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Consulting Engineers Limited

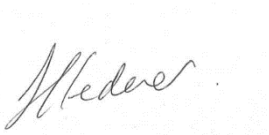
Northacre Facility

Northacre Renewable Energy Limited

Fire prevention plan

ENGINEERING CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	James Bernays		Project Engineer	22/07/2020
	Hannah Lederer		Environmental Scientist	10/08/2020
Checked by:	James Sturman		Lead Consultant	22/07/2020
	Stephen Othen		Technical Director	10/08/2020

Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
00	22/07/2020	First Issue	JB2	JRS
01	10/08/2020	Updated following client comments	HKL	SMO

Contents

1 Introduction

Northacre Renewable Energy Limited (NRE) is applying to the Environment Agency (EA) under the Environmental Permitting Regulations (EPRs) for an Environmental Permit (EP) to operate Northacre Renewable Energy facility (the Facility), to be located on land off Stephenson Road, Westbury, Wiltshire. The Facility will comprise a waste incineration facility together with an associated electrical connection, and the potential to export heat.

A detailed description of the Facility is presented in Section 1.4 of the Supporting Information.

The objective of this report is to provide a preliminary Fire Prevention Plan (FPP) for the Facility, identifying the provisions which have been taken into account during the development phase of the Facility. In addition, provisional operational measures have been identified where these are available. The report will be subject to review following completion of detailed process design.

This report has been developed in accordance with Environment Agency guidance note: *Fire Prevention Plans: Environmental Permits* and the associated report template, as published on the UK government website. The requirements of the FPP will be integrated within the emergency plans and procedures for the Facility to ensure that they are consistent and compatible with other management systems associated with the operation of the Facility.

This document and the measures to mitigate the risk and impact of fires within the Facility have been (and will continue to be) developed in accordance with the requirements of the following:

- Environment Agency guidance note *'Fire Prevention Plans: Environmental Permits'*;
- Building Regulations – *Approved Document B (Fire Safety)*;
- National Fire Protection Association *'NFPA 850: Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations'*; and
- The insurer's requirements where structures or equipment fall outside published guidance or recommended practice.

The EA's Fire Prevention Plan guidance note has been designed with 3 objectives in mind:

1. minimise the likelihood of a fire happening;
2. aim for a fire to be extinguished within 4 hours; and
3. minimise the spread of fire within the site and to neighbouring sites.

The Facility will meet these objectives as follows:

1. The use of suitable management procedures and fire detection systems will minimise the likelihood of a fire happening – refer to sections 4, 5 and 9.
2. Active firefighting measures will be implemented should a fire break out – refer to section 10. Utilising these measures, the Facility aims to extinguish a fire within 4 hours.
3. Fire walls will minimise the spread of fire within the site and to neighbouring sites – refer to section 7.

2 The fire prevention plan

2.1 Site location and description

The site is on the Northacre Trading Estate, approximately 1.5 km to the north-west of Westbury town centre in Wiltshire Council. The site is located on a parcel of land between Arla Foods Westbury Dairies to the north-east and the Northacre Resource Recovery Centre to the south-east. Stephenson Road is immediately north of the site whilst there are fields to the south side of the site. A site location plan is presented in Appendix A.1.

Access to the site is from Stephenson Road, which links via the B3097 to the A350. The A350 provides access in all directions via the primary route network.

The nearest residential properties are two dwellings on Brook Lane to the east, Brook Farm and Orchard House to the south west, and a small number of semidetached houses on Storridge Road to the north-east. The Northacre Trading Estate is located approximately 600 m to the north of the site.

2.2 Activities at the site

Activities covered by this EP application include:

1. single-line waste incineration plant processing incoming waste which is delivered to the site from off-site via road;
2. generation of power and export to the national grid, and the potential to export heat;
3. production of inert bottom ash material that will be transferred off-site to a suitably licensed waste treatment facility for recovery/disposal; and
4. generation of an air pollution control residue that will be transferred to a suitably licensed hazardous waste facility for disposal or recovery.

Table 1 lists the Schedule 1 activities, from the Environmental Permitting Regulations, and the Directly Associated Activities (DAAs).

Table 1: Scheduled and directly associated activities

Type of Activity	Schedule 1 Activity	Description of Activity
Installation	Section 5.1 Part A(1) (b)	The incineration of non-hazardous waste in a waste incineration plant with a nominal design capacity of 30.9 tonnes per hour.
Directly Associated Activities		
Directly Associated Activities		Waste reception, storage and handling facilities
Directly Associated Activities		Combustion and energy recovery processes including the export of electricity to the National Grid
Directly Associated Activities		Flue gas treatment

Type of Activity	Schedule 1 Activity	Description of Activity
Directly Associated Activities		Residue storage and handling facilities
Directly Associated Activity		Standby electrical generation to provide electrical power to the plant in the event of an interruption in the supply

The Stationary Technical Unit (the Facility) will comprise of waste reception; waste storage; water, fuel oil and air supply systems; furnace; boiler; steam turbine/generator set; facilities for the treatment of exhaust or flue gases; on-site facilities for treatment or storage of residues and waste water; flue with associated stack; and devices and systems for controlling combustion operations and recording and monitoring conditions.

The Facility will process approximately 243,200 tonnes per annum (at the design capacity of 30.9 tph with an NCV of 10.5 MJ/kg and an availability of approximately 7,860 hours).

2.3 Site plans and drawings

The following plans and drawings are included within Appendix A:

- site location plan (Appendix A.1);
- access points around the perimeter to assist firefighting (Appendix A.2);
- indicative locations of fire hydrants and water supplies (Appendix A.3);
- indicative locations of fire walls (Appendix A.4);
- indicative location of quarantine area (Appendix A.5);
- materials storage areas (Appendix A.6);
- firewater containment (Appendix A.7); and
- Fire receptor plan (Appendix A.8).

Detailed process design will be undertaken following final contract negotiations and selection of technology provider. Therefore, the information in relation to some of the drawings identified above must be considered to be indicative until detailed design has been completed. Following completion of detailed design, the following drawings will be included within the updated FPP:

- the location of drain covers and any pollution control features such as drain closure values and firewater containment systems;
- site drainage plan;
- the location of gas cylinders; and
- the location of plant, protective clothing and pollution control equipment and materials.

Weather data from the RAF Lyneham meteorological station from the years 2015-2019 has been used to produce wind roses indicating the direction of prevailing winds for the Facility. These are presented in Appendix B.

