Distance to Site (km)
Newport - George Street AQMA 2018	The George Street AQMA encompasses - George Street between George Street / Commercial Road Junction to the George Street / Lower Dock Street Junction.	2018	Annual Mean NO_2	3.2

6.1.2 Nitrogen Dioxide Monitoring

NO_2 is monitored across the UK via local and national networks. This comprises both non-automatic and automatic monitoring methodologies.

NCC non-automatic monitoring outcomes are presented within NCC's Annual Air Quality Progress Report. However, the data is not in a readily available format to understand exact siting locations for consideration within the modelling assessment.

Automatic NO_2 monitoring data reported by Defra's UK-Air resource has been reviewed. Table 6-2 details the two nearest automatic NO_2 monitors within 6km of the Site. These locations are illustrated in Figure G.

Table 6-2: Local NO_2 Automatic Monitoring

Site ID	Site Type	NGR (m)		Distance to Site (km)	2019 Annual Mean NO_2 Concentration (µg/m^3)
		X	Y		
St Julian's	Urban Background	332418	189603	5.2	19.9 (98.3%)

Site ID	Site Type	NGR (m)		Distance to Site (km)	2019 Annual Mean NO_2 Concentration (µg/m^3)
		X	Y		
M4 (Old Barn)	Roadside	332685	189613	5.2	36.5 (97.4%)

6.1.3 Defra Background Maps

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution.

Annual mean background concentrations of NO_2 and SO_2 for the 1km grid squares which cover the modelled domain are presented in Table 6-3. Values refer to reference concentrations (i.e. the year in which comparisons between modelled and monitoring are made), to represent the latest year of ratified data.

Table 6-3: Relevant Defra Mapped Annual Mean Background Concentrations

Pollutant	Reference Year	Annual Mean Concentration (µg/m^3)
NO_2	2018	5.9 – 21.6
SO_2	2001	<1 – 13.0

6.2 Applied Background Concentrations

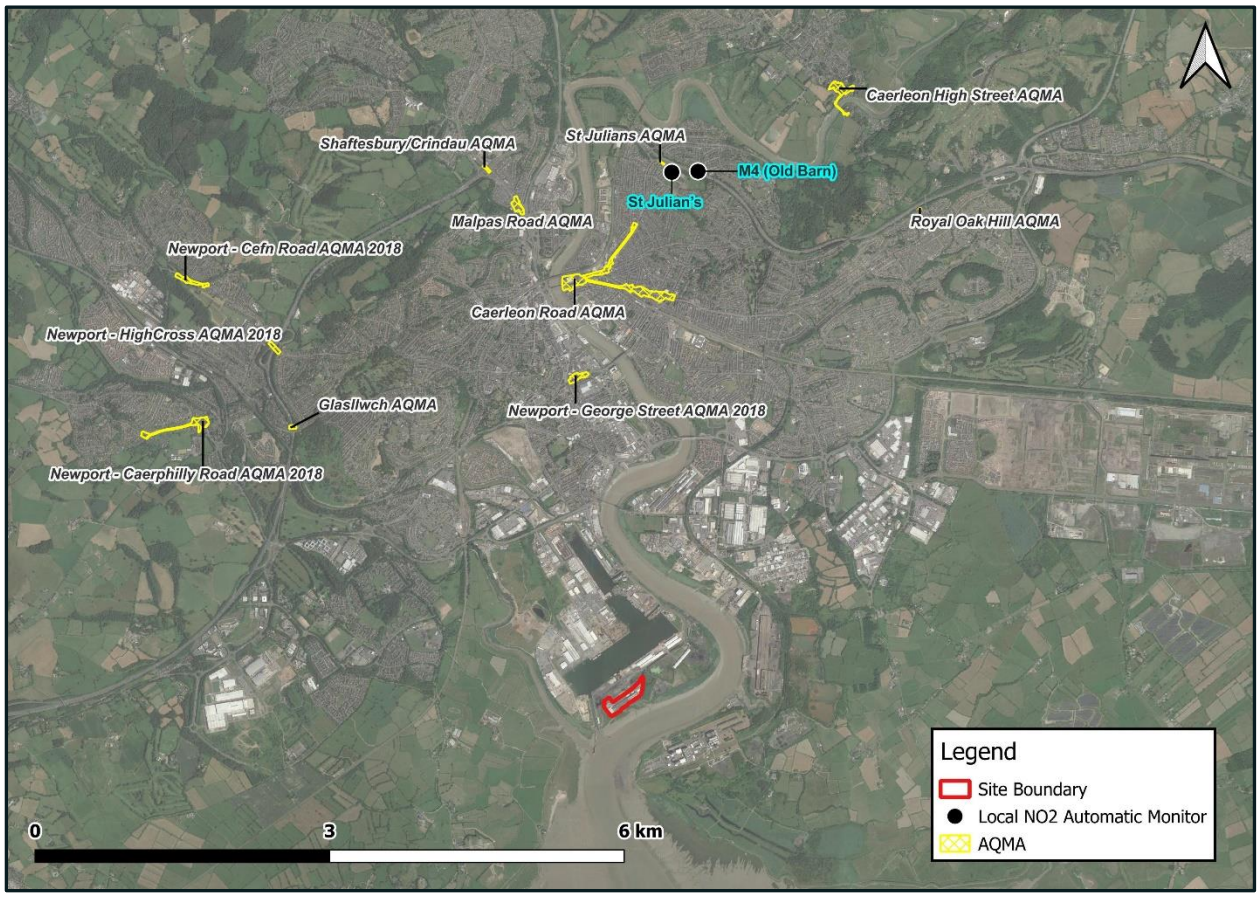
The applied annual mean backgrounds in relation to the assessment of human health are provided in Table 6-4 below – based on the review of available data.

Based upon the data reviewed, there is a degree of spatial variation in NO_2 concentrations reported at roadside vs. background sites. Consideration has been given to both environments within the NO_2 dispersion modelling exercise, via the application of these datasets (at the appropriate locations).

