FICHTNER
Consulting Engineers Limited

GENT FAIRHEAD & CO. LIMITED
RIVENHALL IWMF
FIRE PREVENTION PLAN

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

GENT FAIRHEAD & CO. LIMITED
RIVENHALL IWMF
FIRE PREVENTION PLAN

Document Production & Approval Record				
ISSUE NO. 7	**NAME**	**SIGNATURE**	**POSITION**	**DATE**
Prepared by:	James Sturman		Associate Senior Consultant	13 April 2017
Checked by:	Nick Claridge		Principal Consultant	13 April 2017

Document Revision Record				
ISSUE NO.	**DATE**	**DETAILS OF REVISIONS**	**PREPARED BY**	**CHECKED BY**
1	13 April 2016	For Client comment	JRS	SMO
2	20 April 2016	Final for issue	JRS	SMO
3	2 August 2016	Updated following EA comments	JRS	SMO
4	22 February 2017	For Client comment	JRS	SMO
5	28 February 2017	For issue	JRS	SMO
6	02 March 2017	For issue	JRS	SMO
7	13 April 2017	For issue	JRS	NDC

TABLE OF CONTENTS

TABLE OF CONTENTS III
1 Introduction 1
2 Site Location and Description 2
2.1 The Rivenhall IWMF 2
2.2 The Site 2
2.3 Summary of Site Operations 2
2.4 Site Plans & Drawings 3
3 Fire Prevention 4
3.1 Waste Storage 4
3.1.1 MRF 4
3.1.1.1 Incoming Waste 4
3.1.1.2 Recyclates 6
3.1.1.3 RDF Output 6
3.1.2 MBT 7
3.1.2.1 Incoming Waste 7
3.1.2.2 Bio-dried Waste 8
3.1.3 AD 9
3.1.3.1 Incoming Waste 9
3.1.3.2 Digestate 9
3.1.4 CHP 10
3.1.4.1 Incoming Waste 10
3.1.4.2 Quarantine Area for Unacceptable Waste 12
3.1.4.3 Incinerator Bottom Ash (IBA) 12
3.1.4.4 Air Pollution Control Residues (APCr) 12
3.1.5 Pulp 12
3.1.5.1 RCP Area (Incoming) 12
3.1.5.2 De-inking Sludge 13
3.1.5.3 MDIP 13
3.1.6 Waste Water Treatment Plant (WWTP) 14
3.1.6.1 WWTP sludges 14
3.2 Storage duration 14
3.2.1 MRF 14
3.2.1.1 Incoming Waste 14
3.2.1.2 Recyclates 14
3.2.1.3 RDF Output 14
3.2.2 MBT Facility 15
3.2.2.1 Incoming Waste 15
3.2.2.2 Bio-dried Waste 15
3.2.3 Anaerobic Digestion (AD) Plant 15
3.2.3.1 Incoming Waste 15
3.2.3.2 Digestate 15
3.2.4 CHP 16
3.2.4.1 Incoming Waste 16
3.2.4.2 IBA 16
3.2.4.3 APCr 16
3.2.5 Pulp Plant 16
3.2.5.1 RCP Area (Incoming) 16

