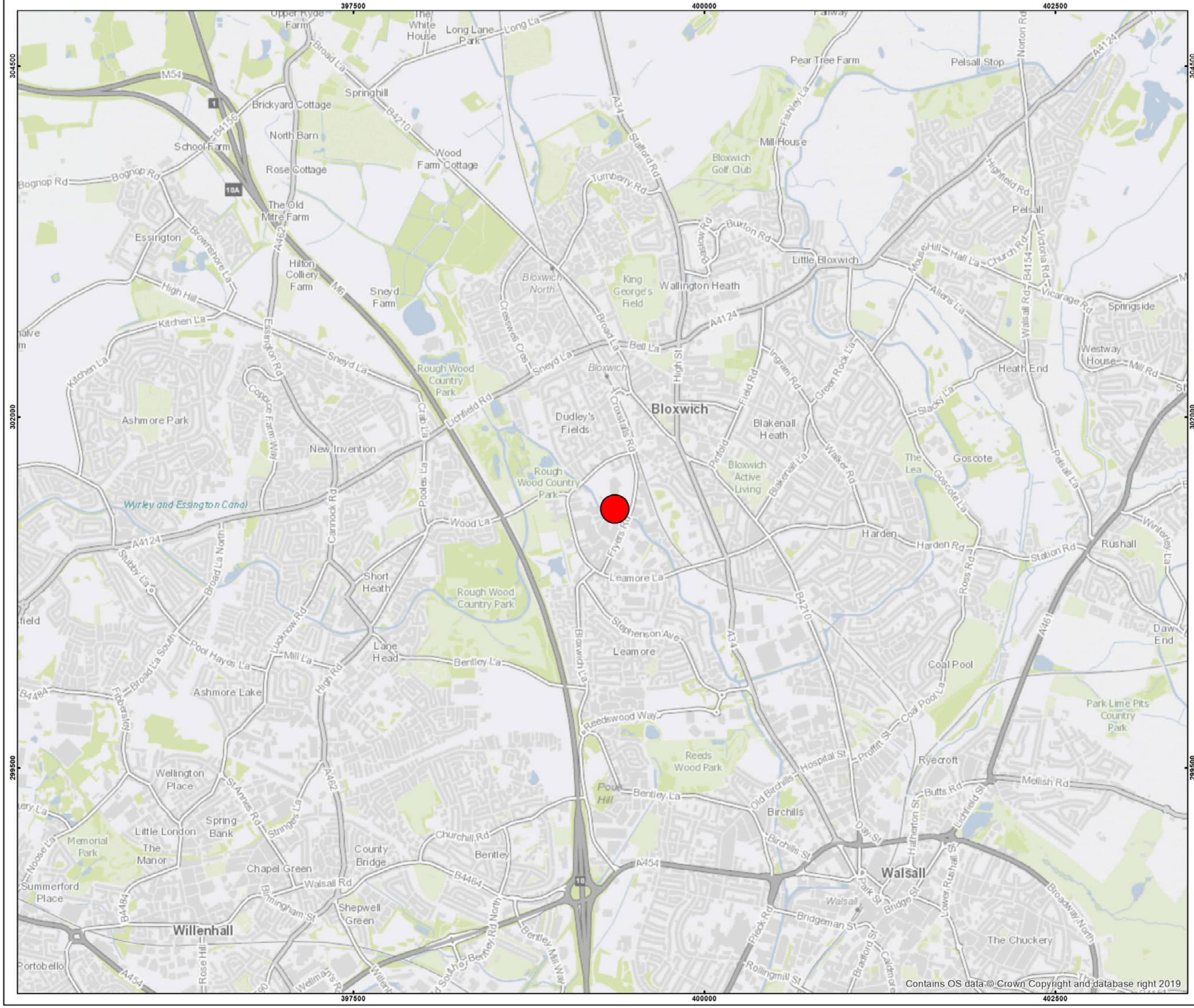
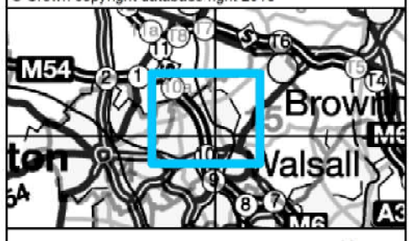


Legend

Site Location

Client:	BH EnergyGap (Walsall) Limited
Site:	3R Facility Walsall
Project:	EP Variation
Title:	Site Location Plan
Drawn by: Stuart Nock	Date: 04/09/2019



0 0.25 0.5 1 km

Scale: 1:25,000

N

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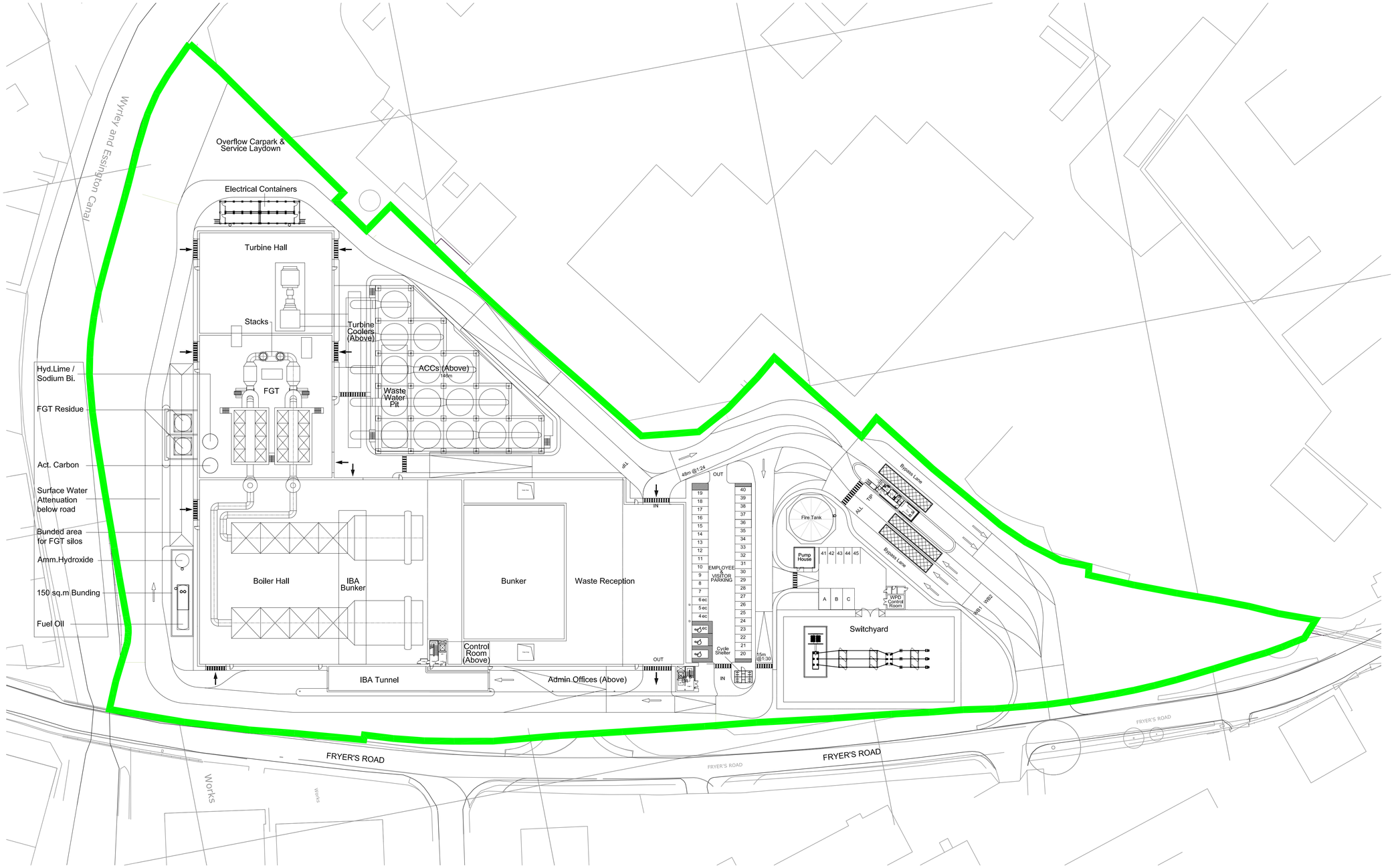
LEGEND

INSTALLATION BOUNDARY



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REV.	DETAILS OF REVISION	DRAWN	CHKD	APR	DATE
X2	PRELIMINARY	AO	KH	JRS	23.10.19
X1	PRELIMINARY	AO	KH	JRS	30.08.19

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CLIENT: BH ENERGYGAP (WALSALL) LIMITED

SITE: 3R FACILITY WALSALL

PROJECT: EP VARIATION

TITLE: INSTALLATION BOUNDARY

DRAWING STATUS:	PRELIMINARY		
DRAWN BY:	AO	DATE: 30.08.19	
CHECKED BY:	KH	DATE: 30.08.19	
APPROVED BY:	JRS	DATE: 30.08.19	
FILENAME:	2605-005-X2 Site Plan Overlay.dwg		
OFFICE OF ISSUE:	STOCKPORT		
SHEET SIZE:	A1	SCALE: 1:600	

DRAWING No.: 2605-005 Sheet 1 of 1

REVISION: X2

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LEGEND

- INSTALLATION BOUNDARY
- WASTE STORAGE AREAS
- WASTE QUARANTINE AREAS

N

Wyley and Essington Canal

Overflow Carpark & Service Laydown

Electrical Containers

Turbine Hall

Stacks

Turbine Coolers (Above)

ACCs (Above)