2.4 Plan of sensitive receptors near the site

The key human health receptors within 1 km which could be impacted by a fire at the Facility are presented in the following table:

Table 2: Sensitive human receptors within 1 km of the site

Name	Location		Distance from the stack [m]
	x	y	
Westbury Dairies	385654	152070	134
Storridge Road 1	385947	152331	318
Storridge Road 2	386022	152265	314
Westbury Lodge	386078	152180	316
Brook Lane 1	385912	152056	125
Cossington Square	386351	152058	564
Primmers Place 1	386416	151994	632
Primmers Place 2	386496	151911	724
Station Road	386523	151833	769
Bridge Court	386474	151680	783
Oldfield Road	386374	151590	749
Phoenix Rise	386259	151457	763
Hackney Way	386112	151140	972
Brook Lane 2	385564	151571	534
Brook Drove 1	385494	151811	382
Brook Drove 2	385021	151871	788

A detailed fire receptor plan, as required by the EA's FPP guidance, is presented in Appendix A.8.

2.5 Where the plan is kept and how to use it

The Fire Prevention Plan will form part of the documented management systems for the Facility. The documented management systems will be available in both electronic and hard copies at easily accessible locations. Staff induction programmes will be location and job role specific; however, they will include IMS awareness training as a minimum. All staff will be able to easily access the documented management systems, including the Fire Prevention Plan.

All visitors will be informed about the fire prevention measures adopted at the Facility as part of the site induction procedures.

2.6 Testing the plan and staff training

A suite of emergency procedures for the Facility will be written and included in the training package for all staff and contractors. Training of site operatives will commence prior to commissioning of the Facility, and all operational personnel will be tested on the fire prevention and emergency procedures.

3 Types of combustible materials

3.1 Combustible waste

The non-hazardous waste types to be treated at the Facility, which may comprise municipal or commercial and industrial waste, are presented in the table below:

Table 3: Wastes to be processed in the Facility

EWC code	Description of waste
Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing	
02 01	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing**
02 01 03	Plant tissue waste
02 06	**Wastes from the baking and confectionery industry**
02 06 01	Materials unsuitable for consumption or processing
Wastes from wood processing and the production of panels and furniture pulp, paper, and cardboard	
03 01	**Wastes from wood processing and the production of panels and furniture**
03 01 01	Waste bark and cork
03 01 05	Sawdust, shavings, cutting wood, particle board, and veneer other than mentioned in 03 01 04
03 03	**Wastes from pulp, paper and cardboard production and processing**
03 03 01	Waste bark and wood
03 03 07	Mechanically separated reject from pulping of waste paper and cardboard
Wastes from the leather, fur, and textile industries	
04 02	**Wastes from the textile industry**
04 02 10	Organic matter from natural products (e.g. grease, wax)
04 02 21	Waste from unprocessed textile fibres
04 02 22	Waste from processed textile fibres
Waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified	
15 01	**Packaging (including separately collected municipal packaging waste)**
15 01 01	Paper and cardboard packaging which is not suitable for recycling and would otherwise be transferred for disposal
15 01 02	Plastic packaging which is not suitable for recycling and would otherwise be transferred for disposal
15 01 03	Wooden packaging which is not suitable for recycling and would otherwise be transferred for disposal
15 01 05	Composite packaging
15 01 06	Mixed packaging
15 01 09	Textile packaging

EWC code	Description of waste
Construction and demolition wastes (including excavated soil from contaminated sites)	
17 02	**Wood, glass and plastic**
17 02 01	Wood
17 02 03	Plastic which is not suitable for recycling and would otherwise be transferred for disposal
17 09	**Other construction and demolition wastes**
17 09 04	Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02, and 17 09 03
Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	
19 02	**Wastes from physical/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**
19 02 03	Premixed wastes composed only of non-hazardous wastes
19 05	**Wastes from aerobic treatment of solid wastes**
19 05 01	Non-composted fraction of municipal and similar wastes
19 05 02	Waste aerobic treatment of solid wastes from non-composted fraction of animal and vegetable waste
19 05 03	Off-specification compost
19 12	**Wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 01	Paper and cardboard which is not suitable for recycling and would otherwise be transferred for disposal
19 12 04	Plastic and rubber
19 12 07	Wood
19 12 08	Textiles
19 12 10	Combustible waste (refuse derived fuel)
19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions	
20 01	Separately collected fractions (except 15 01)
20 01 01	Paper and cardboard which is not suitable for recycling and would otherwise be transferred for disposal
20 01 10	Clothes
20 01 11	Textiles
20 01 38	Wood
20 01 39	Plastics which is not suitable for recycling and would otherwise be transferred for disposal
20 02	Garden and park wastes (including cemetery waste)
20 02 01	Biodegradable waste

EWC code	Description of waste
20 03	Other municipal wastes
20 03 01	Mixed municipal waste
20 03 02	Waste from markets
20 03 03	Street cleaning residues
20 03 07	Bulky waste

3.2 Other combustible materials

In addition to the combustible wastes listed above, there will be a limited number of other materials on site which are potentially combustible. These include;

- maintenance materials; and
- gas cylinders.

Various maintenance materials such as oils and greases will be present in small quantities on site at various locations.

Gas cylinders will be stored within purpose-built dedicated storage facilities. All facilities for the storage of gas cylinders will be kept locked/secured. A system for the regular inspection of gas storage facilities will be developed as part of the operating and maintenance procedures and the site inspection regime.

The location of gas cylinder storage and maintenance materials will be subject to detailed design. A plan showing the location of gas storage facilities and maintenance materials will be developed upon completion of detailed design.

Low sulphur fuel oil will be used for auxiliary firing and will be stored in a dedicated storage tank on-site. A plan showing the location of the primary raw materials and residues is presented within Appendix A.6.

4 Managing common causes of fire

4.1 Arson

Security measures will prevent access by members of the public and thereby prevent the risk of arson attacks or vandalism. The Facility will be surrounded by security fencing. A barrier will be present at the entrance and exit of the site to restrict vehicular access. Only authorised visitors will be able to enter the site.

The Facility will be operational and manned 24 hours a day, 7 days a week, with the CCTV system monitored in the control room by trained and competent operators. The shift team leaders will be responsible for security on the site, including delivery vehicles as they travel around the site.