Table 6-4: Applied Long Term Background Concentrations

Pollutant	Location	Unit	Annual Concentration	Data Source
NO_2	Background	µg/m^3	21.6	Maximum background NO_2 value reported across the modelled domain
NO_2	Roadside	µg/m^3	36.5	Maximum roadside NO_2 value reported across the modelled domain
SO_2	All	µg/m^3	13.0	Maximum SO_2 value reported across the modelled domain

Figure G: Air Quality Baseline Datasets



6.3 Ecological Receptors

APIS is a support tool for the assessment of potential effects of air pollutants on habitats and species, developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology. APIS has been used to provide information on the input parameters used in relation to the ecological impact assessment, where available. This includes,

- Critical Loads / Levels;
- Baseline conditions; and
- Habitat type and sensitivity to atmospheric emissions.

Background concentrations and deposition rates are calculated via a Concentration Based Estimated Deposition (CBED) approach based upon measured-interpolated data for a three-year rolling mean average (presently 2019 – 2021).

APIS provides assessment information for SSSIs, SPAs and SACs – providing minimum / maximum data across the full extent of each designation. For the purposes of conducting an initial screening assessment, worst-case input parameters have been used at the point of maximum impact i.e. maximum reported baseline conditions and minimum Critical Level / Load. Where further assessment is required, receptor specific assessment information has been used to refine the assessment (with use of the grid reference function). These impacts are referred to as:

- Screening Assessment; and
- Further Assessment.

The most sensitive habitat listed on APIS (that is present in the study area) has been used to provide a worst case assessment. In the absence of reported data, assessment information provided for underlying ecological designations has been used where available – and disclosed.

Table A-6 provides details of any other notable assumptions used to refine the ecological impact assessment.

6.3.1 Critical Levels

Information used in the assessment of potential Critical Level impacts alongside current baseline conditions is provided in Appendix A.

The appropriate Critical Level for each ecological designation has been identified via APIS. In the absence of information on APIS, the lower Critical Level has been adopted.

Maximum concentrations across all ecological designations are below the assigned Critical Levels.

6.3.1.1 24-Hour Mean NOx Critical Level

From review of Table 3-3, a 200µg/m^3 NOx 24-hour Critical Level is relevant where:

- Ozone is below the AOT40 Critical Level (6,000µg/m^3); and
- SO_2 is below the lower Critical Level of 10µg/m^3.

At all ecological designations, baseline SO_2 annual mean concentrations are below the lower Critical Level of 10µg/m^3.

AOT40 ozone data has been sourced from the European Environment Agency Air Quality Statistics website[7]. Table 6-5 provides details of 2019 (latest representative year) data from the two nearest monitoring stations.

Table 6-5: Ozone: AOT40 Baseline Data

Site ID	WGS 84		Distance to Site (km)	Ozone Concentration (µg/m^3)
	Lat	Lon		
Newport	51.654	-3.007	11.3	3,223.9
Cardiff Centre	51.482	-3.176	15.5	691.1

Ozone concentrations are below the AOT40 Critical Level.

A 24-hour mean NOx Critical Level of 200µg/m^3 has therefore been adopted for all designations within this assessment.

6.3.2 Critical Loads

6.3.2.1 Nutrient Nitrogen

Information used in the assessment of potential nutrient nitrogen impacts is provided in Appendix A.

Nutrient nitrogen Critical Loads are habitat / species specific (derived from a range of experimental studies). Critical Loads are often reported in ranges, representing the variation in ecosystem responses.

[7] http://aidef.apps.eea.europa.eu/

6.3.2.2 Acidification

Information used in the assessment of potential acidification impacts are provided in Appendix A.

Acidification Critical Loads are dependent on soil chemistry, as well as habitat type. In the UK, empirical Critical Loads have been assigned at a 1km grid square resolution. This is based upon the mineralogy and chemistry of the dominant soil series present in the grid square.

7.0 Predicted Air Quality Impacts

As established in Section 4.0 the LPG boiler is an existing installation that is already operational. These emission releases may already be represented within the applied background datasets. Quantification of these emissions could introduce double-counting of emissions – whilst considering background datasets.

7.1 Human Health

Results presented herein relate to the maximum ground level PC predicted across the entirety of the gridded receptors irrespective of relevant exposure, and as such, represents a conservative outlook. PCs predicted at all other locations, including human receptor locations would be lower.

7.1.1 Long-Term Impacts

Predicted long-term impacts are summarised in Table 7-1. An isopleth of modelled PCs vs the AQAL is provided in Appendix B.

Table 7-1: Predicted Maximum Ground Level Long-Term Impacts

AQAL			PC (µg/m^3)	PC % of AQAL	PEC (µg/m^3)	PEC % of AQAL
Pollutant	Period	µg/m^3				
NO_2	Annual	40	7.3	18.3	28.9	72.3

At the location of maximum impact, the PEC is well below the AQAL. Impacts can be considered insignificant.

It is recognised that NO_2 annual mean PCs cannot be screened out in isolation and impacts are based on the application of the background datasets. Discrete receptor locations may be located at roadside conditions.

To address this, annual mean impacts at discrete receptor locations are presented in Table 7-2. PCs can be considered insignificant without the need to consider PEC.

Table 7-2: Predicted Annual Mean NO_2 Impacts: Discrete Receptors

Receptor	PC (µg/m^3)	PC as % of AQAL
HR1	<0.1	0.1
HR2	<0.1	<0.1
HR3	<0.1	<0.1
HR4	<0.1	<0.1
HR5	<0.1	<0.1
HR6	<0.1	0.1
HR7	<0.1	<0.1
HR8	<0.1	0.1
HR9	<0.1	0.1
HR10	<0.1	0.1
HR11	<0.1	0.1
HR12	<0.1	0.1

Receptor	PC (µg/m^3)	PC as % of AQAL
HR13	0.1	0.1

7.1.2 Short-Term Impacts

Predicted short-term impacts are summarised in Table 7-3. An isopleth of modelled NO_2 PCs vs the AQAL is provided in Appendix B.