3.2.5.2 De-inking Sludge 16
3.2.5.3 MDIP 16
3.2.6 Wastewater Treatment Plant (WWTP) 16
3.2.7 Maximum Total Waste Retentions Times 17
3.3 Monitoring of Stores for Waste and Recovered Materials 17
3.4 Actions to limit self-heating 17
3.4.1 MRF 17
3.4.2 MBT Facility 17
3.4.3 Anaerobic Digestion (AD) Plant 18
3.4.4 CHP 18
3.4.5 Pulp Plant 18
3.4.6 Wastewater Treatment Plant (WWTP) 18
3.5 Contingency 18
3.5.1 MRF 18
3.5.2 MBT Facility 18
3.5.3 Anaerobic Digestion (AD) Plant 18
3.5.4 CHP 19
3.5.5 Pulp Plant 19
3.5.6 Wastewater Treatment Plant (WWTP) 19
3.6 Seasonality 19
3.7 Arson or vandalism 19
3.8 Plant and equipment 20
3.9 Infrastructure and site inspections 20
3.10 Electrical faults 21
3.11 Ignition sources 21
3.12 Industrial heaters 21
3.13 No smoking policy 21
3.14 Heat and spark prevention 21
3.15 Gas bottle and other flammable items 22
3.16 Fire watch 22
3.17 Smoke/heat/flame detectors 22
4 Management and Storage of Waste 23
4.1 Incompatible/hot loads 23
4.2 Waste acceptance - permitted waste 23
4.3 Waste storage – separation distance 23
4.4 Fire walls 23
4.5 Quarantine areas for unacceptable waste 24
4.6 Storage within buildings 24
4.7 Active fire fighting 25
4.7.1 Fire prevention standards 25
4.7.2 Fire detection systems 25
4.7.3 Fire suppression systems 26
4.7.4 Provision of firewater 26
4.7.5 Bunker cannons 28
4.7.6 Fire hose reel system and wet riser system 28
4.7.7 Fire hydrant and mains 28
4.7.8 Fire extinguishers 28
4.7.9 Containment of fire water 28

4.7.10 Fire exercises 29
4.7.11 Contingency during the incident 29
APPENDIX A – PLANS AND DRAWINGS 30
APPENDIX B - WIND ROSE 31
APPENDIX C – FIRE STRATEGY 32

1 INTRODUCTION

Gent Fairhead & Co Limited (GFC) has applied to the Environment Agency for an Environmental Permit for the Rivenhall Integrated Waste Management Facility (Rivenhall IWMF).

The purpose of this document is mainly to detail the provisions which have been taken into account during the design phase of the Rivenhall IWMF to prevent the occurrence of fires within the installation. In addition, provisional operational measures are given.

This document has been developed in accordance with Environment Agency Guidance Note: Fire prevention plans, November 2016.

The report is provided as a preliminary Fire Prevention Plan (FPP) for the Rivenhall IWMF, and will be subject to review following completion of detailed process design, which has not yet been undertaken. Final detailed process design is programmed to commence towards the end of 2017. The development is expected to take approximately 3 to 4 years to design, build, commission and switch to full operational status.

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

The objectives of this fire prevention plan is to set out the measures which will be taken to achieve the following objectives:

- minimise 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.

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

(1) Environment Agency 'Fire prevention plans' November 2016;

(2) Building Regulations – Approved Document B (Fire Safety);

(3) ACE Technical Risks, Engineering Information Bulletin, Guidance Document Energy from Waste (EfW) – Fire Systems Issue 2.0;

(4) ACE Technical Risks, Engineering Information Bulletin, Guidance Document Waste Processing Plants - Fire Systems Issue 2.0;

(5) NFPA 850: Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations, 2005 Edition published by the National Fire Protection Association; and

(6) Insurer's requirements where structures or equipment fall outside published guidance or recommended practice.

Prior to commissioning of the Rivenhall IWMF, a detailed commissioning and fire prevention plan will be submitted to the EA for approval. The commissioning and fire prevention plan will include full details of all fire control, fire management, fire prevention procedures and fire protocols associated with its operation in full accordance with the above.

2 SITE LOCATION AND DESCRIPTION

2.1 The Rivenhall IWMF

Gent Fairhead & Co Limited (GFC) is proposing to construct and operate the facility. The facility will be located at the former Rivenhall Airfield site.

2.2 The Site

The Site is located on the south-eastern edge of the former World War II airfield known as Rivenhall Airfield between the villages of Bradwell (northwest 2.6 km), Silver End (southwest 1.1 km), Rivenhall (south 2.3 km), Coggeshall (northeast 2.8 km) and Kelvedon (southeast 3.4 km).

Access to the site will be provided via a private access road from the existing A120. A plan showing the location of the access to the site from the A120 is presented in Appendix A.