Emergency response procedures will be developed for the Facility, prior to the commencement of operations, as part of the detailed Environmental Management System (EMS). The procedures will detail the response to a number of different emergency situations on site, including unauthorised personnel accessing the Facility.

In accordance with the waste acceptance procedures to be developed for the Facility, unloading of all waste deliveries will be supervised by operational staff. CCTV will be installed in all areas where waste delivery vehicles discharge waste into the bunker. The design and location of the CCTV systems and security alarms will be undertaken during detailed design of the Facility and labelled on a site plan accordingly.

4.2 Plant and equipment

An operating and maintenance manual (O&M manual) will be developed and completed through the commissioning phase of the installation. The O&M manual will set out detailed operating and maintenance instructions for all plant and equipment which requires maintenance.

Maintenance procedures and work instructions will be developed to cover all plant and equipment within the Facility. As part of such work instruction development, the risk of fire will be considered, and appropriate activities included within the work instruction to reduce the risk of fire in all plant and equipment.

As part of the maintenance system, responsibilities for retaining records of all maintenance undertaken and any actions taken following a problem will be defined.

4.3 Electrical faults including damaged or exposed electrical cables

The risk of electrical faults on site will be minimised by the use of qualified electricians and will comply with the relevant British Standards for the design and installation of electrical equipment and supplementary bonding/earthing.

Electrical equipment will be checked and maintained as part of the planned maintenance regime as required in the detailed operating manuals for each piece of equipment.

4.4 Discarded smoking materials

Smoking will be prohibited in operational areas. External areas designated for smoking within the Installation Boundary will be identified, with suitable facilities provided for staff.

4.5 Hot works safe working practices

Staff and contractors will follow safe working practices which may include a permit to work system when carrying out hot works such as welding or cutting. A fire watch will be carried out for a suitable period after hot works have ended, and at the end of a working day.

4.6 Industrial heaters

It is currently expected that industrial heaters will not be installed at the Facility, however, this will be confirmed during detailed design of the Facility. If applicable, the hot work management system will be extended to include the use of industrial heaters and the necessary safeguards required in each instance will be assessed and implemented to ensure their use is safe.

4.7 Hot exhausts and engine parts

A fire watch system will be implemented to detect signs of fires from dusts settling on hot exhausts. This will be developed as part of the operating procedures. This will include daily visual checks of dusts settling on hot exhausts as part of the operational checks by operational staff at the end of each shift. Maintenance work instructions will be raised for any items identified as requiring maintenance.

4.8 Ignition sources

A review under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) will be completed during the detailed design of the Facility, with any risk areas identified on DSEAR zonal drawings.

Vehicles and electrical items necessary for the operation of the Facility will be regularly inspected for electrical faults. All mobile plants serving the Facility will be fitted with fire extinguishers and dust filters where appropriate.

Naked sources of ignition will be controlled through a hot work management system. This system will cover both staff and contractors working at the Facility. The hot work management system will also include requirements to train and authorise 'hot work risk assessors' for the purposes of eliminating, reducing and managing the risks associated with hot work. The hot work system will include for a period of fire watch following the hot works being undertaken.

As part of the hot work management system, the potential for sources of ignition to cause fires will be managed on a case-by-case basis. Where feasible, the guidance of keeping all sources of ignition at least 6 metres away from any combustible or flammable waste will be followed as part of this management system. This will include ensuring that the location of stored mobile plants, which is subject to detailed design of the Facility, will be stored at least 6 metres away from combustible wastes.

4.9 Leaks and spillages of oils and fuels

Emergency response procedures will be developed as part of the emergency procedures for the Facility. The procedures will include actions to be undertaken to respond to spills and leaks of chemicals. This will include actions to be undertaken to prevent liquids leaking or trailing from site vehicles. In addition, oil interceptors will treat surface water runoff from roadways prior to discharge off-site.

The location of spill kits will be marked up on a site plan following detailed design of the Facility.

4.10 Build-up of loose combustible waste, dust and fluff

The Facility will be designed to prevent the accumulation of dusts by designing structural members such that their shape or method of installation minimizes the surface area where dust can settle.

As part of the detailed design of the Facility, the control of dust and fluff has been considered. This includes:

- the use of an enclosed fuel reception/unloading building; and
- mechanical ventilation of the waste reception and storage areas to prevent fugitive emissions from the building façade.

These systems will be checked as part of the planned maintenance regime as required in the detailed operating manuals for each piece of equipment.

On a regular basis, inspections will be undertaken to identify the build-up of loose combustible materials, such as waste, dust and fluff. Where inspections identify that there has been a build-up of loose combustible materials, appropriate cleaning will be undertaken to clean this material from the surfaces.

4.11 Reactions between wastes

Waste acceptance procedures will be in place which will minimise the risk of incompatible wastes coming into contact with each other, or unstable wastes being accepted at the Facility.

In the unlikely event that waste identified as ‘unacceptable’ is received, a quarantine area will enable segregation of the waste prior to transfer off-site (refer to section 8).

4.12 Deposited hot loads

Hot loads, either identified in the bunker and removed, or identified prior to transfer to the bunker (if not immediately rejected) will be transferred to the dedicated quarantine area. Appropriate fire detection and protection measures will be installed in the quarantine area.

5 Preventing self-combustion

5.1 General self-combustion measures

It is acknowledged that some wastes can self-combust under certain conditions. Self-combustion can be managed through preventative measures, carefully managing storage times, pile volumes and height, and the temperature of the wastes.

5.2 Managing storage time

5.2.1 Methods used to record and manage the storage of all waste on site

The capacity of the waste bunker will be clearly stated and not exceeded. It is anticipated that the waste storage capacity of the bunker will be approximately 9,000 m^3 During normal operation, it is expected that the maximum period which waste will remain within the waste bunker is up to 5 days.

Prior to any planned shutdowns of the Facility, waste deliveries will be stopped and/or diverted to alternative waste management facilities, and the waste within the bunker will be combusted to minimize the quantity of waste remaining in the bunker prior to the shutdown commencing. This will ensure that there is only a small residue in the bunker during the period of shutdown. The duration of planned shutdowns will vary significantly, dependent on the nature of the work required, and typically will not extend beyond four weeks.

In the event that the Facility is not able to receive waste due to an unplanned incident forcing a full shutdown of the Facility, waste deliveries will be stopped and/or diverted to a suitably licenced waste management facility.