Table 7-3: Predicted Maximum Ground Level Short-Term Impacts

AQAL			PC (µg/m^3)	PC % of AQAL	PEC (µg/m^3)	PEC % of AQAL
Pollutant	Period	µg/m^3				
NO_2	1-Hour (99.79%ile)	200	33.3	16.6	76.5	38.2
SO_2	24-Hour (99.18%ile)	125	7.2	5.8	n/c	n/c
SO_2	1-Hour (99.73%ile)	350	13.0	3.7	n/c	n/c
SO_2	15-Minute (99.9%ile)	266	14.2	5.3	n/c	n/c
Table Notes: n/c = not calculated: the PEC has only been calculated where the PC is 10% or above.						

SO_2 PCs can be considered insignificant. At the location of maximum impact, the NO_2 PEC is well below the AQAL. Impacts can be considered insignificant.

It is recognised that NO_2 PCs cannot be screened out and impacts are based on the application of background datasets. Discrete receptor locations may be located at roadside conditions.

To address this, 1-hour mean (99.79%ile) NO_2 impacts at discrete receptor locations are presented in Table 7-4. PCs can be considered insignificant without the need to consider PEC

Table 7-4: Predicted 1-Hour Mean (99.79%ile) NO_2 Impacts: Discrete Receptors

Receptor	PC (µg/m^3)	PC as % of AQAL
HR1	0.7	0.4
HR2	0.6	0.3
HR3	0.5	0.3
HR4	0.4	0.2
HR5	0.4	0.2
HR6	0.6	0.3
HR7	0.3	0.2
HR8	0.5	0.2
HR9	0.4	0.2
HR10	0.5	0.3
HR11	0.4	0.2
HR12	0.7	0.4
HR13	1.0	0.5

7.2 Sensitive Ecosystems

Results presented herein relate to the maximum modelled impact at each individual ecological designation requiring assessment. This represents a conservative outlook. PCs predicted across the remainder of each designation would be lower.

7.2.1 Critical Levels

7.2.1.1 Oxides of Nitrogen

Table 7-5 details the maximum predicted impacts on the NOx annual mean Critical Levels, at the identified ecological sites.

Table 7-5: Maximum Predicted Impacts on NO_X Annual Mean Critical Levels

Site	Type	Screening Assessment				Further Assessment	
		Maximum Impact		Maximum Background			
		PC (µg/m³)	PC as % CL	PEC (µg/m³)	PEC as % CL	PEC (µg/m³)	PEC as % CL
E1	SPA/Ramsar	0.3	1.0	26.4	88.0	12.4	41.4
E2	SSSI	0.1	0.2	n/c	n/c	n/c	n/c
E3	SAC	2.3	7.8	24.3	81.0	22.9	76.2
E4	SSSI	0.1	0.3	n/c	n/c	n/c	n/c
E5	SAC	0.3	1.0	26.4	88.0	12.4	41.4
E6	SSSI	0.2	0.8	n/c	n/c	n/c	n/c
E7	SSSI	0.6	2.0	26.7	89.0	12.7	42.4
E8	SSSI	2.3	7.8	24.3	81.0	22.9	76.2

The outcomes of the screening assessment (maximum assessment inputs) indicate that the PECs are below the Critical Level at all ecological designation, where calculated. Despite this, further assessment has been conducted to identify the receptor specific PECs. These are below the Critical Level at all ecological designations.

Table 7-6 details the maximum predicted impacts on the NOx 24-hour mean Critical Levels at the identified ecological sites.

Table 7-6: Maximum Predicted Impacts on NO_X 24-Hour Mean Critical Levels

Site	Type	Screening Assessment			
		Maximum Impact		Maximum Impact	
		PC (µg/m³)	PC as % CL	PEC (µg/m³)	PEC as % CL
E1	SPA/Ramsar	4.9	2.5	57.1	28.6
E2	SSSI	0.8	0.4	n/c	n/c
E3	SAC	35.2	17.6	79.2	39.6
E4	SSSI	1.5	0.8	n/c	n/c
E5	SAC	4.9	2.5	57.1	28.6

Site	Type	Screening Assessment			
		Maximum Impact		Maximum Impact	
		PC (µg/m^3)	PC as % CL	PEC (µg/m^3)	PEC as % CL
E6	SSSI	2.7	1.4	39.5	19.7
E7	SSSI	5.5	2.7	57.6	28.8
E8	SSSI	35.2	17.6	79.2	39.6

The outcomes of the screening assessment (maximum assessment inputs) indicate that the PECs are below the Critical Level at all ecological designations, where calculated.

NOx Critical Level impacts can be considered insignificant.

7.2.1.2 Sulphur Dioxide

Table 7-7 details the maximum predicted impacts on the SO_2 annual mean Critical Levels at the identified ecological sites.

Table 7-7: Maximum Predicted Impacts on SO_2 Annual Mean Critical Levels

Site	Type	Screening Assessment			
		Maximum Impact		Maximum Impact	
		PC (µg/m^3)	PC as % CL	PEC (µg/m^3)	PEC as % CL
E1	SPA/Ramsar	<0.1	0.4	n/c	n/c
E2	SSSI	<0.1	0.1	n/c	n/c
E3	SAC	0.3	3.3	4.0	39.9
E4	SSSI	<0.1	0.1	n/c	n/c
E5	SAC	<0.1	0.4	n/c	n/c
E6	SSSI	<0.1	0.3	n/c	n/c
E7	SSSI	0.1	0.8	n/c	n/c
E8	SSSI	0.3	3.3	4.0	39.9

The outcomes of the screening assessment (maximum assessment inputs) indicate that the PECs are below the Critical Level at all ecological designations, where calculated.

SO_2 Critical Level impacts can be considered insignificant.

7.2.2 Critical Loads

7.2.2.1 Nutrient Nitrogen

Table 7-8 details the maximum predicted impacts on nutrient nitrogen Critical Loads at the identified ecological sites.