FGT

Waste Water Pit

Boiler Hall

IBA Bunker

Bunker

Waste Reception

Control Room (Above)

IBA Tunnel

Admin Offices (Above)

48m @1:24

TIP

OUT

IN

EMPLOYEE & VISITOR PARKING

Cycle Shelter

15m @1:30

Fire Tank

Pump House

Bypass Lane

ALL

WB1

WB2

WPD Control Room

Switchyard

FRYER'S ROAD

Works

10m

SCALE 1:600@A1

REV.	DETAILS OF REVISION	DRAWN	CHKD	APR	DATE
X1	PRELIMINARY	DTW	KH	JRS	22.10.19

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CLIENT: BH ENERGYGAP (WALSALL) LIMITED

SITE: 3R FACILITY WALSALL

PROJECT: EP VARIATION

TITLE: WASTE STORAGE AREAS

DRAWING STATUS:	PRELIMINARY	
DRAWN BY:	AO	DATE: 05.09.19
CHECKED BY:	KH	DATE: 05.09.19
APPROVED BY:	JRS	DATE: 05.09.19
FILENAME:	2605-008-X1 Waste storage Areas.dwg	
OFFICE OF ISSUE:	STOCKPORT	
SHEET SIZE:	A1	SCALE: 1:600

DRAWING No.: 2605-008 Sheet 1 of 1

REVISION: X1

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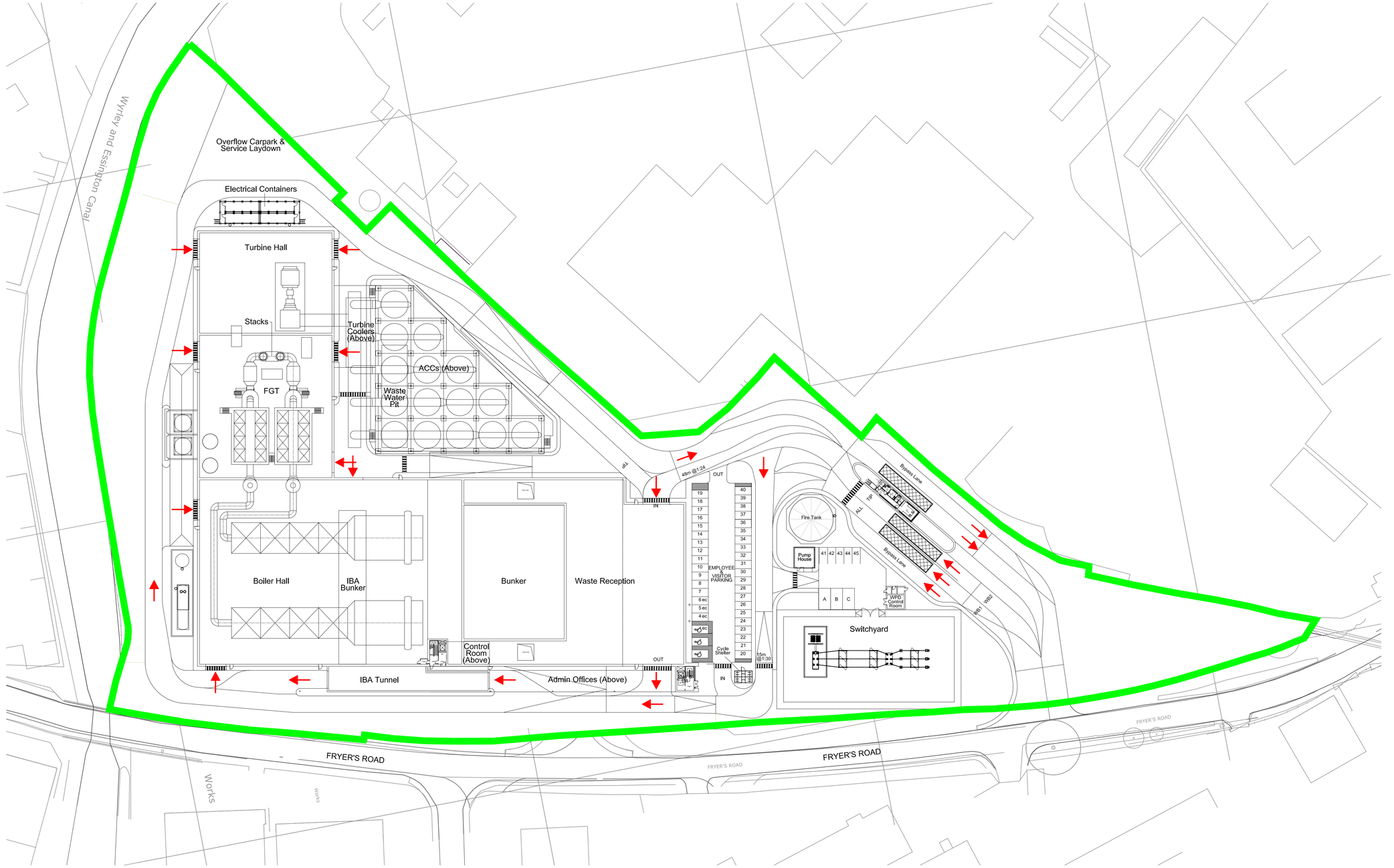
INSTALLATION BOUNDARY

EMERGENCY ACCESS POINTS



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CLIENT: BH ENERGYGAP (WALSALL) LIMITED

SITE: 3R FACILITY WALSALL

PROJECT: EP VARIATION

TITLE: ACCESS POINTS

DRAWING STATUS:	PRELIMINARY	
DRAWN BY:	AO	DATE: 05.09.19
CHECKED BY:	KH	DATE: 05.09.19
APPROVED BY:	JRS	DATE: 05.09.15
FILENAME:	2605-009-X1 Access Points.dwg	
OFFICE OF ISSUE:	STOCKPORT	
SHEET SIZE:	A1	SCALE: 1:600

DRAWING No.: 2605-009 Sheet 1 of 1

REVISION: X1

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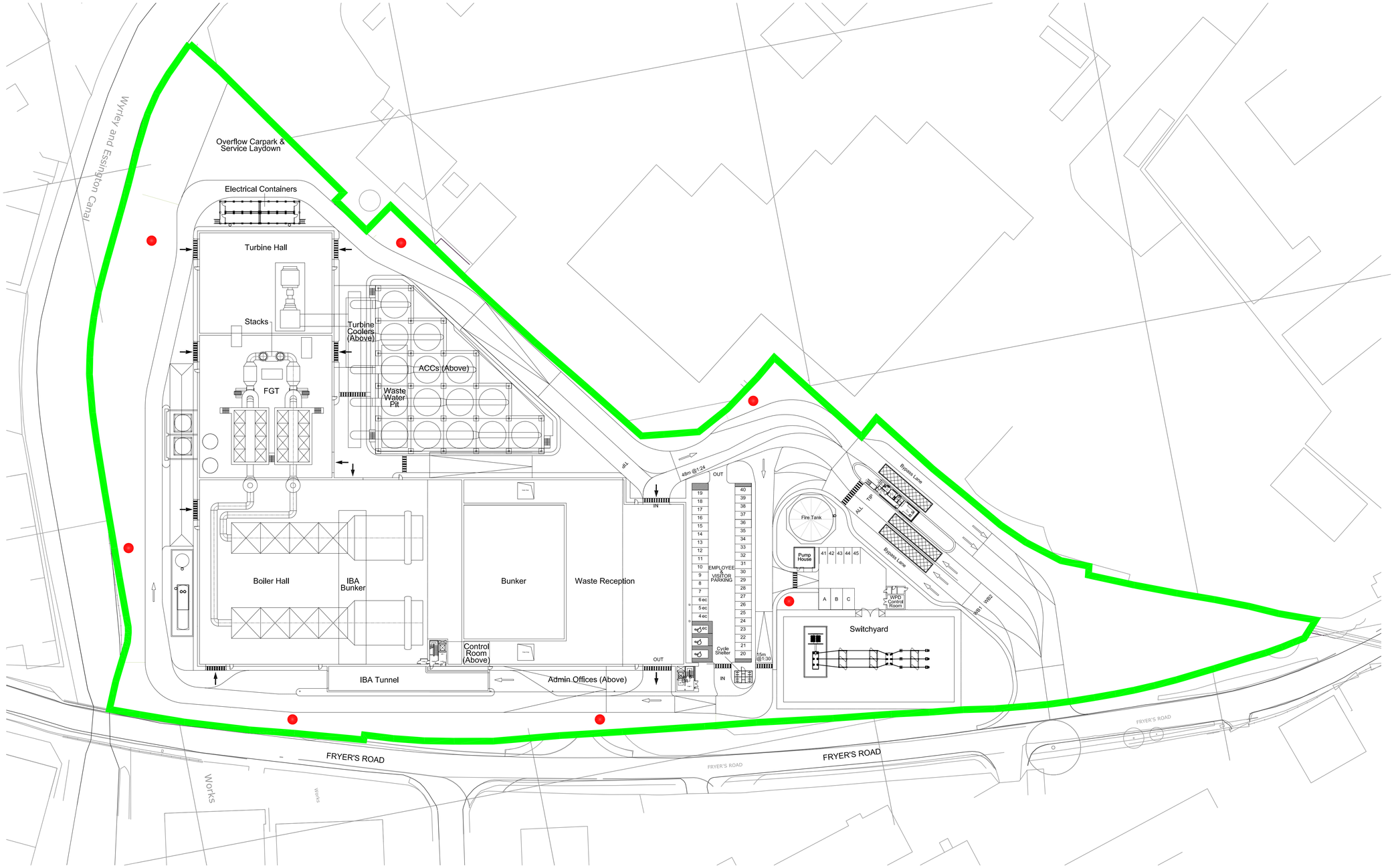
LEGEND

- INSTALLATION BOUNDARY
- INDICATIVE LOCATIONS OF FIRE HYDRANTS.