5.2.2 Stock rotation policy

Following the recommencement of waste deliveries after a period of shutdown, deliveries of 'new' waste will be mixed with residual quantities of waste within the bunker in accordance with the bunker management procedures for the Facility – refer to Section 5.3.1. This ensures that older waste is not 'buried' within the bunker.

It is not expected that there will be seasonal variations in the demand or supply of waste.

5.3 Monitor and control temperature

5.3.1 Monitoring and controlling temperature

As part of the detailed design and construction of the Facility, the fire system design will be designed and installed by a suitably qualified and experienced fire engineering company, which employs appropriately qualified persons. The system will be developed in accordance with NFPA 850, which is an industry standard for fire protection systems for power generating facilities, the local fire officer, the fire risk insurers and any relevant standards and codes of practice.

Operational staff will be briefed on the need for monitoring for the early signs of fires. The waste bunker and all main process areas will have CCTV to allow remote monitoring from the control rooms on a continuous basis. All waste delivered to the Facility will be supervised by operational staff, who will be responsible for the inspection and monitoring of waste deliveries. The frequency

of inspection of waste storage areas (and other parts of the site) will be increased during a full shutdown, and a checklist utilised to ensure a complete record of issues and comments that may require further action, such as assessing the presence of hotspots.

Bunker

Thermal imaging cameras will be fixed around the perimeter of the bunker to provide the crane driver with a continuous thermal 'map' of the bunker. The temperature of waste in the bunker will continue to be monitored even during periods of shutdown.

During daytime operation, the bunker will be visually monitored by control personnel, such as the crane operator. At night-time, the control personnel will visually monitor the thermal imaging system as part of their responsibilities for operating the Facility. Therefore, the crane driver will be able to identify and react to hot areas in the bunker and undertake the mixing or feeding of waste as appropriate.

Bunker management procedures will be adopted to ensure that there is a regular turnover of waste within the bunker, preventing hotspots or anaerobic conditions developing within the bunker. The turning of waste within the bunker is standard practice at waste incineration plants in the UK. As well as helping to mix the waste (to produce a more homogenous fuel which is better for control of the combustion process), it helps to prevent the formation of hotspots. Turning helps to release heat that has built up in the waste. By taking grabs of waste and then spreading it over a wider area, it dissipates the entrained heat and removes thermal inertia within the waste. It also increases the evaporation of water, which is a heat absorbing process. These factors help to minimise the risk of self-heating and ignition. In addition, mixing the waste with the crane enables waste from the base of the bunker to be brought to the surface. The crane will be sized to allow for mixing and rotating the waste within the bunker, whilst providing appropriate quantities of waste within the feed hopper to maintain operation of the waste combustion process. The size of the crane will ensure that the mixing of waste is feasible in relation to the amount of waste present in the bunker. The crane operator will be trained in careful waste handling and crane operation as to maintain the integrity of the bunker.

In extreme cases, the firewater cannons may be used to extinguish any smouldering or burning waste. The thermal imaging cameras will be set with two trigger alarms at different temperatures within the bunker. The fire water cannons will be activated if the high-high temperature alarm is reached.

IBA storage

Due to the high thermal temperatures in which the IBA has been generated, it will not be expected to contain any combustible materials which are able to self-combust from the elevated temperatures within the IBA. In addition, the quenching of the ash will ensure it has been suitably cooled prior to storage.

APCr storage

The APCr is not expected to contain any combustible materials which could self-combust from elevated temperatures within the APCr.

5.3.2 Dealing with hot weather and heating from sunlight

The waste bunker will not have external windows. Therefore, sunlight will not penetrate during hot weather and cause hotspots within the waste pile to develop.

6 Manage waste piles

6.1 Maximum pile sizes

It is understood that the EA's maximum waste pile sizes are not applicable to waste stored within a waste bunker.

6.2 Storing waste materials in their largest form

Waste received at the Facility will not undergo any further treatment, such as shredding, prior to incineration.

6.3 Waste stored in containers

Air Pollution Control residues (APCr) will be stored within a silo. The design of the silo is subject to detailed design, but it is expected that the total storage capacity for APCr will be approximately 350 m^3. The APCr silo will have sufficient capacity for the storage of approximately 5 days of APCr, assuming that the Facility operates continuously at the nominal capacity. As stated in Section 5.3.1, the APCr is not expected to contain any combustible materials which could self-combust from elevated temperatures within the APCr.

7 Prevent fire spreading

7.1 Separation distances

Following consultation with the EA, it is understood that the storage requirements relating to pile separation distance (i.e. storing combustible waste piles with a separation distance of at least 6 metres) only applies to external storage of wastes. All wastes which are delivered or stored within the site will be within buildings and will primarily be stored within the waste bunker. Taking this into consideration, pile separation distances will be adopted as good practice where feasible.

7.2 Fire walls construction standards

Fire walls will be installed within the buildings as required. The location and specification for fire walls will be subject to detailed design of the Facility, and dependent on the layout to be further developed by the EPC Contractor. The indicative locations of these fire walls are given in Appendix A.4.

Subject to the location of the process equipment, operational areas will be segregated into fire zones (the "Fire Zones"). In accordance with NFPA 850, certain specific Fire Zones such as the waste bunker and boiler hall will be separated from each other by fire barriers with a minimum of 2-hour fire resistance rating, spatial separation, or by other approved means. The specific Fire Zones to which this applies, and the means of separation, will be subject to agreement with the fire risk insurers. A review under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) will be completed during the detailed design of the Facility, with any risk areas identified on zoning drawings.

As part of the detailed design process, a fire risk assessment will be undertaken for each Fire Zone to identify the appropriate fire detection and protection systems in association with appropriate civil work design principles to control:

- the risk of fire propagation;
- the spread of fumes and smoke;
- firewater flooding; and
- to maintain the integrity of dedicated fire partition walls in the event of fire.

The fire zoning will be subject to agreement between NRE and the fire risk insurers.

The dividing wall between the waste bunker hall and boiler hall and all other walls within the bunker will be suitably constructed in concrete, block work or a suitably rated cladding system up to roof level to form a continuous 2-hour fire rated barrier for the full width and height of the building structure. In addition, the base of the bunker will be constructed of reinforced concrete, and the whole structure has been designed as a water retaining structure. The structural design and construction of this dividing wall shall be such that the integrity of the fire barrier is maintained in the event of the collapse of the bunker hall roof due to a fire in the bunker. These walls and the base of the bunker will be resistant to crane grab impact and the impingement of water cannon jets. The structure of the waste bunker itself therefore will have adequate fire resistance.