The former airfield and its immediate surroundings are on a plateau above the River Blackwater. This plateau is currently being excavated and, therefore, under the current planning permissions, most of the former airfield will become a restored 'bowl' for continued agricultural use. The airfield was previously open and exposed and had been used predominantly for agricultural purposes, although extensive sand and gravel extraction and restoration has been undertaken at the Site.

A plan showing the location of key receptors such as critical infrastructure within 1km of the site is presented in Appendix A. A site drainage plan is presented in Appendix A (C23.1_142064-DC-GA-C-108G Drainage Layout).

A wind rose showing the prevailing wind direction as used in the air quality modelling is presented in Appendix B.

2.3 Summary of Site Operations

There will be six principal activities to the Rivenhall IWMF, (1) Combined Heat and Power (CHP) Plant; (2) Materials Recycling Facility (MRF); (3) anaerobic digestion (AD) facility; (4) Mechanical Biological Treatment (MBT) facility;(5) A De-inked Paper Pulp Production Facility (Pulp plant); and (6) Wastewater treatment plant (WWTP). The capacities of the treatment processes are as follows:

(1) The CHP plant will have a maximum design capacity to process up to 595,000 tonnes per annum of non-hazardous Solid Recovered Fuel (SRF)[1] and Refuse Derived Fuel (RDF), herein referred to as RDF;

(2) The MRF will have a maximum design capacity to process 300,000 tonnes per annum of direct waste and treated waste materials from the MBT to recover recyclates for transfer off-site, with the residual material being transferred to the CHP facility;

(3) The AD plant will be designed to process up to 30,000 tonnes per annum of food and organic waste, with the resultant biogas being combusted in a CHP engine;

(4) The MBT Plant will have a maximum design capacity to process 170,000 tonnes per annum of waste which will be biologically dried and then fed into the MRF to recover recyclates prior to production of a RDF to be transferred to the CHP plant;

(5) The Pulp plant will have a maximum design capacity to process 170,000 tonnes per annum of waste paper to produce approximately 85,500 tonnes per annum of recycled and reusable paper pulp; and

(6) The Wastewater Treatment Plant will have a maximum design capacity of 550,000 m^3 per annum of wastewater from the installation.

[1] The planning permissions states as an *Informative* "reference to Solid Recovered Fuel (SRF) for the purposes of this planning permission is considered to be the same as Refuse Derived Fuel (RDF)."

Detailed descriptions of the operation of the IWMF are presented within section 1.3 of the Supporting Information submitted with the EP application.

Each of the waste treatment processes will be controlled from individual control rooms. The control rooms will be designed with suitable fire protection to enable staff to trigger fire-fighting techniques. The grab for the CHP Plant will be operated remotely from the crane driver's cabin in the CHP plant control room overlooking the bunker.

2.4 Site Plans & Drawings

The following plans are included in Appendix A:

- site location plan;
- site layout plan;
- site drainage plan;
- waste storage areas plan;
- access points around the perimeter to assist fire-fighting; and
- indicative locations of fire hydrants and water supplies.

As stated in section 1, at the time of developing this submission in support of the EP application detailed process design is programmed to commence over the coming months. Therefore, the information in relation to the location of drain covers and any pollution control features such as drain closure valves and firewater containment systems are provided as indicative.

- Until detailed design has been completed, it is not possible to provide plans which confirm the location of the following:location of gas cylinders; and
- the location of plant, protective clothing and pollution control equipment and materials.

These plans will be included following completion of detailed design.

Wind roses showing the direction of the prevailing winds for the facility for 2009 to 2013, as taken from Stanstead Airport, are presented in Appendix B.

3 FIRE PREVENTION

3.1 Waste Storage

Incoming waste will be stored within dedicated waste storage facilities. There will not be any storage of waste within 'piles' within the facility. The storage arrangements for incoming waste are detailed within the following sections.

It should be noted that it is not anticipated that there will not be any storage of waste within containers at the facility.