Table 7-8: Predicted Nutrient Nitrogen Deposition Impacts

Site	Type	Screening Assessment					Further Assessment
		PC	Critical Load	PC as % Critical Load		Maximum PEC	PEC
		(kgN/ha/yr)		Minimum	Maximum	(kgN/ha/yr)	(kgN/ha/yr)
E1	SPA/Ramsar	0.03	10 - 20	0.3	0.2	n/c	n/c
E2	SSSI	0.01	10 - 20	0.1	<0.1	n/c	n/c
E3	SAC	0.24	10 - 20	2.4	1.2	21.6	12.94
E4	SSSI	0.01	10 - 20	0.1	<0.1	n/c	n/c
E5	SAC	0.03	10 - 20	0.3	0.2	n/c	n/c
E6	SSSI	0.02	10 - 20	0.2	0.1	n/c	n/c
E7	SSSI	0.06	10 - 20	0.6	0.3	n/c	n/c
E8	SSSI	0.24	10 - 20	2.4	1.2	21.6	12.94

All long-term PCs are <1% of the minimum Critical Load at all designations. This is with the exception of E3 and E8. The maximum PC is:

- 2.4% of the minimum Critical Load (10kgN/ha/yr); and
- 1.2% of the maximum Critical Load (20kgN/ha/yr).

E3 and E8 represent the River Usk SAC and SSSI. There are no Critical Loads for E8 available on APIS. E3 Critical Loads (underlying SSSI) have been adopted (Table A-4).

From review of Table A-4, the maximum background deposition rate (21.36kgN/ha/yr) at E3 and E8 is already above the minimum and maximum Critical Loads (10-20kgN/ha/yr). The maximum PEC is 21.6kgN/ha/yr. The Site does not contribute to an exceedance at these locations. The minimum background deposition rate (12.31kgN/ha/yr) at E3 and E8 is below the maximum Critical Load (20kgN/ha/yr).

Further assessment has been conducted to determine the PEC at the location of maximum impact at E3 and E8. This has involved the consideration of the receptor specific background datasets to refine the impact assessment.

The background deposition rate at the location of maximum impact at E3 and E8 is 12.7kgN/ha/yr. This is above the minimum Critical Load (10kgN/ha/yr), but below the maximum Critical Load (20kgN/ha/yr). The maximum PEC is 12.94kgN/ha/yr; this translates to:

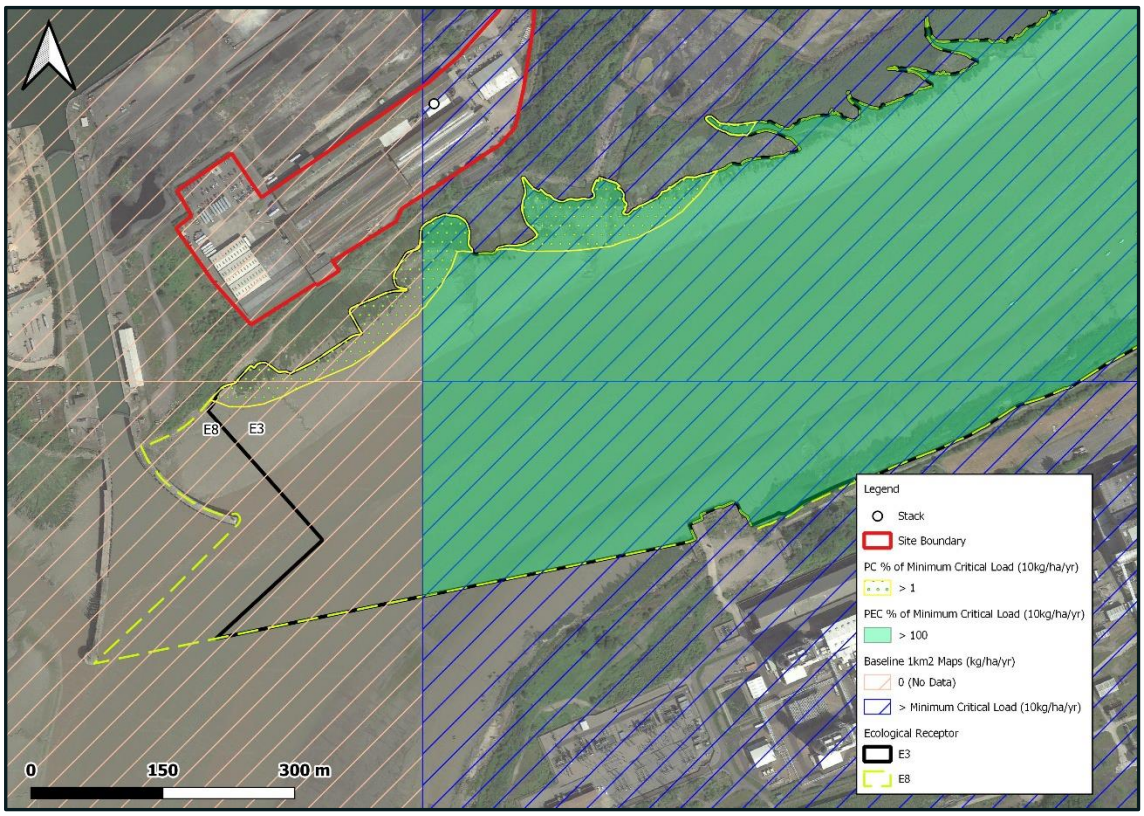
- 129.4% of the minimum Critical Load (10kgN/ha/yr); and
- 64.7% of the maximum Critical Load (20kgN/ha/yr).

As the PEC is below the maximum Critical Load (20kgN/ha/yr), it can be discounted – and impacts considered insignificant. As per APIS, the maximum Critical Load is relevant for most saltmarshes. The minimum Critical Load (10kgN/ha/yr) applies to more densely vegetated upper marsh (e.g. EUNIS class MA223, MA224) and to areas of marsh subjected to direct run-off from adjacent catchments.

Figure H illustrates the spatial extent of nutrient nitrogen PC and PEC vs. the minimum Critical Load (10kgN/ha/yr). This comprises:

- PC >1% of the Critical Load; and / or
- PEC >100% of the Critical Load.