All openings in fire barriers will be provided with fire doors, including fire dampers, penetration seals (fire stops), or other approved means having a fire protection rating consistent with the designated fire resistance rating of the barrier. Windows in fire barriers (e.g. control rooms, observation windows, computer rooms, etc.) will be provided with appropriate fire protection to maintain the integrity of the fire barrier, e.g. by means of a fire shutter, automatic water curtain,

window sprinkler system, etc. All cable trays or piping systems passing through fire barriers will be fitted with fire stops.

In addition, the glass partition in the control room/crane cabin will be 2-hour fire rated, and hence resistant to fire. Therefore, the site staff will be able to continue operating the crane for a limited amount of time in the event of a fire, depending on severity.

7.3 Storing waste in bays

Incoming waste to the Facility will be stored within a dedicated waste bunker and will not be stored in bays. Therefore, the EA's requirements for waste stored in bays does not apply to the Facility.

8 Quarantine area

8.1 Quarantine area location and size

A suitable area for the quarantine of unacceptable waste will be designated as part of the detailed design stage.

The Facility is subject to detailed design, but it can be confirmed that, where appropriate, the quarantine areas will be in accordance with the requirements of the fire prevention plan (FPP) guidance, i.e. it will:

- hold at least 50% of the volume of the largest pile, row or block of containers at the Facility; and
- where practicable, have a separation distance of at least 6 metres around the quarantined waste.

Following completion of detailed design, plans showing the location of all quarantine areas will be developed. The plans will show the size of the quarantine area, clearance areas around the perimeter, and infrastructure associated with the quarantine areas. A drawing which shows the indicative location of the quarantine area is presented in Appendix A.5.

8.2 How to use the quarantine area if there is a fire

The quarantine area will be used to temporarily store, if needed, any unacceptable waste prior to removal from site. Unacceptable waste is broadly defined as waste which does not meet the requirements set out in the fuel supply agreements which have been agreed with waste suppliers for the Facility, or other waste which is unsuitable for incineration and/or not compliant with the EWC codes stated in the EP (this may include hot loads).

Additionally, for unacceptable waste identified inside the bunker, a facility will be available to allow unacceptable waste to be back-loaded from the bunker into one of two back-loading bays either side of the bunker, for examination and/or removal from the site to a licensed disposal facility.

8.3 Procedure to remove material stored temporarily in the event of a fire

Hot loads stored within the quarantine area will be removed as soon as possible (i.e. within 1 hour of a fire starting). Appropriate fire detection and protection measures (e.g. smoke/flame detectors, hose reel, sprinklers, or water cannon) will be installed in the quarantine area. Therefore, fires within waste stored in the quarantine area will be extinguished prior to the waste being transferred off-site. The final design of the quarantine area will be subject to detailed design and agreed with fire risk insurers.

The unacceptable waste will be segregated from all other incoming waste, allowing it to be collected and loaded into appropriate road vehicles for removal off-site, once deemed safe to do so.

9 Detecting fires

Procedures will be in place at the Facility to detect a fire in its early stages, in order to reduce the impact of the fire.

The choice of fire detection system (smoke/heat/flame detectors) to be installed within the Facility will be subject to detailed design. However, it can be confirmed that the fire detection systems will be covered by a UKAS-accredited third-party certification scheme.

During detailed design, appropriate fire detection systems will be proposed for the different areas of the Facility. The chosen fire detection systems will be appropriate to the activities undertaken in the different areas. Following completion of detailed design, a plan showing the fire detection systems in each area will be included into this Fire Prevention Plan.

9.1 Detection systems in use

There will be a fire detection and alarm system which will cover all of the waste processing areas within the Facility. The fire alarm systems will include the following:

- local detectors/transducers and call points;
- sounders/high intensity flashing beacons;
- cabling and containment systems;
- local control and indication panels; and
- remote control and indication panel (incorporating integral printers) will be in the control room.
- All fire detection systems shall be installed in accordance with BS 5839, Part 1 (2002) and subsequent amendments to give level P1 + M coverage in accordance with the requirements of the Loss Prevention Council ("LPC") guidance. In low fire risk areas, such as the Boiler Hall, the requirements for a P1 detection system may be relaxed.

In areas which are identified as having a low fire risk, the proposed fire detection method(s) will be agreed with the requirements of the fire service and fire risk insurer. The fire detection, protection and alarm systems will comply with the requirements of the fire service and fire risk insurer. All fire detection systems will be design, installed and maintained in accordance with an appropriate UKAS-accredited third-party certification scheme.

The following fire detection systems will be incorporated into the design of the Facility:

1. Tipping hall fire detection and suppression will be provided by an automatic temperature-activated sprinkler system to protect roofing and steelwork, with fire hose reels used manually in the case of vehicle fires or similar ground-level fires. The tipping hall fire detection and suppression systems will be subject to detailed design of the Facility.
2. Waste bunker fire detection will be provided by thermal imaging cameras and/or flame detectors which will be fixed around the perimeter of the bunker with automatic scanning of the entire fire zone. The thermal imaging cameras will provide a continuous thermal ‘map’ of the surface of the waste within the bunker. The thermal mapping will be displayed in the control room and will be used by the crane operator to manage temperatures within the bunker. The staff within the control room, as well as the crane operator, will be trained in the identification and implementation of corrective measures in the event of elevated temperatures within the bunker. The thermal imaging cameras will enable the crane operator and/or the control room staff to identify and react to hot areas in the bunker and undertake mixing or feeding of waste as appropriate. In extreme cases, the use of firewater cannons which covers the entire extent of the waste bunker to extinguish any smouldering/burning waste may be required.