3.1.1 MRF

3.1.1.1 Incoming Waste

The incoming waste storage facility within the MRF is the day holding bunker / floor tipping bay ('bunker/bay') situated within the MBT building area. The bunker/bay will be of concrete construction and located within the MBT process areas. The floor of the bunker/bay is contiguous with the floor of the MBT building. Waste is held in the bunker/bay by means of rear and side-wall concrete push-walls designed to withstand the wheeled loader operations, and for increased safety and operational reasons the theoretical volume (or airspace) of the bunker/bay will be greater than the operational maximum.

The bunker/bay will be sized to accommodate a maximum volume of waste of 432m³ based upon the following dimensions of stored waste :

- Width of waste stored - 12m
- Height of waste stored – 3m
- Depth of waste stored (front to back) - 12m

The dimensions of the bunker/bay will be larger than the dimensions of the pile to allow for tipping and pile management using a wheel loader, i.e. push-walls are expected to be 4 or 5 metres high, width up to 18 m and depth 14m. Control markings, such as thick horizontal and vertical painted lines on the walls will delineate a "maximum" potential pile size.

There will be clear separation of 6 metres between the bunker/bay side-walls for incoming MBT wastes and the side-wall for the adjacent feeding bay into the MRF

The waste types to be treated within the MRF are presented in Table 3-1:

Table 3-1 – Waste To Be Processed in the MRF Facility

EWC Code	Description
WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED	
packaging (including separately collected municipal packaging waste)	
15 01 01	paper and cardboard packaging
15 01 02	plastic packaging
15 01 03	wooden packaging
15 01 04	metallic packaging
15 01 05	composite packaging
15 01 06	mixed packaging

Table 3-1 – Waste To Be Processed in the MRF Facility	
EWC Code	**Description**
15 01 07	glass packaging
absorbents, filter materials, wiping cloths and protective clothing	
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02
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	
wastes from aerobic treatment of solid wastes	
19 05 01	non-composted fraction of municipal and similar wastes
19 05 03	off-specification compost
wastes from shredding of metal-containing wastes	
19 10 01	iron and steel waste
19 10 02	non-ferrous waste
wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
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	
separately collected fractions (except 15 01)	
20 01 01	paper and cardboard
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	plastics
20 01 40	metals
garden and park wastes (including cemetery waste)	
20 02 01	biodegradable waste (from garden and park wastes including cemetery waste)
20 02 03	other non-compostable municipal waste
other municipal wastes	
20 03 01	mixed municipal waste
20 03 02	waste from markets
20 03 03	street-cleaning residues

3.1.1.2 Recyclates

Recyclates which are recovered within the MRF will be baled and stored in the dedicated MRF Recyclates Storage Area at the front of the building prior to transfer off-site to a suitably licenced recycling facility. The MRF Recyclates Storage Area is an area of hardstanding at the same level as the MRF operating floor. Stored recyclates will be in the form of bales.

Recyclates will drop from either of the two lines, and from the manual picking conveyor, into segregated steel troughs (one per recyclate type) running transversely beneath the recycling lines. These troughs will be fitted with a walking floor at the base and a gate at one end leading onto a conveyor belt that feeds a baler. Each recyclate commodity can then be baled separately as required by opening the selected gate onto the baling conveyor. Each bale will be approximately 1.1m x 1.1m x 1.1m = 1.3 m^3 maximum.

The baled recyclates will be stored in piles awaiting transfer to a licenced reprocessing facility. The bales will be stored in 25-tonne piles (i.e. approximately 25 bales per pile). The baled recyclates will be stored in this area for no more two weeks prior to collection and transfer off-site to a reprocessing facility. The baled recyclates storage area will be at the front of the MRF building and will be 70 m wide by 3 m deep (front to back). Within the dedicated storage area, the individual piles will be no less than 6 metres apart.

The MRF recyclates storage area will be covered by water sprinklers designed for 14.3mm/minute.

3.1.1.3 RDF Output

The RDF output will be stored in the RDF Storage Bay within the MRF at the end of the MRF lines. The day holding bunker / floor tipping bay ('bunker/bay') will be of concrete construction and located within the MRF process areas. The floor of the bunker/bay is contiguous with the floor of the MRF building. Waste is held in the bunker/bay by means of rear and side-wall concrete push-walls designed to withstand wheeled loader operations, and for increased safety and operational reasons the theoretical volume (or airspace) of the bay will be greater than the operational maximum.