REV.	DETAILS OF REVISION	DRAWN	CHKD	APR	DATE
X1	PRELIMINARY	AO	KH	JRS	05.09.19

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SITE: 3R FACILITY WALSALL

PROJECT: EP VARIATION

TITLE: INDICATIVE FIRE HYDRANT LOCATIONS

DRAWING STATUS:	PRELIMINARY	
DRAWN BY:	AO	DATE: 05.09.19
CHECKED BY:	KH	DATE: 05.09.19
APPROVED BY:	JRS	DATE: 05.09.19
FILENAME:	2605-010-X1 Indicative Fire Hydrants.dwg	
OFFICE OF ISSUE:	STOCKPORT	
SHEET SIZE:	A1	SCALE: 1:600

DRAWING No.: 2605-010 Sheet 1 Of 1

REVISION: X1

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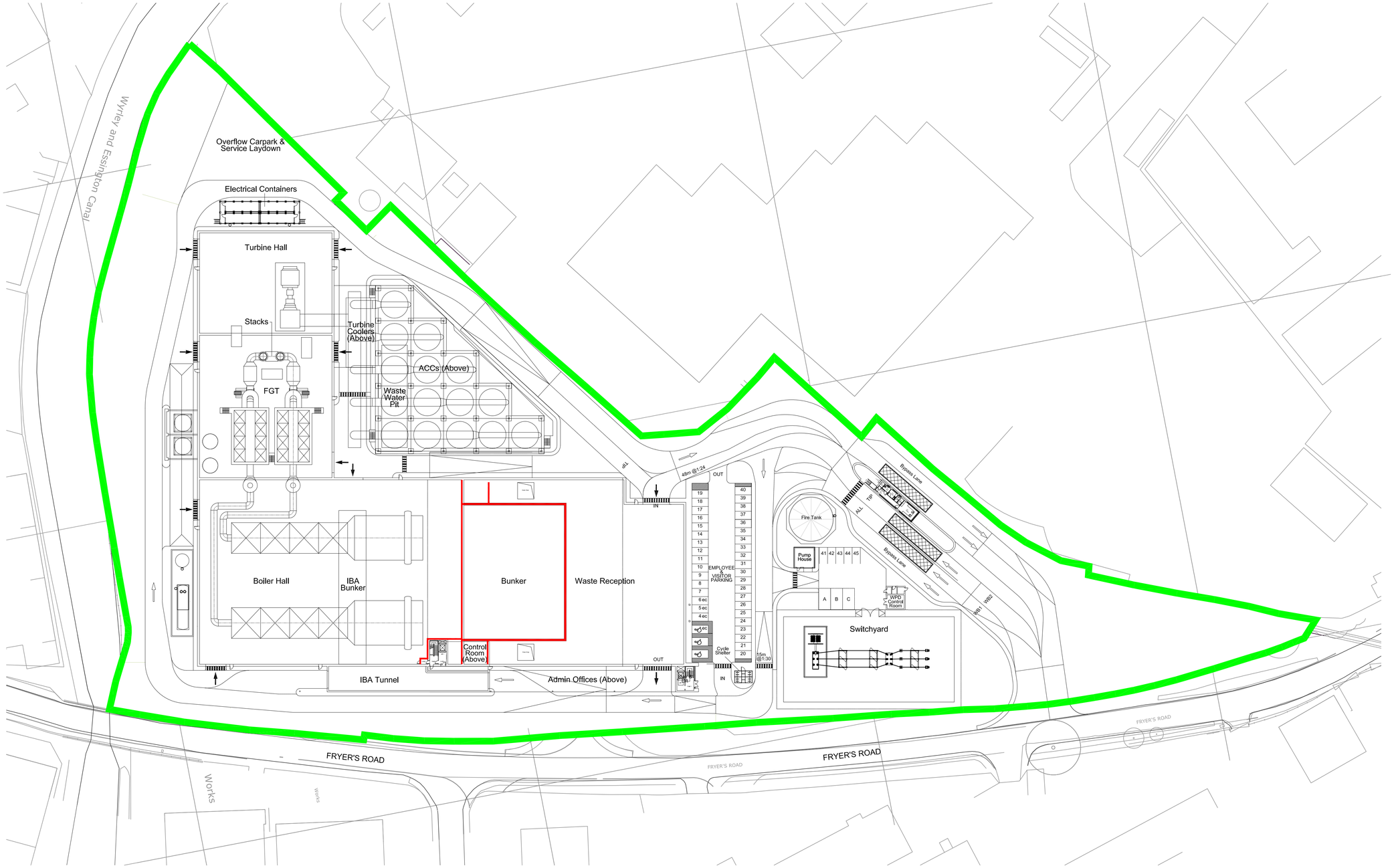
LEGEND

- INSTALLATION BOUNDARY
- INDICATIVE FIRE WALLS



10m SCALE 1:600@A1

REV.	DETAILS OF REVISION	DRAWN	CHKD	APR	DATE
R1	PRELIMINARY	AO	KH	JRS	06.11.19

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CLIENT: BH ENERGYGAP (WALSALL) LIMITED

SITE: 3R FACILITY WALSALL

PROJECT: EP VARIATION

TITLE: INDICATIVE FIRE WALLS

DRAWING STATUS:	PRELIMINARY	
DRAWN BY:	AO	DATE: 05.09.19
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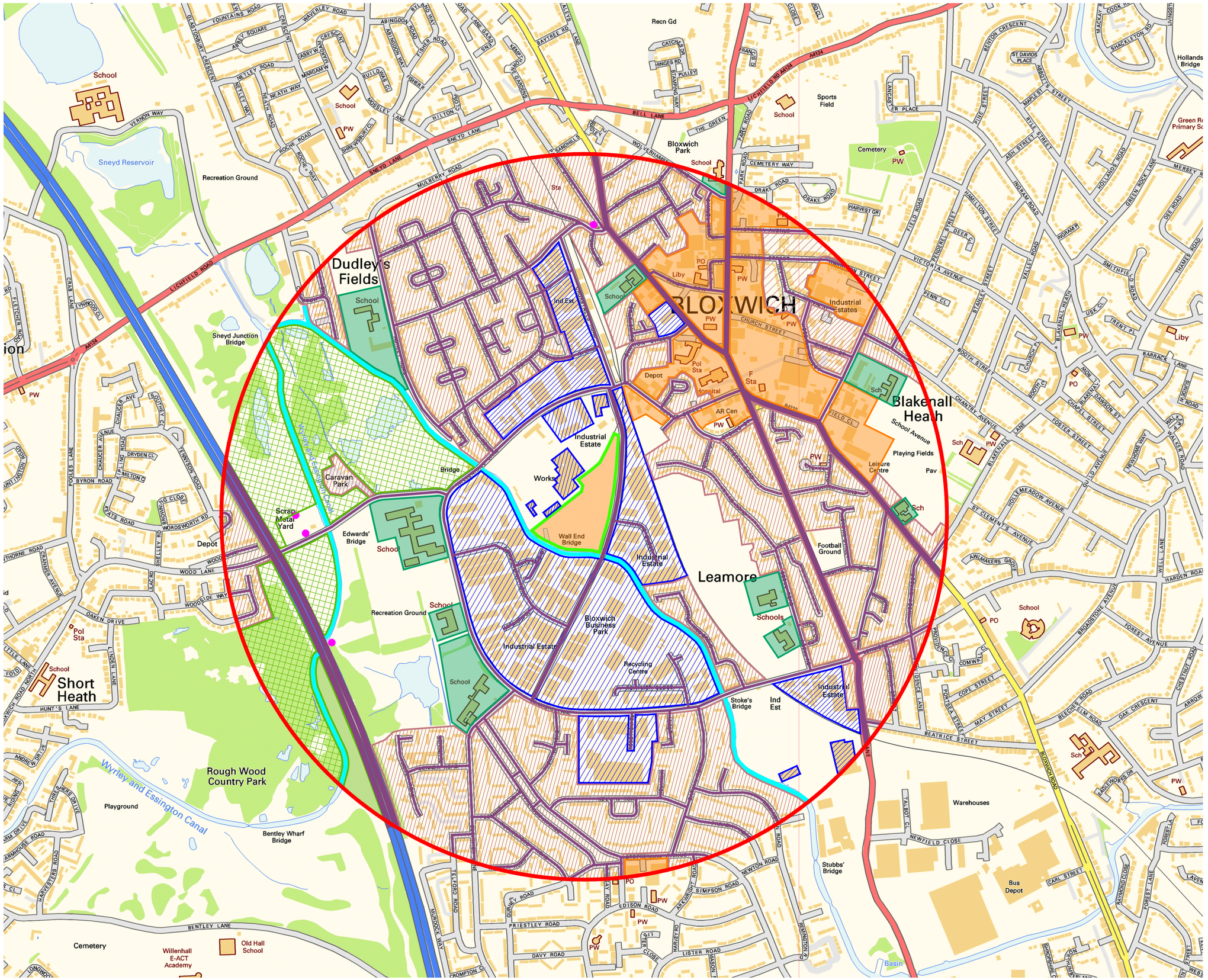
FILENAME:	2605-011-R1 Indicative Fire Walls.dwg	
OFFICE OF ISSUE:	STOCKPORT	
SHEET SIZE:	A1	SCALE: 1:600