- Water cannons and manual fire hoses are considered to be the primary means of fighting a bunker fire.
- To proactively prevent fires, it is anticipated that the system will be configured to sound an alarm based on certain conditions. This would involve the thermal imaging cameras being set with two alarms at two different 'trigger' temperatures. These are described below.
  - Temperature set-points would be determined during detailed design of the Facility and in consultation with the fire service. It is understood that the system will be designed so that trigger temperatures can be amended if required.
  - High temperature alarms in other UK waste incineration plants operate with a trigger temperature of approximately 90°C, with high-high temperature alarms operating with a trigger temperature of approximately 120°C. For the Facility, this is subject to detailed design, and will be set in consultation with the fire risk insurers. However, it is estimated that the trigger temperatures will be approximately 90°C and 120°C for the high temperature and high-high temperature alarms respectively.
- Following activation of the high temperature alarm in an area within the bunker, the area with an elevated temperature can be readily identified and, if possible, extinguished based on operator action through mixing within the bunker or fed into the hopper to be incinerated.
- Following activation of the high-high temperature alarm in an area within the bunker, the area with an elevated temperature will be targeted and the firewater cannons will be activated to reduce the temperature in the area where self-heating has occurred.
- Furthermore, the crane will be sized appropriately so that the time for waste mixing, feeding and management is within an acceptable time range for feeding waste to the feed hopper.

3. Feed hopper area fire detection will be provided by the waste feed hopper supervision camera and firefighting nozzles or a deluge system to flood the feed hoppers if required.
4. In the boiler house the main cable trays and other fire sensitive areas will be protected with a sprinkler system.
5. Electrical rooms with significant concentrations of electrical equipment will be fitted with fire detection systems.
6. Oil type transformer protection will provide complete water spray impingement on all exposed exterior surfaces. Water spray application shall include the conservator tank, pumps, etc.
   - Dry-type transformers will be used for indoor transformer installations. If appropriate, enclosures for dry-type transformers will be provided with suitably designed fire detection systems.
7. The fire sensitive areas of turbine-generator and ancillaries will be protected by a dedicated fire detection and automatic sprinkler fire protection system.
8. Procedures will be developed in the operation of the fire detection systems. Training will be provided to the relevant staff in the different fire detection systems. Training records in the operation of the fire detection systems will be retained on-site.
9. All automatic fire detection and alarm systems will be designed and maintained by a suitably qualified, experienced and registered fire protection engineer.
10. Detailed design calculations, risk assessments and system drawings to demonstrate compliance with the requirements of the building control officer, fire officer and the insurer's requirements will be produced during detailed design.
11. It will be the responsibility of the operators and shift managers to monitor fire alarms.

9.2 Certification for the systems

Where appropriate, the Facility will be designed and operated in accordance with the relevant fire prevention and detection standards, or alternative recognised international standards where they are available, including but not limited to the following:

- BS EN 671: Fixed fire-fighting systems;
- BS 5266: Emergency Lighting;
- BS 5041: Fire hydrant systems equipment;
- BS 5839: Fire Detection and Alarm systems for buildings;
- BS EN 15004: Fixed Firefighting systems – Gas extinguishing systems;
- BS EN 12845: Fixed firefighting systems – Automatic sprinkler systems – Design, installation and maintenance;
- BS 5306: Fire extinguishing installations and equipment on premises;
- BS 9990: Non-automatic fire-fighting systems in buildings – Code of practice;
- BS 9999: Code of Practice for Fire Safety in the design, management and use of Buildings;
- Building Regulations, in particular Approved Document B, Volume 2 – Buildings other than dwelling houses, Section B5, Access and facilities for the fire service;
- NFPA 850: Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations; and
- Requirements/guidance from the Insurer.

Records associated with the certification of the fire prevention and suppression systems will be retained on site throughout the lifetime of the Facility.

10 Supressing fires

The fire-fighting system on site will be subject to detailed design. The main features of the fire suppression system are described in the following sections.

10.1 Suppression systems in use

There will be a fire suppression system installed in the locations considered by the fire strategy and NFPA 850 to be at risk of fire. It is anticipated that the fire suppression systems will include the following (in appropriate locations at the Facility):

- automatic sprinkler/water deluge systems;
- automatic foam systems; and
- inert gas suppression and carbon dioxide gas suppression.

The automatic fire suppression systems will be designed and maintained by a suitably qualified, experienced and registered fire protection engineer. The fire suppression systems will be covered by a recognised (typically UKAS) third party certification scheme.

Detailed design calculations, risk assessments and system drawings to demonstrate compliance with the requirements of the building control officer, fire officer and the insurer's requirements will be retained on site throughout the lifetime of the Facility.

10.1.1 Bunker cannons

Thermal cameras will be installed over the waste reception bunker to detect any hot spots in the waste. If the temperature of any hot spot exceeds a defined set-point (for the Facility, this is subject to detailed design, and will be set in consultation with the Fire Service. However, as stated in section 9.1,it is estimated that the trigger temperatures will be approximately 90°C and 120°C for the high temperature and high-high temperature alarms respectively, subject to agreement with the fire risk insurers), water cannons installed around the bunker can be used to prevent the potential for fire spreading within the bunker.

Water cannons will be located in positions to optimise the horizontal and vertical coverage of spray for total firefighting suppression across the entire area of the bunker.

Through detailed design of the waste bunker, the number and position of the fire monitors and cannons will be established, alongside the manual and/or automatic remote-control systems. Thermal imaging screens will be installed within the control room.

10.1.2 Fire hose reel system and wet riser system

Hose stations will be designed in accordance with NFPA 14, Standard for the Installation of Standpipe, Private Hydrants and Hose Systems, or BS equivalent. Fire hoses will be provided at strategic positions within the Facility for firefighting in fire risk areas.

For firefighting purposes, hose reels and extinguishers where appropriate will be provided within the buildings.

The positioning of hose points will take into account the following:

- location and physical protection as to avoid potential damage by vehicles;
- size and number to be determined for the specific works layout (e.g. push wall positions);

- ease of use, maintenance, and storage, such as through the use of continuous-flow, non-collapsible hose reels; and
- protection from freezing in unheated areas.

Following detailed design of the Facility, a plan identifying the location of the fire hose reels will be developed.

10.1.3 Fire hydrants and mains

Fire hydrants will be designed in accordance with NFPA 14 Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems (or BS equivalent), and will be connected to a ring main at strategic positions around the Facility to provide firewater supplies to external fire risk areas. The fire hydrants will be designed in accordance with the requirements of the Building Regulations and the fire service; and, where appropriate, spaced at no greater than 100 m apart and within 12 m of the building.

The location of hose reels and hydrants will be subject to detailed design and will be agreed with the fire insurers and the fire officer. The positioning of fire hydrants will take into account:

- location and physical protection as to avoid potential damage by vehicles;
- size and number to be determined for the specific layout; and
- protection from freezing.

The fire hydrants will be fed from the fire water storage tank and maintain the required pressure in accordance with the requirements of the fire service.