Figure H: Spatial Extent of Nutrient Nitrogen PC and PEC

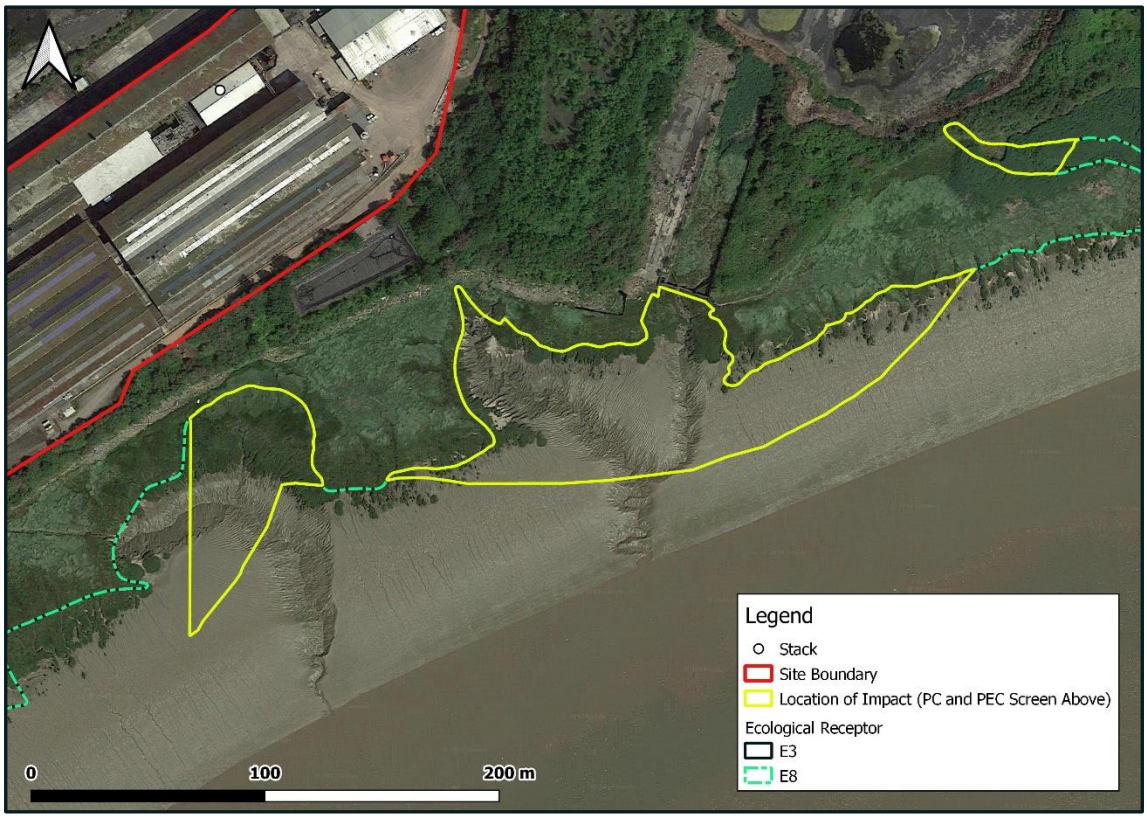


The area where PC >1% of the Critical Load borders the southern Site boundary. Towards the east of this area, the PEC >100% of the Critical Load.

The APIS 1km background datasets are overlayed to provide baseline context. The blue hashed grid squares represent the areas where baseline conditions (APIS 1km^2 datasets) are above the Critical Load. The locations where PEC is >100% of the Critical Load is confined to these grid squares. Thus, the Site does not cause an exceedance. No baseline data exists for the remaining grid squares.

The area of impact (where both the PC and PEC screening thresholds are exceeded) is marked in a yellow outline in Figure I. The spatial extent of the affected area is confined to the northern bank of the River Usk. The area represents 14,450m^2 (3,400m^2 covers saltmarshes).

Figure I: Spatial Extent of Nutrient Nitrogen Impacts



From review of the APIS nutrient nitrogen Critical Load ranges recommended for use in air pollution impact assessments[8], the range for the relevant E3 and E8 nitrogen class (marine saltmarsh habitats) is 20-30kgN/ha/yr. The PEC is below this range. Impacts can be considered insignificant.

Despite the above, from review of recently air quality assessments prepared in support of nearby schemes available on NRW's public register (Uskmouth Conversion Project)[9], the River Usk SSSI and SAC are not considered to be sensitive to nitrogen deposition. This is based on NRW's advice. This advice is considered to be relevant for this assessment – as the study areas are comparable i.e. affecting the same area.

Based on the above, nutrient nitrogen impacts can be considered to be insignificant.

7.2.2.2 Acidification

Table 7-9 details the maximum predicted impacts on acidification Critical Loads, at the identified ecological sites.

Table 7-9: Acid Deposition Impacts at Ecological Receptors

Site	Type	Sensitivity (A)	Applied Critical Load (MaxS/MaxN) (keq/ha/yr)	PC	PC as %
E1	SPA/Ramsar	N	4.856	0.007	0.2
E2	SSSI	S	4.000	0.001	<0.1

[8] https://www.apis.ac.uk/sites/default/files/downloads/APIS%20critical_load_range_document.pdf

[9] https://publicregister.naturalresources.wales/Search/Download?RecordId=40705

Site	Type	Sensitivity (A)	Applied Critical Load (MaxS/MaxN) (keq/ha/yr)	PC	PC as %
E3	SAC	No information on APIS			
E4	SSSI	S	4.000	0.001	<0.1
E5	SAC	N	4.856	0.007	0.2
E6	SSSI	S	4.000	0.004	0.1
E7	SSSI	N	4.856	0.014	0.3
E8	SSSI	No information on APIS			

Table Notes:

(A) Whether Nitrogen or Sulphur is the principal constraint in the local setting (Critical Load Function).

All long-term PCs are <1% of the minimum Critical Load at all designations. Impacts can be considered insignificant.