DRAWING No.: 2605-011 Sheet 1 Of 1 REVISION: R1



N

PREVAILING WIND DIRECTION SSW

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DO NOT SCALE

LEGEND

- INSTALLATION BOUNDARY
- 1km RADIUS
- INDUSTRIAL RECEPTORS
- RESIDENTIAL RECEPTORS
- COMMERCIAL RECEPTORS
- ANCIENT WOODLAND
- SCHOOLS
- WATERCOURSE
- ROADS
- WATER WELLS

REV.	DETAILS OF REVISION	DRAWN	CHKD	APR	DATE
X1	PRELIMINARY	AO	KH	JRS	04.09.19

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CLIENT: BH ENERGYGAP (WALSALL) LIMITED

SITE: 3R FACILITY WALSALL

PROJECT: EP VARIATION

TITLE: FIRE RECEPTOR PLAN

DRAWING STATUS:	PRELIMINARY	
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APPROVED BY:	JRS	DATE: 04.09.19
FILENAME:	2605-012-X1 Fire Receptor Plan.dwg	
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SHEET SIZE:	A1	SCALE: 1:5000

DRAWING No.: 2605-012 Sheet 1 or 1

REVISION: X1

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Consulting Engineers Limited

BH EnergyGap (Walsall) Limited

EP Variation - Fire Prevention Plan

ENGINEERING CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	Katie Hampton		Environmental Scientist	03/09/2019
Checked by:	Tim Overton		Associate Senior Consultant	04/09/2019

Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
00	04/09/2019	For Client	KLH	TO
1	21/10/2019	Updated following Client comments	JRS	TO
2	30/10/2019	Final update for Client approval	JRS	TO

Contents

1 Introduction

BH EnergyGap (Walsall) Limited (BH EnergyGap) were granted an Environmental Permit (EP) for a waste incineration facility (referred to as the 3R Facility), on Fryers Road, Walsall, West Midlands on 22 September 2016.

Following further procurement and discussions with technology providers, BH EnergyGap is applying for a number of amendments to the EP, including a change in the proposed waste incineration technology and the capacity of the 3R Facility.

The 3R Facility will comprise a waste incineration plant of moving-grate combustion technology, together with an associated electrical connection.

1.1 Objective

The objective of this report is to provide a preliminary Fire Prevention Plan (FPP) for the 3R Facility, identifying the provisions which have been taken into account during the development phase of the 3R Facility. In addition, provisional operational measures have been identified where these are available. The report would be subject to review following completion of detailed process design, and discussions with the Engineering Procurement and Construction (EPC) contractor that will be responsible for the design and construction of the 3R Facility. The construction phase of the 3R Facility is expected to take approximately 36 months, with a period of 12-months for commissioning and testing of the 3R Facility prior to full operations.

This report has been developed in accordance with EA guidance note: *Fire Prevention Plans: Environmental Permits*, as published on the UK government website. The requirements of the FPP will be integrated within the emergency plans and procedures for the 3R Facility to ensure that they are consistent and compatible with other management systems associated with the operation of the 3R Facility.

A suite of emergency procedures for the 3R Facility will be written and included in the training package for all staff and contractors. Training of site operatives is expected to commence approximately 6 months prior to commencement of commissioning of the 3R Facility, and all operational personnel will be tested on the fire prevention and emergency procedures.

This document and the measures to mitigate the risk and impact of fires within the 3R 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',* Updated 4th May 2018;
- Building Regulations – *Approved Document B (Fire Safety)*;
- ACE Technical Risks, Engineering Information Bulletin, *Guidance document Energy from Waste (EfW) – Fire Systems Issue 4.0* (27 June 2017);
- National Fire Protection Association *'NFPA 850: Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations'*, 2015 Edition; and
- the insurer's requirements where structures or equipment fall outside published guidance or recommended practice.

2 Site Location and Variation Description

2.1 The Site

BH EnergyGap (Walsall) Limited (BH EnergyGap) were granted an Environmental Permit (EP) for a waste incineration facility (referred to as the 3R Facility), on land adjacent to Fryers Road, Walsall, West Midlands on 22 September 2016. The 3R Facility will be a single-stream waste incineration plant with the capacity to process approximately 478,300 tonnes of mixed non-hazardous waste per annum.

The Site will be located on land previously categorised as being contaminated land, with part of the site a former landfill. The land is currently unoccupied and cleared of former structures, with contamination status regraded through the implementation of a clay capping layer over the contaminated soil. The Site is located within an industrial estate comprising light industry. The surrounding land use beyond the industrial estate varies, and includes industrial properties, residential areas, a school with school grounds, public open space and a Local Nature Reserve.

2.2 The Variation

BH EnergyGap is proposing the following changes to the EP:

1. Changing the waste incineration technology from a fluidised bed gasification to conventional moving grate;
2. Increasing the capacity of the facility from 300,000 tonnes per annum (assuming a throughput of 37.5 tonnes per hour and 8,000 hours of availability) to approximately 478,300 tonnes per annum (assuming 54.6 tonnes per hour and an availability up to 8,760 hours operation);
3. Removal of the Mechanical Pre-treatment Plant and associated infrastructure;
4. Amendments to the Operating Techniques to reflect the proposed changes in the design and capacity of the 3R Facility; and
5. Change the reagent to be used in the SNCR system from urea to ammonia solution.

2.3 Site Plans & Drawings

Included in Appendix A of this report are the:

- site location plan (Appendix A.1);
- site layout plan (Appendix A.2);
- waste storage areas plan (Appendix A.3);
- access points around the perimeter to assist fire-fighting (Appendix A.4);
- indicative locations of fire hydrants and water supplies (Appendix A.5);
- indicative locations of fire walls (Appendix A.6); and
- fire receptor plan (Appendix A.7).

Wind roses indicating the direction of prevailing winds for the 3R Facility from 2014 to 2018, as taken from Birmingham Airport, are presented in Appendix B.

As stated in section 1.1, detailed process design will be undertaken following final contract negotiations with the EPC contractor. Therefore, the information in relation to the drawings identified above must be considered to be indicative until detailed design has been completed.

Following completion of detailed design, the following drawings would 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 the unacceptable waste quarantine area;
- the location of fixed and mobile plant storage;
- the location of gas cylinders; and
- the location of plant, protective clothing and pollution control equipment and materials.

2.4 Key Receptors

Receptors within 1km of the 3R Facility which could potentially be impacted by a fire at the 3R Facility (e.g. from smoke or particulate emissions) are presented in the plan shown in Appendix A.7.

3 Fire Prevention

3.1 Waste Storage

3.1.1 Incoming Waste

Incoming waste for processing at the 3R Facility will be unloaded into the waste bunker. The waste bunker will have a nominal storage capacity of approximately 14,400 m^3 of waste, allowing for approximately 4 days of waste throughput. Allowing for stacking within the waste bunker, the waste bunker is capable of storing approximately 27,300 m^3 of waste, allowing for approximately 7 days of waste throughput.

If an extended unforeseen shutdown was to occur, there will be facilities in place for loading of the waste from the bunker into vehicles for transfer off-site to a suitably licensed waste management facility. A plan showing the location of the waste bunker is presented in Appendix A.2, subject to detailed design of the 3R Facility.

With respect to the potential volume of firewater required, this would be considerably less than the total potential (or 'airspace') volume of the bunker, i.e. reduced by the volume taken up by waste at the time of a potential fire.

There will be a two-hour fire wall between the waste bunker/tipping hall and the boiler hall, and the roof of the bunker and tipping hall will be fire protected. Firewater cannons will be installed over the waste bunker (refer to Section 4.8.6). The roof steelwork above the bunker will be protected with water sprinklers in the event of a fire within the bunker. These measures are in in accordance with the requirement of NFPA and insurers for facilities which combust waste derived fuels.

Bunker management procedures will be adopted to ensure that there is a regular turnover and mixing of waste within the bunker through the use of the crane, preventing hotspots or anaerobic conditions from developing within the waste bunker. 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 regular 'turning over' of the contents of the bunker will ensure that waste does not accumulate within the lower levels of the bunker. 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 can operate in automatic mixing mode and the crane operator will be trained in careful waste handling and crane operation as to maintain the integrity of the 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 crane driver will, therefore, be able to identify and react to hot areas in the bunker and undertake mixing or feeding of waste as appropriate, or, in extreme cases, use the firewater cannons (with both automatic and manual controls) to extinguish any smouldering/burning waste. In addition, there would be flame detectors located above the waste feed hoppers, with an associated deluge system.

The 3 objectives of the FPP guidance note are met as follows:

- Both the mixing of waste and thermal imaging cameras are considered to minimise the likelihood of a fire happening.
- Section 4.8 of this report details active fire-fighting measures to be implemented should a fire break out. Utilising these measures, the 3R Facility aims to extinguish a fire within 4 hours.

- The fire walls (described in section 4.4) would minimise the spread of fire within the site and to neighbouring sites.

It should also be noted that the waste bunker will be designed and constructed in concrete as a water retaining structure to protect against the leak of contaminated firewater, and to minimise the risk of emissions of pollutants to groundwater. The reinforced concrete floor and walls of the bunker will be of sufficient strength as to maintain integrity in the event of a fire.