Following completion of detailed design, a plan identifying the location of the fire hose reels and hydrants will be developed. An indicative drawing showing the location of the fire hydrants is presented in Appendix A.3.

10.1.4 Fire extinguishers

Fire extinguishers will be strategically located throughout the operational areas in accordance with the requirements of BS 5306.

The location of the fire extinguishers will be subject to implementation of the recommendations of the fire officer for the Facility. Following completion of detailed design, a plan identifying the location of the fire extinguishers will be developed.

10.2 Certification for the systems

The relevant standards for the fire prevention and suppression systems are described in Section 9.2.

It is anticipated that the automatic fixed fire suppression systems for the Facility will be designed in accordance with the requirements of ACE (ACE Technical Risks - Engineering Information Bulletin Guidance Document) and NFPA 850.

11 Firefighting techniques

11.1 Alternative fire detection and suppression measures

In addition to the fire detection and suppression systems identified in Sections 9 and 10, the design of the Facility will include 'additional measures' to prevent the spread of fire, such as fire walls (refer to section 7.2).

It is acknowledged that the Facility is not designed strictly in accordance with all of the requirements of the FPP guidance (specifically, the provision of water for firefighting, refer to section 12). However, the overall design of the Facility, including the fire detection and fire suppressions systems, where applicable, have been designed to achieve the requirements of the guidance, namely:

- minimising the likelihood of a fire happening;
- aim for a fire to be extinguished within 4 hours; and
- minimise the spread of fire within the site and to neighbouring sites.

In addition, in the event of a significant fire within the waste bunker, the plant can be shut-down which will include the shut-down of the induced draft (ID) fan and the extraction of combustion air from within the bunker. The plant shut-down will reduce the risk of fire spread between the 'fire compartments' within the Facility.

12 Water supplies

12.1 Available water supply

The Facility will have a firewater storage tank designed in accordance with the requirements of BS 5306. The firewater storage tank will be connected to the local water supply and will be installed with a suitable system to prevent freezing. The tank will be fitted with a local external water level indicator as well as with remote water level control and level alarm indication to the distributed control system (DCS). The firewater tank will be designed to ensure the required firewater capacity is always available for fire protection.

It is estimated that the capacity of the firewater tank will be approximately 2200 m^3. The firewater tank will be designed to ensure the required fire water capacity is available for fire protection at all times. The firewater tank has been sized to exceed the minimum requirements of NFPA 850. However, water supply restraints mean tank refill times under NFPA are unable to be met. Therefore, the size of the tank may need to be increased or refill times relaxed. The exact size of the firewater tank will be confirmed following detailed design. When specifying the sizing for the firewater tank, it will be based on early fire detection and automatic fire suppression systems in the waste reception and storage areas such that any fire can be rapidly contained and extinguished.

The attenuation pond will supply approximately 300 m^3 of further firewater containment.

The FPP Guidance requires a supply of firewater of 2,000 l/min for 3 hours for a 300 m^3 pile of waste but this is based on an open pile of waste with free run off, rather than storage in a bunker which contains the water. For a waste bunker with a waste storage capacity of 9,000 m^3, the guidance implies the need for a 10,800 m^3 fire water tank, which is excessive. It should be noted that the potential volume of firewater required to extinguish a fire in the bunker will be considerably less than the total 'airspace' volume of the bunker, as the waste present in the bunker will reduce the available volume.

It is acknowledged that the provisions for the supply of firewater at the Facility are not in accordance with the EA's FPP guidance. However, the measures proposed are considered to provide suitable containment in the event of a fire within the bunker. The measures proposed include:

- the waste bunker being a contained concrete structure, with thick fire-resistant concrete walls;
- the provisions for firefighting in the waste reception and bunker area will be in accordance with NFPA 850 and as required by the fire risk insurers; and
- foam may be used as an additive in the firewater system which will reduce the quantity of water required for firefighting, but the use of foam will be subject to detailed design.

Further potential water sources in the vicinity of the site are Bliss Brook to the west, Fish Pond to the south and the two fishing ponds on either side of Station Road, to the south east. These are marked in Figure A.8. It is proposed that the design of the systems for the provision and containment of firewater are confirmed via a pre-operational condition.

13 Managing fire water

13.1 The containment of fire water

The waste bunker will be design and constructed as a water retaining structure in accordance with BS EN 1992-3. This will protect against the leak of contaminated firewater from the bunker and minimise the risk of contamination of groundwater in the event of a fire within the bunker.

Drainage systems will be designed for the prevention of flooding of equipment. Fire water retention will be accomplished through the installation of one or a combination of:

- floor drains;
- floor trenches;
- open doorways or other wall openings;
- kerbs for containing or directing drainage;
- equipment pedestals; and
- pits, sumps, and sump pumps.

The provisions for drainage and any associated drainage facilities will be sized to accommodate the concurrent flow due to operation of the following components (in accordance with NFPA 820):

- the spill of the largest single container of any flammable or combustible liquids in the area, where the bund around oil tanks should be large enough to contain the oil and the water from suppression systems;
- the maximum expected number of fire hose lines operating for a minimum of 10 minutes; and
- the maximum design discharge of fixed fire suppression systems operating for a minimum of 10 minutes.

There are three different types of firewater flows which will be required to be contained if there was a fire at the Facility:

1. Firewater resulting from treating fires in the bunker and tipping hall area. This firewater will be routed to the bunker which is watertight and hence can contain large amounts of firewater. The total below-ground volume of the bunker will be approximately 9,000 m^3, however, this will be reduced by the quantity of waste present.
2. Firewater from inside any other process building or from the IBA storage area. Such firewater is expected to be extremely rare and small in quantity so only small amounts of firewater will arise. This drainage will be contained, to prevent contaminated water discharging off-site.
3. Firewater from outside any building. Such firewater will be contained in the site drainage systems. The surface water drainage system will be installed with a penstock valve which will prohibit the discharge of contaminated surface water from being discharged off-site. During a fire event, this penstock valve will be automatically closed to prevent any discharge of firewater from the Facility. This would allow areas of kerbed hardstanding and the site drainage to act as a further buffer store in the event that the primary containment measures are overwhelmed.

A plan showing the proposed landscaping to surround the site (which shows the locations of natural and unmade ground surrounding the Facility) is presented in Appendix A.9. The landscaping shown within this drawing is indicative and will be subject to detailed design of the Facility.