8.0 Conclusions

The conclusions of the detailed atmospheric dispersion modelling assessment of emissions to air on receiving environment are as follows:

- Maximum ground level PCs will have an insignificant impact on human health; and
- Predicted impacts on designated sensitive habitats are considered insignificant.

Appendix A Ecological Input Parameters

Air Emissions Risk Assessment

Medium Combustion Plant: Existing

Vital Energi for SAICA Pack UK Limited for SAICA Pack UK Limited

SLR Project No.: 410.065367.00001

24 October 2023

A.1 Critical Levels

Table A-1: Baseline Annual Mean NOx Conditions: Ecological Receptors

Site	Name	Type	Critical Level (µg/m^3)	Baseline NOx (µg/m^3)
E1	Severn Estuary (Wales)	SPA/Ramsar	30	5.1 - 26.1
E2	Gwent Levels - Nash and Goldcliff	SSSI	30	7.5 - 14.8
E3	River Usk / Afon Wysg	SAC	30	3.1 – 22.0
E4	Gwlyptiroedd Casnewydd	SSSI	30	7.5 - 11.3
E5	Severn Estuary (Wales)	SAC	30	5.1 - 26.1
E6	Gwent Levels - St. Brides	SSSI	30	9.4 - 18.4
E7	Severn Estuary	SSSI	30	7.5 - 26.1
E8	River Usk	SSSI	30	5.5 – 22.0

Table A-2: Baseline Annual Mean SO_2 Conditions: Ecological Receptors

Site	Name	Type	Critical Level (µg/m^3)	Baseline SO_2 (µg/m^3)	Comment
E1	Severn Estuary (Wales)	SPA/Ramsar	10	0.6 - 5.8	Critical Level not reported on APIS. Used Severn Estuary SAC
E2	Gwent Levels - Nash and Goldcliff	SSSI	10	0.9 - 2.5	Critical Level not reported on APIS. Adopted lower Critical Level
E3	River Usk / Afon Wysg	SAC	10	0.4 - 3.7	APIS: Lower Critical Level
E4	Gwlyptiroedd Casnewydd	SSSI	10	0.9 - 1.8	Critical Level not reported on APIS. Adopted lower Critical Level
E5	Severn Estuary (Wales)	SAC	10	0.6 - 5.8	APIS: Lower Critical Level
E6	Gwent Levels - St. Brides	SSSI	10	1.4 - 2.9	Critical Level not reported on APIS. Adopted lower Critical Level
E7	Severn Estuary	SSSI	10	0.8 - 2.5	Critical Level not reported on APIS. Used Severn Estuary SAC
E8	River Usk	SSSI	10	0.8 - 3.7	Critical Level not reported on APIS. Used River Usk SAC

Table A-3: Baseline 24-Hour Mean NOx Conditions: Ecological Receptors

Site	Name	Type	Critical Level (µg/m^3)	Baseline NOx (µg/m^3)	Comment
E1	Severn Estuary (Wales)	SPA/Ramsar	200	10.1 - 52.2	AOT40 not exceeded and SO_2 is below Critical Level
E2	Gwent Levels - Nash and Goldcliff	SSSI	200	15.1 - 29.6	AOT40 not exceeded and SO_2 is below Critical Level
E3	River Usk / Afon Wysg	SAC	200	6.1 - 43.9	AOT40 not exceeded and SO_2 is below Critical Level
E4	Gwlyptiroedd Casnewydd	SSSI	200	15.1 - 22.6	AOT40 not exceeded and SO_2 is below Critical Level
E5	Severn Estuary (Wales)	SAC	200	10.1 - 52.2	AOT40 not exceeded and SO_2 is below Critical Level
E6	Gwent Levels - St. Brides	SSSI	200	18.8 - 36.8	AOT40 not exceeded and SO_2 is below Critical Level
E7	Severn Estuary	SSSI	200	14.9 - 52.2	AOT40 not exceeded and SO_2 is below Critical Level
E8	River Usk	SSSI	200	11.0 - 43.9	AOT40 not exceeded and SO_2 is below Critical Level

A.2 Critical Loads

Table A-4: Baseline Nutrient Nitrogen Conditions: Ecological Receptors

Site	Type	Feature / Habitat	Nitrogen Class	Approach	Deposition Velocity	NGR (Max Impact)		Critical Load	Baseline
						X	Y	Min - Max (kgN/ha/yr)	
E1	SPA / Ramsar	Anser albifrons albifrons	Atlantic upper-mid & mid-low salt marshes	-	Grassland	331440	183760	10 - 20	8.58 - 17.32
E2	SSSI	Tringa tetanus	Low and medium altitude hay meadows	-	Grassland	333903	183992	10 - 20	11.71 - 13.24
E3	SAC	Atlantic salt meadows	Atlantic upper-mid & mid-low salt marshes	-	Grassland	332000	184175	10 - 20	12.31 - 21.36
E4	SSSI	Tringa tetanus	Atlantic upper-mid & mid-low salt marshes	-	Grassland	333089	183589	10 - 20	11.71 - 12.31
E5	SAC	Atlantic salt meadows / Low and medium altitude hay meadows	Atlantic upper-mid & mid-low salt marshes	-	Grassland	331440	183760	10 - 20	8.58 - 17.32
E6	SSSI	Standing Water	Site specific advice should be sought	Adopted E2 habitat / N Class	Grassland	331301	183731	10 - 20	11.62 - 13.64
E7	SSSI	Anas acuta	Atlantic upper-mid & mid-low salt marshes	-	Grassland	331629	183913	10 - 20	9.44 - 14.14
E8	SSSI	Standing Water	Site specific advice should be sought	Adopted E3 habitat / N Class	Grassland	332000	184175	10 - 20	12.31 - 21.36