The waste types that will be permitted to be treated at the 3R Facility, which may comprise municipal or commercial and industrial waste, are presented in Table 3-1:

Table 3-1: Wastes to be processed in the 3R Facility

EWC Code	Description of Waste
02	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing**
02 01	***wastes from agriculture, horticulture, aquaculture, forestry, hunting and***
02 01 03	fishing
02 01 04	plant-tissue waste
02 01 10	waste plastics (except packaging)
02 02	***Preparation and processing of meat – fish and other foods of animal origin***
02 02 03	materials unsuitable for consumption or processing
02 02 04	sludges from on-site effluent treatment
02 06	***Baking and confectionary industry***
02 06 01	wastes from the baking and confectionery industry
02 06 03	sludges from on-site effluent treatment
03	**materials unsuitable for consumption or processing**
03 01	***Wastes from wood processing and the production of panels and furniture,***
03 01 01	pulp, paper and cardboard
03 01 05	wastes from wood processing and the production of panels and furniture
03 03	***wastes from pulp, paper and cardboard production and processing***
03 03 07	mechanically separated rejects from pulping of waste paper and cardboard
03 03 08	wastes from sorting of paper and cardboard destined for recycling
04	**Wastes from the leather, fur and textile industries**
04 02	***wastes from the textile industry***
04 02 10	organic matter from natural products (for example grease, wax)
04 02 21	wastes from unprocessed textile fibres
04 02 22	wastes from processed textile fibres
15	**Waste packaging, absorbents, wiping cloths, filter materials and protective**
15 01	***clothing not otherwise specified***
15 01 01	paper and cardboard packaging
15 01 03	wooden packaging
15 01 04	metallic packaging

EWC Code	Description of Waste
15 01 05	composite packaging
15 01 06	mixed packaging
15 01 09	textile packaging
17	**Construction and demolition wastes (including excavated soil from contaminated sites)**
17 02	***wood, glass and plastic***
17 02 01	wood
18	**Healthcare Waste**
18 01	***Natal care – diagnosis – treatment or prevention of disease in humans***
18 01 04	wastes whose collection and disposal is not subject to special requirements in order to prevent infection (for example dressings, plaster casts, linen, disposable clothing, diapers)
19	**Wastes from waste management facilities, off-site waste water treatment**
19 02	***plants and the preparation of water intended for human consumption and***
19 02 03	water for industrial use
19 05	***wastes from physico/chemical treatments of waste (including dechromatation,***
19 05 01	decyanidation, neutralisation)
19 05 02	premixed wastes composed only of non-hazardous wastes
19 05 03	wastes from aerobic treatment of solid wastes
19 06	***non-composted fraction of municipal and similar wastes***
19 06 04	non-composted fraction of animal and vegetable waste
19 06 06	off-specification compost
19 09	***Preparation of water intended for human consumption or water for industrial use***
19 09 02	sludges from water clarification
19 12	***wastes from the mechanical treatment of waste (for example sorting,***
19 12 01	crushing, compacting, pelletising) not otherwise specified
19 12 07	paper and cardboard
19 12 08	wood other than that mentioned in 19 12 06
19 12 10	textiles
19 12 12	combustible waste (refuse derived fuel)
19 13	***Soil and groundwater remediation***
19 13 04	sludges from soil remediation other than those mentioned in 19 13 03
19 13 06	sludges from groundwater remediation other than those mentioned in 19 13 05
19 13 08	aqueous liquid wastes and aqueous concentrates from groundwater remediation other than those mentioned in 19 13 07
20	**other wastes (including mixtures of materials) from mechanical treatment of wastes**
20 01	***other than those mentioned in 19 12 11***

EWC Code	Description of Waste
20 01 01	Municipal wastes (household waste and similar commercial, industrial and
20 01 10	institutional wastes) including separately collected fractions
20 01 11	textiles
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	plastics
20 02	***garden and park wastes (including cemetery waste)***
20 02 01	biodegradable waste
20 03	***other municipal wastes***
20 03 01	mixed municipal waste
20 03 02	waste from markets
20 03 04	septic tank sludge
20 03 06	waste from sewage cleaning

It is not considered that there is a fire risk associated with the sludges to be processed at the Facility as the moisture content of these materials will significantly reduce the risk of fire from the storage and handling of the sludges. If required, sludges with a low moisture content could be delivered directly to the waste bunker so that they do not present any additional risk of fire.

3.1.2 Quarantine Area for Unacceptable Waste

A suitable area for the quarantine of unacceptable waste will be designated as part of the detailed design stage; however, it is expected that it will be located within the tipping hall. The quarantine area will be used to temporarily store any unacceptable waste (which has been detected prior to being tipped into the waste bunker, or identified by the crane driver and removed using the waste crane grab) prior to transfer off-site. Unacceptable wastes could include items which are considered to be non-combustible, large/bulky items or items of hazardous waste.

The quarantine area will be designed to enable unacceptable waste to be segregated from all other incoming waste, allowing it to be collected and loaded into appropriate road vehicles for transfer off-site. In accordance with the EA's FPP Guidance, the quarantine area will be located at a minimum distance of 6m from the waste bunker. Where this a 6m separation distance cannot be implemented dur to layout constraints, alternative techniques will be included within the design to prevent the spread of fire risk. The quarantine area will be kept clear at all times when it is not being used for the storage of unacceptable waste.

Appropriate fire detection and protection measures will be installed in the quarantine area. The final design of the quarantine area will be subject to detailed design and agreed with fire risk insurers.

Additionally, for unacceptable waste identified inside the bunker, the crane maintenance arrangement can be used as a back-loading facility to remove any unacceptable waste for examination and/or removal from the site to a licensed disposal facility.

3.1.3 Incinerator Bottom Ash

Bottom ash from the waste incineration process will be transferred to a dedicated IBA storage area or ash bunker. The size of the IBA storage area will be subject to detailed design, but it is estimated that the bunker will have a storage capacity of approximately 1,600 m^3.

3.1.4 Air Pollution Control Residues

Air Pollution Control residues (APCr) will be stored within silos. The design of the silos is subject to detailed design; however, it is expected that the 3R Facility will have a storage capacity of approximately 400 m^3.

The silos would be elevated above ground level so that APCr can be discharged pneumatically into road tankers from above. Removal of the APCr will be by sealed road tankers.

3.2 Storage Duration

3.2.1 Waste Bunker

The waste bunker will have a nominal storage capacity of approximately 14,400 m^3 of waste, allowing for 4 days of waste throughput. Allowing for stacking within the waste bunker, the waste bunker is capable of storing approximately 27,300 m^3 of waste, allowing for approximately 6.6 days of waste throughput. The time that waste will be stored in the bunker would increase if a shutdown of the 3R Facility was to occur. However, the quantity of waste stored within the bunker would be significantly reduced prior to a planned shut-down.

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. This ensures that 'old' waste is not 'buried' within the bunker.

Waste deliveries will take place between 07:30 to 19:00 Monday to Fridays, and between 07:30 and 13:00 on Saturdays. Waste will not be delivered on Sundays or Bank Holidays.

Waste will be delivered on a first-in, first-out principle. The operation of the 3R Facility is not expected to follow any seasonal variations in the demand for incoming wastes to be treated or the resulting residues generated. However, should any variations in the demand or supply of combustible waste be identified, they will be managed appropriately, ensuring that wastes are stored for no longer than 6 months in the bunker. This will include procedures to reject or prevent waste deliveries should a build-up of waste in the bunker be identified.

3.2.2 Quarantine Area for Unacceptable Waste

The quarantine area would be used for the inspection and storage of unacceptable waste. Waste would only be retained in until such time it is removed.

After inspection and verification, depending on whether the waste was deemed unacceptable or not, the waste will either be:

- transferred to the waste bunker; or
- transferred off-site to a suitably licensed waste management facility.

3.2.3 Incinerator Bottom Ash

The size of the IBA storage area will be subject to detailed design, but it is estimated that it will have a storage capacity of approximately 1,600 m^3, equivalent to 5 days generation.

3.2.4 Air Pollution Control Residues

APCr will be stored in a silo, with a storage capacity of approximately 400 m^3, equivalent to 6 days of generation.

3.3 Monitoring of Stores for Waste and Recovered Materials

In accordance with the waste acceptance procedures, which will be developed for the 3R 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 waste reception facilities, and areas where wastes and recovered materials are discharged from the processes. The design of the CCTV systems would be undertaken during detailed design of the 3R Facility.

Within the 3R Facility, the waste bunker will be continuously monitored by the fully automatic thermal imaging system linked to the firewater cannons. During daytime and night-time operation, the waste bunker will be visually monitored by operational personnel, and the operational personnel will also visually monitor the thermal imaging system as part of their responsibilities for operating the 3R Facility.

IBA delivered to the IBA storage area will be inspected by operational staff. If the IBA is identified as having a poor quality, it will be quarantined for further inspection. If the IBA is rejected due to poor 'burn-out', it will be returned to the waste bunker.

3.4 Actions to Limit Self-Heating

3.4.1 Waste Bunker

Alongside the thermal imaging cameras, the turning of waste within the bunker will be undertaken to limit self-heating.

During operation, the turning of waste within the bunker is standard practice at UK plants that combust waste. 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 over a wider area, turning dissipates 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.

In extreme cases, if the heat does not dissipate as expected, the firewater cannons or sprinkler system will be used to extinguish any smouldering/burning waste, with the firewater cannons providing the principal method of extinguishing the smouldering/burning waste.

3.4.2 IBA Storage

Due to the high thermal temperatures in which the IBA has been combusted, it will not be expected to contain significant amounts of combustible materials which are able to self-combust from the elevated temperatures within the IBA. TOC and LOI will be within the required limits. The IBA storage area (bunker) will have sufficient capacity for the storage of approximately 5 days of IBA, assuming that the 3R Facility operates continuously at the nominal design capacity. In addition, the IBA will be quenched prior to storage and hence is not considered to be flammable or pose a fire risk.

3.4.3 APCr Storage

The APCr is not expected to contain any combustible materials which would self-combust from elevated temperatures within the APCr. APCr will be stored in dedicated silos, with a capacity equating to approximately 6 days storage in total. The storage area for APCr will have protection measures against the build up of static, and no nearby source of ignition will be present. Hence, the storage of APCr is not considered to pose a fire risk.