14 During and after an incident

14.1 Dealing with issues during a fire

Emergency procedures will be developed during the construction and commissioning phase. The emergency procedures will include, but not be limited to:

- fire identification and reporting procedures;
- an evacuation plan;
- emergency communication procedures;
- responding to chemical spillages;
- containment of firewater;
- requirements for diverting incoming waste; and
- Notification of any adjacent residential properties and businesses which may be impacted by the incident.

All staff and contractors will be trained in the emergency response procedures for the waste combustion process as well as the site-wide emergency procedures. Where specific responsibilities are given to specific staff, training will be provided to those employees. Training records in the emergency response procedures for all staff and contractors will be retained on-site as part of the documented management systems.

The effectiveness of the emergency response procedures will be reviewed following any emergency incidents on-site. Where appropriate the procedures will be updated, and staff trained in the updated procedures.

A copy of the emergency procedures will be maintained at the gate house, or other suitable location, and will include the fire system mimic panel to allow co-ordination of the emergency response to a fire in the event that the main offices are unavailable.

On a periodic basis, tests of the emergency procedures will be undertaken. The intention of the tests is to verify that all staff and contractors are aware of the emergency procedures. Following all tests, the implementation of the procedures will be reviewed. If appropriate, the procedures will be amended, or additional training provided to all staff and contractors.

In the event of an incident resulting in the Facility not being capable to receive waste, waste deliveries to the Facility will be stopped or diverted to a suitably licensed waste management facility.

Deliveries of waste to the Facility will not be recommenced until it has been deemed safe for the Facility to be restarted following the incident. During a complete shutdown of the Facility, the fire detection systems will remain operational.

14.2 Notifying residents and businesses

Dependent on the nature and scale of any incidents, it may be necessary to notify local residents and businesses of the incident. Prior to commencement of operation of the Facility, and as part of the development of the documented management systems associated with the operation of the Facility, communication procedures will be developed and implemented.

14.3 Clearing and decontamination after a fire

Following a fire which requires the presence of the emergency services; materials, building structures, furnishings, vehicles, equipment and raw materials could be damaged. Once the fire had been fully extinguished and the emergency services given approval to enter the Facility, an assessment will be undertaken by the management team for the Facility, insurance assessors, structural engineers and fire damage/salvage specialists to assess the extent of the damage.

Once a full inventory of the damage and equipment has been completed under the strict supervision of specialist structural engineers, any building or structure will be made safe. Severely damaged equipment or building materials will be removed from site by a licenced waste/scrap company. Building structures that are deemed safe will be cleaned, as necessary.

Waste within the bunker which is not suitable to be incinerated will be backloaded from the bunker into HGVs and removed from site by a licenced waste carrier. Affected areas will be cleaned and washed before equipment and structural repairs will take place.

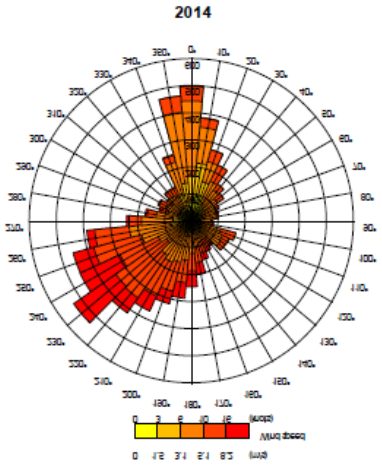
14.4 Making the site operational after a fire

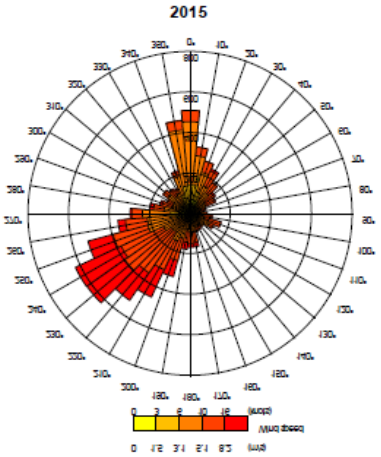
If there was a significant fire requiring a full shutdown of the Facility, the Facility will not restart operations until the relevant regulatory authorities (Fire Service, Health and Safety Executive, Environment Agency, etc.), as well as the fire insurers, advised that it was safe to do so.

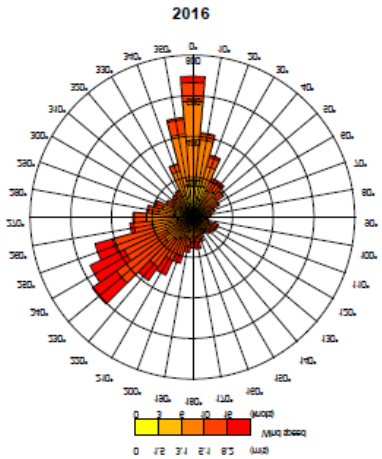
Appendices

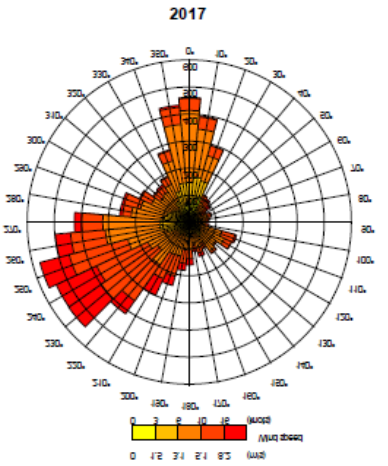
A Plans and drawings

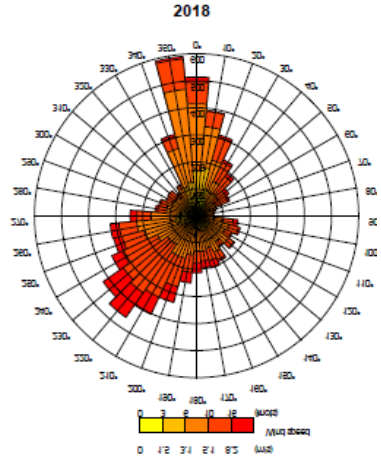
B Wind Roses











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ENGINEERING + CONSULTING

FICHTNER

Consulting Engineers Limited

Kingsgate (Floor 3), Wellington Road North,
Stockport, Cheshire, SK4 1LW,
United Kingdom

t: +44 (0)161 476 0032
f: +44 (0)161 474 0618

www.fichtner.co.uk