Table A-5: Baseline Acidification Conditions: Ecological Receptors

Site	Type	Feature	Habitat/Acidity Class	Approach	Deposition Velocity	NGR (Max Impact)		Critical Load			Baseline (A)		Sensitivity (B)
						X	Y	CLminN	CLmaxN	CLmaxS	N	S	
								(keq/ha/yr)					
E1	SPA / Ramsar	Anas strepera (North-western Europe)	Freshwater	Adopted E7 values	Grassland	331440	183760	0.856	4.856	4.000	0.85	0.27	N
E2	SSSI	Tringa totanus	Calcareous grassland (using base cation)	-	Grassland	333903	183992	1.071	5.071	4.000	0.88	0.15	S
E3	SAC	Water courses	Freshwater	No information	-	-	-	No information on APIS (C)			-	-	-
E4	SSSI	Tringa totanus	Calcareous grassland (using base cation)	-	Grassland	333089	183589	1.071	5.071	4.000	0.88	0.15	S
E5	SAC	Alosa alosa	Freshwater	Adopted E7 values	Grassland	331440	183760	0.856	4.856	4.000	0.85	0.27	N
E6	SSSI	Potamogeton trichoides	No critical load has not assigned for this feature	Adopted E2 values	Grassland	331301	183731	1.071	5.071	4.000	0.88	0.15	S
E7	SSSI	Numenius arquata	Calcareous grassland (using base cation)	-	Grassland	331629	183913	0.856	4.856	4.000	0.85	0.27	N
E8	SSSI	Alosa alosa	Freshwater	No information	-	-	-	No information on APIS (C)			-	-	-

Table Notes:

(A) Identified via search by location – at the location of maximum impact. Where null values are provided the grid square with highest reported background acid deposition rate has been used.

(B) APIS Critical Load Function outcome

(C) No underlying designation with data.

Table A-6: Ecological Assessment Approach

ID	Name	Issue	Approach	Justification
E3	River Usk SAC	Bog woodland listed on APIS	Excluded from assessment	Based on a review of satellite imagery and online literature, this feature is not believed to be present in the study area. The study area represents an estuarine environment (saltwater) which is unlikely to lead to the formation of bogs.
E3	River Usk SAC	Unmanaged Broadleafed/Coniferous Woodland listed on APIS	Excluded from assessment	Based on a review of satellite imagery and online literature, this feature is not believed to be present in the study area. The study area represents an estuarine environment – comprising predominately marshland.
E6	Gwent Levels - St. Brides SSSI	No Critical Load information on APIS	Adopted Gwent Levels - Nash and Goldcliff values	Based on a review of citations, the Gwent Levels comprise a network of SSSIs – and are expected to have comparable ecosystems.