3.5 Contingency

If, due to an unplanned incident, the 3R Facility is not able to receive waste deliveries will be diverted to a suitably licenced waste management facility.

If there is a significant fire which requires a full shutdown of the 3R Facility, the 3R Facility will not restart operations until the relevant regulatory authorities (Fire Service, Health and Safety Executive, Environment Agency, etc.), as well as the insurers, have advised that it is safe to do so. During a complete shutdown of the 3R Facility, the fire detection systems will remain operational. The thermal imaging cameras will be set with trigger alarms at different temperatures within the bunker, with the firewater cannons activated if the temperature alarm is reached (refer to section 4.8.2).

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 3R Facility, and as part of the development of the documented management systems associated with the operation of the 3R Facility, communication procedures will be developed and implemented.

For periods of planned maintenance, the waste levels within the bunker will be maintained to ensure that the quantities of waste within the bunker can be combusted. Prior to the planned shutdown of the 3R Facility, waste deliveries will be 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 temperature of waste in the waste bunker would continue to be monitored by the thermal imaging system during a planned shut-down. Therefore, the crane operators or the control room would be able to continue to mix waste to prevent excessive temperatures in the bunker, or if necessary use the firewater cannons.

If the 3R Facility was not available due to a period of extended unplanned maintenance, facilities will be provided for loading of the waste from the bunker into vehicles for transfer off-site to a suitably licensed waste management facility. It is anticipated that extended unplanned shutdowns would rarely exceed 14 days, after which waste will begin to be removed from the 3R Facility, based upon the status of operation.

3.6 Seasonality

The operation of the 3R Facility is not expected to follow any seasonal variations in the demand for incoming wastes to be treated or the resulting residues generated.

3.7 Arson or Vandalism

Security measures will prevent unauthorised access by members of the public and thereby prevent the risk of arson attacks or vandalism. The 3R Facility will be enclosed by security fencing. Main entrance gates will be present at the entrance of the site to control vehicular access. These gates will be closed outside of working hours. Only authorised visitors will be able to enter the site.

The 3R Facility will be operational and manned 24 hours a day, 7 days a week. A supervised CCTV system will monitor the entrance gates, pedestrian gates and the whole boundary. The site security 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 3R 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 3R Facility.

3.8 Plant and Equipment

An Operations and Maintenance Management System will be developed, which will comprise O&M manuals, computerized maintenance management system, Permit to Work Systems will be developed and implemented through the commissioning phase of the installation. The O&M Manual will set out detailed operating and maintenance instructions for all the plant and equipment which requires maintenance.

Maintenance procedures and work instructions will be developed to cover all plant and equipment within the 3R 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.

Vehicles will be fitted with fire extinguishers on-board. Mobile plant will be stored/parked away from any waste or other combustible materials.

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

3.9 Infrastructure and Site Inspections

Regular site inspections will be undertaken which will cover all operational areas as part of the normal operating procedures. Records of site inspections will be retained on-site. Inspections will be carried out on a continuous basis, but as a minimum an inspection of the main operational areas will be carried out during every operating shift with maintenance work instructions raised for any items identified.

3.10 Electrical Faults

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; and the requirements of the Electricity at Work Act and associated regulations.

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.

3.11 Ignition Sources

A review under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) will be completed during the detailed design of the 3R Facility, with any risk areas identified on DSEAR zonal drawings, which will include aspects such as the ammonia tank or any test gases for the CEMS systems.

Vehicles and electrical items necessary for the operation of the 3R Facility will be regularly inspected for electrical faults. All mobile plants serving the 3R Facility will be fitted with fire extinguishers and dust filters.

Naked sources of ignition will be controlled through a hot works permitting system. This system will cover both staff and contractors working at the 3R Facility. The hot works permitting 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 works. The hot works system will include for a period of fire watch following the hot works being undertaken.

As part of the hot works permitting 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 would be followed as part of this system. This will include ensuring that mobile plant storage locations will be stored at least 6 metres away from combustible wastes. The location of mobile plant storage locations is subject to detailed design of the 3R Facility.

The guidance of keeping sources of ignition at least 6m away from any combustible or flammable waste will be followed as part of this management system. Potential sources of ignition are covered in sections 3.12 to 3.19.

3.12 Industrial Heaters

It is currently not expected that industrial heaters will be installed at the 3R Facility, however, this will be confirmed during detailed design.

If applicable, the hot works system would be extended to include the use of industrial heaters and the necessary safeguards required in each instance would be assessed and implemented to ensure their use is safe.

3.13 Leaks and Spillages of Oils and Fuels

Emergency response procedures will be developed as part of the emergency procedures for the 3R Facility. The procedures will include actions to be undertaken to respond to spills and leaks of chemicals. Spill kits will be made easily accessible on-site. Actions will be undertaken to prevent liquids leaking or trailing from site vehicles.

Daily checks will be undertaken at the 3R Facility, and should a leak be identified, the leaking fluid will be contained or the equipment will be put out of service until it is fully repaired.

3.14 Build-up of Loose Combustible Waste, Dust and Fluff

The 3R Facility would 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 3R Facility, the control of dust and fluff has been considered. This includes:

- the use of an enclosed fuel reception/unloading building under negative pressure with air extraction; and
- mechanical ventilation of waste storage areas (bunker and tipping hall) to be used a combustion air 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 waste, dust and fluff. Where inspections identify that there has been a build-up of loose combustible waste, dust and fluff, appropriate cleaning will be undertaken to clean this material from the surfaces.

There will be an adequate supply of water available to working areas for use in minimising and supressing dust. Haul routes will be inspected regularly for integrity, with repairs instigated without delay as required.

Due to both the nature of the waste to be received on site, and the design parameters and management identified above, dusty wastes are not anticipated.

Good housekeeping practices will be employed at the 3R Facility to minimise the accumulation of any dust or fluff, with a periodic deep clean undertaken.

3.15 Hot Exhausts

A fire watch system will be implemented to detect signs of fires from dusts settling on hot exhausts. This would be developed as part of the operating procedures. This will include regular visual checks of dusts settling on hot exhausts as part of the operational checks by operational staff for each shift.

3.16 No Smoking Policy

A no smoking policy will be adopted and implemented at the 3R Facility. Smoking will be prohibited in operational areas. External areas designated for smoking will be identified, with suitable facilities provided for staff. Any external smoking areas will be located at safe distances from storage areas of combustible materials, to prevent accidental ignition.

3.17 Heat and Spark Prevention

A review under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) will be completed during the detailed design of the 3R Facility, with any risk areas identified on zoning drawings.

3.18 Gas Bottle and Other Flammable Items

Gas cylinders will be stored within purpose-built dedicated storage facilities, including the test gases for the CEMS systems. All facilities for the storage of gas cylinders will be kept locked/secured. The location of gas cylinder storage and other flammable items will be subject to detailed design. A plan showing the location of gas storage facilities and other flammable items will be included in Appendix A upon completion of detailed design.

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.

3.19 Fire Watch

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 room and by the crane operator on a continuous basis. In addition, the bunker thermal imaging cameras will be used to identify any hotspots which may pose a fire risk.

All waste delivered to the 3R Facility will be supervised by operational staff, who will be responsible for the inspection and monitoring of waste deliveries.

A hot works management system will be in place at the 3R Facility; this is covered in more detail in Section 3.11.

3.20 Smoke/Heat/Flame Detectors

The choice of fire detection system (smoke/heat/flame and carbon dioxide detectors) to be installed within the 3R Facility is 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 which is approved by fire insurers, or equivalent scheme if applicable. This will be confirmed prior to the commencement of commissioning of the 3R Facility.

Suitable detection systems will be installed in each area dependant on the fire risks associated with the area. A plan showing the location of the fire detection system in each area will be presented in Appendix A upon completion of detailed design.

4 Management and Storage of Waste

4.1 Incompatible/Hot Loads

Waste acceptance procedures will be developed for the 3R Facility. These will include considerations for incompatible wastes and hot loads, including the installation of radiation detection equipment at the weighbridge. Waste supply contracts will be agreed with waste suppliers/producers, which will include specifications for the supply of incoming waste. This will limit the likelihood of incompatible wastes being transferred to the 3R Facility.

Upon arrival at the weighbridge, the waste vehicles will be directed to the waste reception area. Unacceptable waste such as incompatible and hot loads, identified as part of the waste acceptance process, will not be accepted at the 3R Facility. The unacceptable waste will either be returned to the waste processing facility which has transferred the waste to the 3R Facility or sent to a suitably licensed waste management facility.

Incompatible waste, including hot loads, will be identified by the operator through examination of the waste as it is being unloaded within the waste reception areas. Furthermore, if unacceptable waste is identified within the bunker it would be able to be removed from the bunker using the crane grab.

Unacceptable wastes, including incompatible wastes and hot loads, will be transferred to a dedicated quarantine area (refer to sections 0, 3.2.2 and 4.5).

4.2 Waste Acceptance – Permitted Waste

Prior to commencement of operations, waste acceptance procedures will be developed and implemented for the 3R Facility. This fire prevention plan will be updated following development of the procedures. The procedures will include arrangements for the management of wastes which are permitted to be treated.

4.3 Waste Storage – Separation Distance

Following consultation with the Environment Agency, it is understood that the storage requirements relating to pile separation distance only applies to external storage of wastes. As detailed in Section 3.1, all wastes which are delivered or stored within the site will be within enclosed buildings. Taking this into consideration, the pile separation distances will be adopted as good practice where feasible.

4.4 Fire Walls

Suitable fire walls will be installed within the appropriate areas within the 3R Facility. The location and specification for fire walls would be subject to detailed design of the 3R Facility, and dependent on the layout as proposed by the EPC contractor. Therefore, at this stage it is not feasible to provide a layout drawing showing the location of all fire walls; however, a drawing showing the indicative location of the known fire walls is presented in Appendix A.