Appendix B Isopleths

Air Emissions Risk Assessment

Medium Combustion Plant: Existing

Vital Energi for SAICA Pack UK Limited for SAICA Pack UK Limited

SLR Project No.: 410.065367.00001

24 October 2023

Figure B-1: Annual Mean NO_2 PC % of AQAL

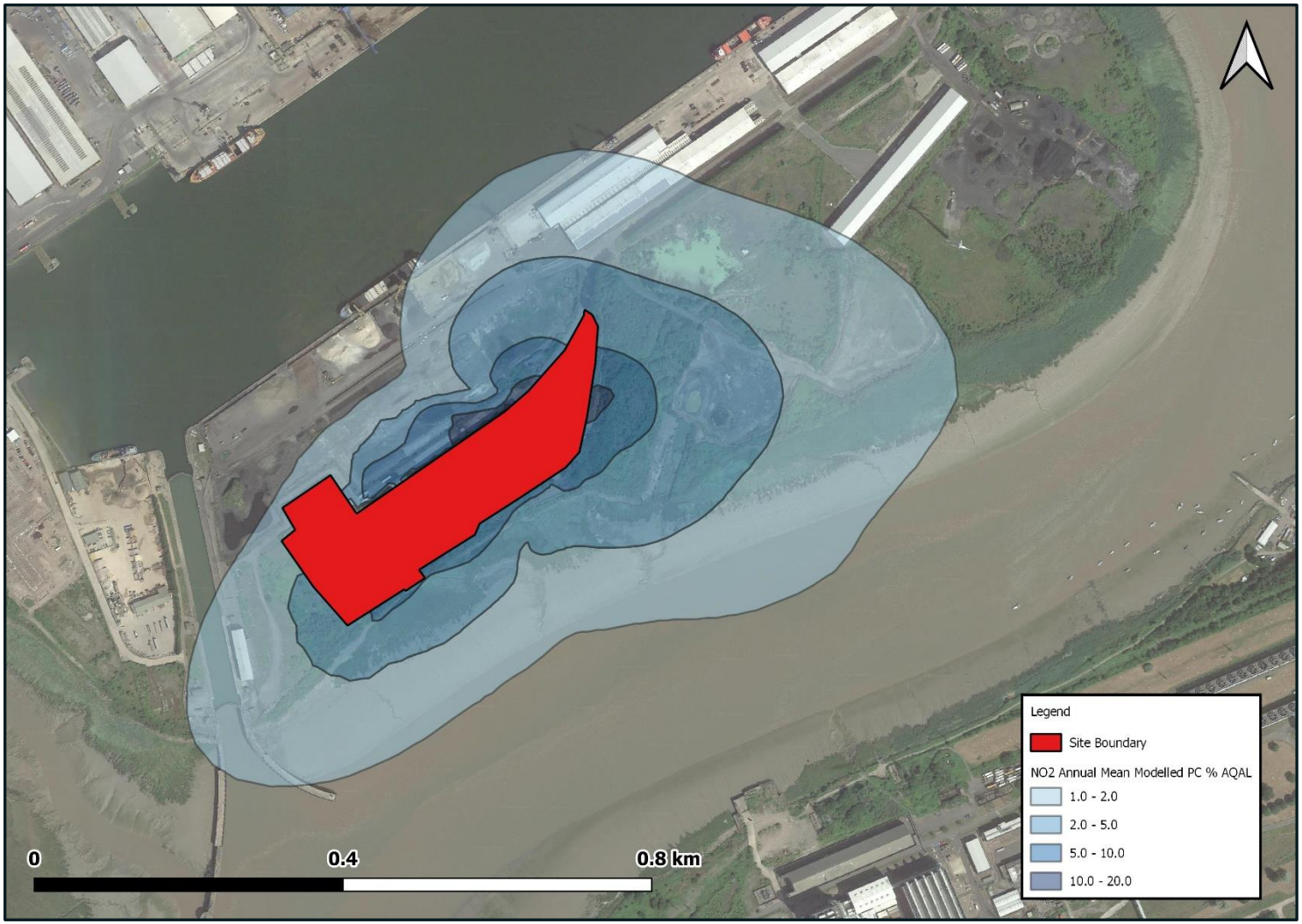


Figure B-2: 1-Hour Mean (99.79%ile) NO_2 PC % of AQAL

Appendix C Modelling Checklist

Air Emissions Risk Assessment

Medium Combustion Plant: Existing

Vital Energi for SAICA Pack UK Limited for SAICA Pack UK Limited

SLR Project No.: 410.065367.00001

24 October 2023

Table B-1: Modelling Checklist

Item	Yes / No	Details / Reason for Omission
Location map	Yes	Figure A
Site plan	Yes	Figure A
Pollutants modelled	Yes	Table 4-2
Relevant environmental standards	Yes	Section 3.0
Details of modelled scenarios	Yes	Section 4.0
Details of relevant ambient concentrations	Yes	Section 6.0
Model description and justification	Yes	Section 5.1
Special model treatment used	Yes	N/A
Table of emission parameters used	Yes	Table 4-2 and Table 4-2
Details of modelled domain and receptors	Yes	Section 5.2
Details of meteorological data used	Yes	Section 5.5
Details of terrain treatment	Yes	Section 5.3
Details of building treatment	Yes	Section 5.4
Model uncertainty and sensitivity	Yes	Section 5.9
Assessment of impacts	Yes	Section 1.0
Contour plots	No	Figure H and Appendix B
Model input files	Yes	Appendix D

Appendix D Model Files

Air Emissions Risk Assessment

Medium Combustion Plant: Existing

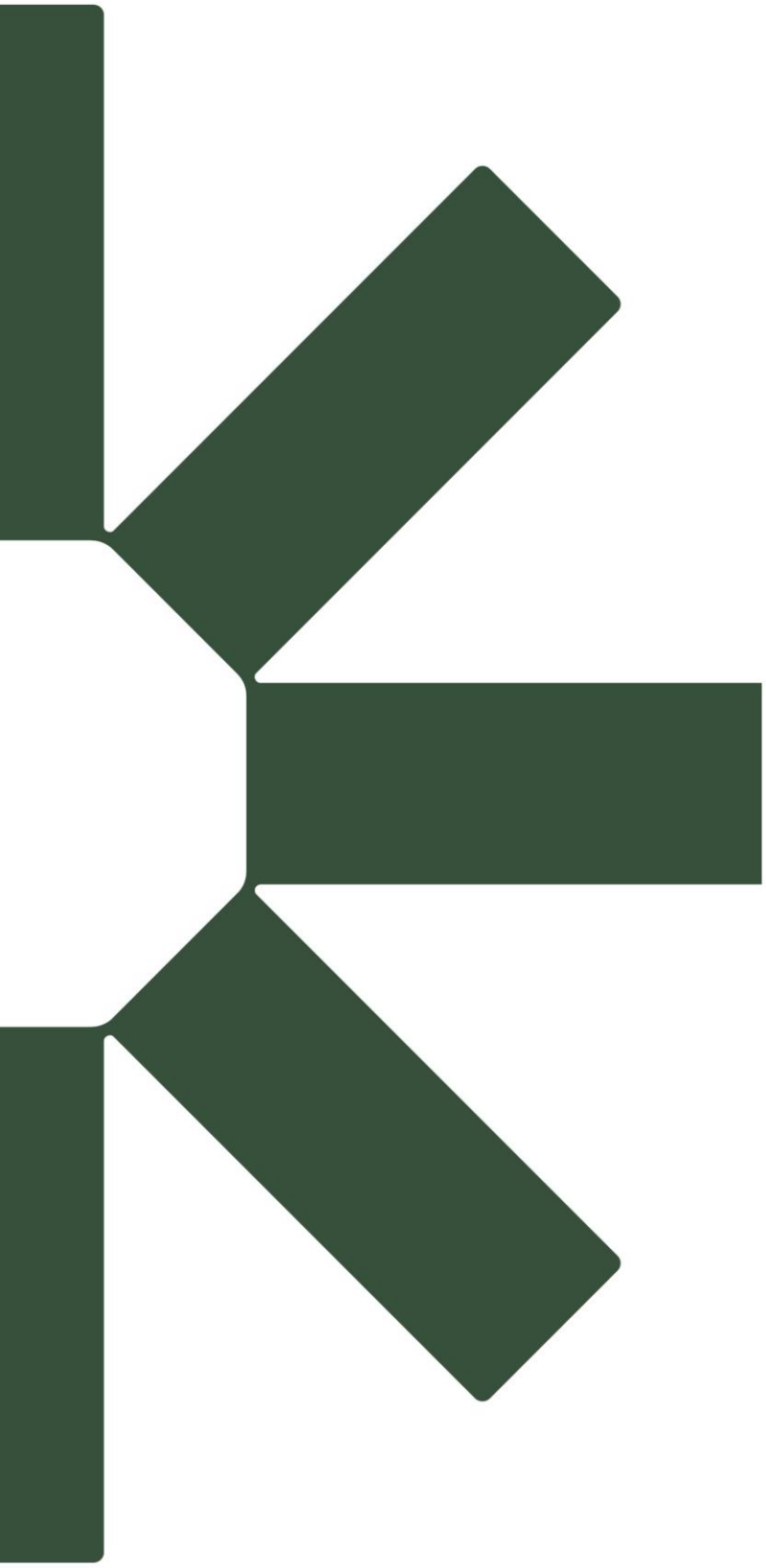
Vital Energi for SAICA Pack UK Limited for SAICA Pack UK Limited

SLR Project No.: 410.065367.00001

24 October 2023

D.1 Electronic Model Files

File Name: Saica Park Newport MCPD v1_2018



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