Subject to the location of the process equipment, operational areas would 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.

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 the agreement of BH EnergyGap 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. Any doors within this wall will be fire rated. The structural design and construction of this dividing wall will 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. The walls and the base of the bunker will be resistant to crane grab impact and the impingement of firewater cannon jets. The structure of the waste bunker itself therefore will have adequate fire resistance and water retention properties.

Any exposed steel columns located at the front of the waste bunker will be protected against structural damage caused by fire or impact with the waste crane or waste vehicles. This protection will be provided by concrete encasement or other acceptable means and will extend from the base of the column to the level of the waste feed hopper.

All openings in fire barriers will be provided with fire doors, including (if feasible) airlock systems, 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 adequately fire rated or 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, to achieve the required 2-hour fire resistance, the Plant control room viewing window shall have a glazing system designed to provide at least 60 minutes integrity with further protection from a water drenching curtain system. The site staff will therefore be able to continue operating the crane for a limited amount of time in the event of a fire, depending on severity.

4.5 Quarantine Areas for Unacceptable Waste

As stated in section 0, a suitable area for the quarantine of unacceptable waste will be designated as part of the detailed design stage; however, it is expected that it will be located within the tipping hall.

In the event of a fire within the waste bunker, if it is not feasible for burning wastes to be fed to the furnace or extinguished using the fire suppression systems, the quarantine area will be used to store burning waste from the bunker. If it is safe to do so, where burning/smouldering waste is identified within the bunker, the waste crane will be used to remove the burning waste from the waste bunker and deposit it into the quarantine area. If it is safe to do so, fire hoses/extinguishers

will be used to extinguish the fire, or the emergency services will be called to assist with extinguishing the fire.

The EA FPP Guidance requires that the quarantine area is large enough to fulfil the following requirements:

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

As stated in Section 3.1.1, the capacity of the waste bunker is approximately 14,400 m^3 - this is the largest waste pile stored at the 3R Facility. Taking into consideration the fire detection and prevention measures (refer to sections 4.8.1 to 4.8.3) which have been incorporated into the design of the 3R Facility, it is not considered that the quarantine area is required to have capacity to store at least 50% of the capacity of the bunker. However, to allow for the capability to store burning loads the quarantine area will be designed to store at least 50% of the volume of the largest waste delivery vehicle which delivers waste to the 3R Facility.

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. Where the separation distances cannot be demonstrated alternative techniques will be included within the design to prevent the spread of fire risk.

The final design of the fire detection and protection measures (e.g. smoke / flame detectors, hose reel, sprinklers, or firewater cannon) installed in this area will be subject to the recommendations of the final fire strategy completed during the detailed design phase of the project and agreed with insurers.

4.6 Storage within Buildings

The detailed arrangements for waste storage are explained within section 3.1, but it can be confirmed that all incoming wastes and residues following processing will be stored within buildings, with the exception of APCr which will be stored outside in sealed silos.

As part of the detailed design and construction of the 3R 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 (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. Where appropriate, waste storage areas will be designed with automatic fixed fire detection and suppression systems to enable a fire to be supressed in less than 4 hours.

4.7 Shutdown

The duration of planned shut-downs will vary significantly, dependent on the nature of the work required, and typically will not extend beyond two weeks. The nature of a planned shutdown allows the 3R Facility to minimise waste deliveries prior to the shutdown. During periods of shutdown, the waste within the bunker will be maintained at suitable levels. Facilities will be in place to back-load waste from within the bunker for transfer off-site to a suitably licensed waste management facility. In the event that the 3R Facility is not able to receive waste, due to an unplanned incident forcing

a full shut-down of the 3R Facility, incoming waste deliveries will be diverted to a suitable waste management facility.

When any waste treatment processes are shutdown, whether it is planned or unplanned, both engineered fire detection controls and procedures will be implemented to minimise the risk of a fire within waste storage areas. The controls implemented during shut-down will be dependent on whether combustion fan is operational, and thus could include the closing of louvers in the tipping hall to seal the building.

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, assessing the presence of dust, odours and hotspots. The operation of all thermal monitoring equipment will be maintained during all periods of shutdown where there is waste within the bunker.

4.8 Active Fire Fighting

The firefighting system for the 3R Facility will be subject to detailed design. The main features of the fire system are described in the following sections.

4.8.1 Fire Prevention Standards

Where appropriate, the 3R Facility will be designed and operated in accordance with the following fire prevention and detection standards, or alternative recognised international standards where they are available:

- BS EN 671: Fixed fire-fighting systems;
- BS 5266: Emergency Lighting;
- BS 5446: Automatic Fire Alarm Systems;
- BS 5839: Fire Detection and Alarm systems for buildings;
- ISO 6182: Fire Protection – Automatic Sprinkler Systems;
- ISO 6183: Fire Protection Equipment – Carbon Dioxide Systems;
- CIBSE Guide Volume E, Fire Engineering, 2003;
- 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 5588: Fire Precautions in the design, construction and use of buildings (only in as much as referred to in the Building Regulations);
- 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; and
- Building Regulations, in particular Approved Document B, Volume 2 – Buildings other than dwelling houses, Section B5, Access and facilities for the fire service.

All staff, visitors and contractors will be informed about the fire safety precautions as part of the induction procedures.

4.8.2 Fire Detection Systems

There will be a fire detection and alarm system which will cover all of the waste processing areas within the 3R 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) would be in the control room.

All fire detection systems will be installed in accordance with BS 5839, Part 1 2002 and subsequent amendments to give level P1 + M coverage in accordance with the Loss Prevention Council ("LPC") Rules for Automatic Fire Detection and Alarm Installations for the Protection of Property. In low fire risk areas e.g. the boiler house, the requirements for a P1 detection system may be relaxed. In areas which are identified as having a low fire risk, proposed detection method(s) would 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 (or similar standard).

The following fire detection systems will be incorporated into the design of the 3R Facility, unless otherwise requested by the fire insurers for the 3R Facility:

1. Tipping hall fire detection will be provided by flame detectors in accordance with an appropriate risk study.
2. Waste bunker fire detection will be provided by thermal imaging cameras and 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.
   - Firewater cannons and manual fire hoses are considered to be the primary means of fighting a bunker fire.
   - To proactively prevent fires, the system will be configured to alarm based on certain conditions. The thermal imaging cameras would be set with at least two triggers/alarms at different temperatures (described below). As indicated in insurer guidelines, high temperature sprinkler heads would be utilised, and temperature set-points would be determined during detailed design and in consultation with the fire service. It is understood that the system will be designed so that the trigger temperatures for the fire detection system can be amended if required from operational experience. 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 hopper.
   - Following activation of the high temperature alarm in an area within the bunker, the area with an elevated temperature will be readily identified and, if possible, extinguished based on operator action through mixing within the bunker or fed into the hopper to be

incinerated. High temperature alarms in other UK waste incineration plants operate with a trigger temperature of approximately 90 °C. For the 3R Facility, this is subject to detailed design, and will be set in consultation with the Fire Service.

- 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 would be activated to reduce the temperature in the area where self-heating has occurred. High-high temperature alarms in other UK waste incineration plants operate with a trigger temperature of approximately 120°C. For the 3R Facility, this is subject to detailed design, and will be set in consultation with the Fire Service.
- The system can be designed so that the trigger temperature for the fire detection systems can be amended if required from operational experience.
- 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 a deluge system to flood the feed hoppers if required.
4. In the boiler house the boiler auxiliary burner fuel supply valve train will have a wire and fusible link system or heat detector and solenoid valve such that in the event of an external fire the local fuel supply isolation valve (fuel oil) is automatically closed.
5. Electrical rooms with significant concentrations of electrical equipment such as switchgear rooms, low voltage rooms, control system rack room, Uninterruptible Power Supply (UPS) and crane control cabinet rooms will be fitted with suitable fire detection systems.
   - The fire detection will be by means of a 'double knock' system composing of ionisation (or heat and smoke) detectors to minimise the risk of false activation. In addition, Manual Call Points will be installed in all areas. The fire detection systems will be designed for ease of regular testing to demonstrate correct operation. Suitable automatic fire protection systems will be located within the rooms. The electrical equipment would be installed within rooms of blockwork construction.
6. The turbine-generator and ancillaries will be protected by a dedicated fire detection and automatic sprinkler fire protection system. The area will be segregated into 3 fire zones: turbine, generator and lubricating oil skid. The fire detection and protection system will be installed such that detectors cover all potential areas of fire risk.
   - Automatic actuation of the fire protection systems via a double knock system with manual operation from the control room will be provided.
   - The fire detection systems would be installed in accordance with NFPA 850. In addition, in accordance with NFPA 850, all areas beneath the turbine-generator operating floor that are subject to oil flow, oil spray, or oil accumulation would be protected by an automatic sprinkler or foam-water sprinkler system.
   - A 'double knock' system will be used with a dry glass bulb for 1st knock and dedicated heat detectors as the 2nd knock. Break glass units will be installed at each entrance to the turbine hall. These detection and protection systems will be segregated from the main fire detection and protection system. Locations of pipes and equipment will be designed to minimise the risk of oil fires spreading. Passive fire protection to the generator and the cooling system will be designed in accordance with the requirements of the fire insurer.
7. 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 would be retained on-site.
8. All automatic fire detection and alarm systems will be designed and maintained by a suitably qualified, experienced and registered fire protection engineer.

9. 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.
10. It would be the responsibility of the shift managers to monitor fire alarms.

4.8.3 Fire Suppression Systems

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. The fire suppression systems will include the following:

- automatic sprinkler/water deluge systems for the fuel reception areas, waste bunker, waste feed hopper, fire pump container and the emergency diesel generator;
- automatic foam systems for the turbine generator and lube oil systems, auxiliary burners; and;
- inert gas suppression for the electrical rooms and CEMS container.

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 produced following detailed design.

4.8.4 Alternative Fire Detection and Suppression Measures

In addition to the fire detection and suppression systems identified in sections 4.8.2 and 4.8.3, the design of the 3R Facility will include a number of 'additional measures' to prevent the spread of fire, such as fire walls (section 4.4), fire hose reels and wet riser system (section 4.8.7), and fire extinguishers (section 4.8.9).

Whilst it is acknowledged that the 3R Facility does not comply with all of the requirements of the EA guidance note 'Fire Prevention Plans', namely the capacity of the firewater tank (refer to section 4.8.5); the overall design of the 3R 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 would initiate a 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 3R Facility.

4.8.5 Provision of Firewater

The 3R Facility will have a firewater storage tank designed in accordance with the requirements of BS 5306.

The firewater storage tank would be connected to the local water supply. The tank would 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 automatic fixed fire suppression systems for the 3R Facility would be designed in accordance with the requirements of the insurer and NFPA 850. The water storage capacity for the fire protection systems would be based on providing a 2-hour supply based on the flow rate requirements for the sum of items (a) and (b) as:

a. the greater of items (i) or (ii) below:
   i. the largest fixed fire suppression system demand; or
   ii. any fixed fire suppression system demands that could reasonably be expected to operate simultaneously during a single event e.g. turbine under-floor protection in conjunction with other fire protection system(s) in the turbine area; and
b. a reasonable assessment of anticipated hose stream demand at not less than 1,890 l/min for 10 minutes.

The firewater tank would be designed to ensure the required firewater capacity is available for fire protection at all times.

In accordance with the requirements of NFPA 850, it is estimated that the size of the firewater tank will be approximately 1,400 m^3. 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 use of foam as an additive in the firewater system would reduce the quantity of water required for firefighting. However, the use of foam would be subject to detailed design.

The firewater tank will be designed to ensure the required fire water capacity is available for fire protection at all times.

The FPP Guidance requires a supply of firewater of 2,000 litres/minute 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 nominal storage capacity of 14,400 m^3, the guidance implies the need for approximately a 17,280 m^3 fire water tank, which is excessive.

It is acknowledged that the provisions for the supply of firewater at the 3R Facility are not in accordance with the requirements of the EA's FPP guidance. However, the proposed management systems; the design considerations of the 3R Facility; and the provision of the fire prevention and fire-fighting measures detailed within this FPP are considered to be in excess of the requirement of the FPP guidance. Therefore, the requirements of the EA's FPP guidance should not apply to the 3R Facility.

4.8.6 Firewater Cannons

As described in section 4.8.2, the firewater cannons will automatically activate following the activation of a high-high temperature alarm. The firewater cannons will also, following the detection of a hot spot using the thermal cameras, automatically operate when the temperature of the hot spot exceeds a defined set-point (subject to agreement with the fire risk insurers). The firewater cannons will also be designed to be operated and controlled manually from the control room.

The firewater cannons will be located in positions to optimise the horizontal and vertical coverage of the water spray(s) 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 firewater cannons will be established, alongside the automatic and remote-control systems. Thermal imaging screens will be installed within the control room.

4.8.7 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 hydrant systems equipment will be provided at strategic positions within the 3R 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 3R Facility, a plan identifying the location of the fire hose reels will be developed.

4.8.8 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 an underground fire main at strategic positions around the 3R Facility to provide firewater supplies to external fire risk areas. The fire hydrants would be designed in accordance with the requirements of the Building Regulations and the fire service; and spaced at no greater than 90 metres apart and within 12 metres 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 would take into account:

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

The fire hydrants will be fed from the fire water storage tank and maintained at 1.5bar pressure.

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.5.

4.8.9 Fire Extinguishers

Fire extinguishers will be strategically located throughout the operational areas in accordance with the requirements of BS 5306: Part 3.

The location of the fire extinguishers will be subject to implementation of the recommendations of the fire officer for the 3R Facility. Following completion of detailed design, a plan identifying the location of the fire extinguishers will be developed and presented in Appendix A.

4.8.10 Containment of Firewater

The containment systems for firewater will be subject to the appointment of an EPC contractor who will be responsible for the design and construction of the 3R Facility. However, it can be confirmed

that drainage and prevention of flooding of equipment and the fire retention would be accomplished by installation of one or a combination of:

- impermeable surfacing;
- sealed drainage;
- 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, and in particular drainage for the turbine hall deluge system would be sized to accommodate the concurrent flow due to operation of the following components:

- 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 would be required to be contained if there was a fire at the 3R Facility:

1. Firewater resulting from treating fires in the bunker and tipping hall area. This firewater is routed to the bunker which is watertight and hence can contain large amounts of firewater.
2. Firewater from inside any of the process buildings. Such firewater is expected to be extremely rare and small in quantity so only small amounts of firewater will arise. This drainage would be contained, to prevent contaminated water discharging off-site.
3. Firewater from outside any building. Such firewater would be contained in the site drainage systems and routed to an appropriately sized attenuation vessel. The vessel will be installed with a penstock valve which will prohibit the discharge of potentially contaminated surface water off-site, as well as allowing the firewater to be recycled. Details of the attenuation vessel will be confirmed during detailed design of the plant.

The water used for fire-fighting would be sampled and analysed to identify whether it is suitable to be used as process water, or if treatment/disposal is required. If the firewater is considered to be contaminated, it will be discharged if the composition is deemed to be acceptable. If the effluent is unsuitable for discharge, it will be pumped out and transferred off-site, via tanker, to a suitably licensed waste management facility.

4.8.11 Contingency During the Incident

Emergency procedures would 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 would 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 would be provided to those employees. Training records in the emergency response procedures for all staff and contractors would be retained on-site.

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

A copy of the emergency procedures would 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, assumed to be twice a year, tests of the emergency procedures would 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 would be reviewed. If appropriate, the procedures would be amended, or additional training provided to all staff and contractors.

In the event of an incident resulting in the 3R Facility not being capable to receive waste, waste deliveries to the 3R Facility would be diverted to a suitably licensed waste management facility.

Deliveries of waste to the 3R Facility will not be recommenced until it has been deemed safe for the 3R Facility to be restarted following the incident.

4.8.12 Actions Following 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 3R Facility, an assessment will be undertaken by the management team for the 3R 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 would be removed from site by a licenced waste/scrap company.

Building structures that are deemed safe would be cleaned, as necessary.

Waste within the bunker which is not suitable to be incinerated would be backloaded from the bunker into HGV's and transferred off-site by licenced waste carriers to a suitably licensed waste management facility. Affected areas would be cleaned and washed before equipment and structural repairs would take place.

Incoming waste deliveries would be prevented, with incoming wastes diverted to alternative waste management facilities, until it can be concluded that it is safe to start-up the 3R Facility.

Appendices

A Plans and Drawings

A.1 Site Location Plan

A.2 Site Layout Plan

A.3 Waste Storage Areas Plan

A.4 Access Points Around the Perimeter to Assist Fire-Fighting

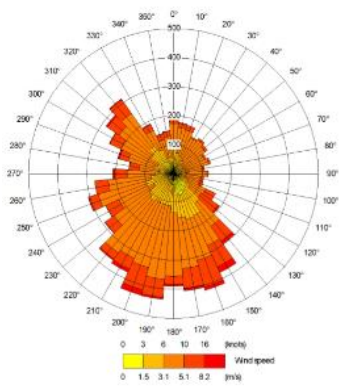
A.5 Indicative Locations of Fire Hydrants and Water Supplies

A.6 Indicative Locations of Fire Walls

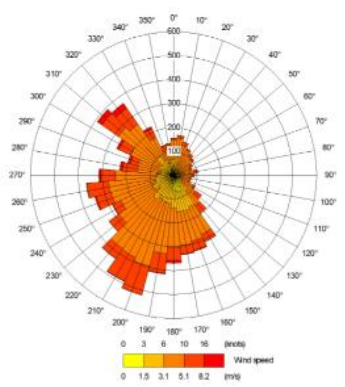
A.7 Fire Receptor Plan

B Windroses from Birmingham Airport

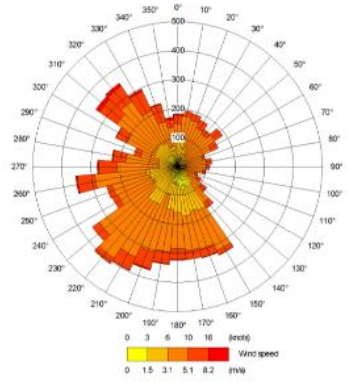
2014



2015



2016



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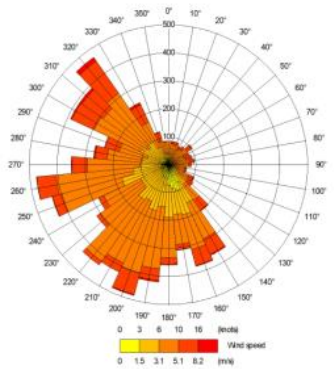
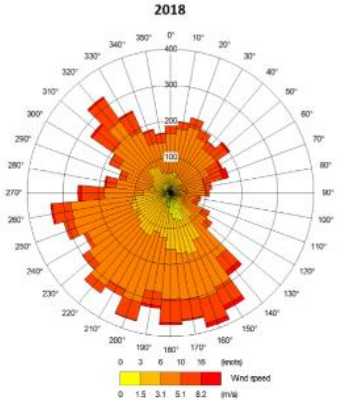


2018



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