RDF will drop into the bunker/bay from conveyors and the volume of the pile will be managed by the plant operator using a wheel loader. The bunker/bay will be sized to accommodate a maximum volume of RDF of 432m^3 based upon the following dimensions of stored RDF:

- Width of RDF stored – 12m
- Height of RDF stored – 3m
- Depth of RDF stored (front to back) - 12m

The dimensions of the bunker/bay will be larger than the dimensions of the pile to allow for tipping and pile management using a wheel loader (i.e. push-walls may be 4 or 5m high and of plan width up to 14m and depth 21m). Control markings, such as thick horizontal and vertical painted lines on the walls will delineate a "maximum" potential pile size

Whilst the maximum stored waste in the RDF bunker/bay floor area will be limited by operations to less than 450 m^3, it is possible that two trailers will be used to collect RDF as it is deposited by the conveyors. One would be filled while the other would be taken by a slave tractor to the RDF bunker in the CHP plant.

The RDF storage area will be covered by water sprinklers designed for 14.3mm/minute.

3.1.2 MBT

3.1.2.1 Incoming Waste

The incoming waste storage facility within the MBT is the day holding bunker / floor tipping bay('bunker/bay') situated within the MBT building area. The bunker/bay will be of concrete construction and located within the MBT process areas. The floor of the tipping bay is contiguous with the floor of the MBT building. Waste is held in the bunker/bay by means of rear and side-wall concrete push-walls designed to withstand the wheeled loader operations, and for increased safety and operational reasons the theoretical volume (or airspace) of the bay will be greater than the operational maximum.

The bunker/bay will be sized to accommodate a maximum volume of waste of 432m³ based upon the following dimensions of stored waste:

- Width of waste stored – 12m
- Height of waste stored – 3m
- Depth of waste stored (front to back) - 12m

The dimensions of the bunker/bay will be larger than the dimensions of the pile to allow for tipping and pile management using a wheel loader (i.e. push-walls may be 4 or 5m high and of plan width up to 18m and depth 14m) Control markings, such as thick horizontal and vertical painted lines on the walls will delineate a "maximum" potential pile size.

There will be a 6-metre clear separation between the tipping bay side-walls for incoming MBT wastes and the adjacent bay side-wall for the bay for direct feed into the MRF.

The day holding bunker will be emptied at the end of each day.

The whole of the MBT area will be covered by water sprinklers designed for 14.3mm/minute.

The waste types to be treated within the MBT are presented in Table 3-2:

Table 3-2 – Waste To Be Processed in the MBT Plant

EWC Code	Description
WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED	
packaging (including separately collected municipal packaging waste)	
15 01 01	paper and cardboard packaging
15 01 02	plastic packaging
15 01 03	wooden packaging
15 01 04	metallic packaging
15 01 05	composite packaging
15 01 06	mixed packaging
15 01 07	glass packaging
absorbents, filter materials, wiping cloths and protective clothing	
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02

Table 3-2 – Waste To Be Processed in the MBT Plant	
EWC Code	**Description**
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	
wastes from aerobic treatment of solid wastes	
19 05 01	non-composted fraction of municipal and similar wastes
19 05 03	off-specification compost
wastes from shredding of metal-containing wastes	
19 10 01	iron and steel waste
19 10 02	non-ferrous waste
wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
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	
separately collected fractions (except 15 01)	
20 01 01	paper and cardboard
20 01 38	wood other than that mentioned in 20 01 37
garden and park wastes (including cemetery waste)	
20 02 01	biodegradable waste (from garden and park wastes including cemetery waste)
20 02 03	other non-compostable municipal waste
other municipal wastes	
20 03 01	mixed municipal waste
20 03 02	waste from markets
20 03 03	street-cleaning residues

3.1.2.2 Bio-dried Waste

There will be 16 vessels installed within the MBT facility. Each vessel is designed to hold up to 200 tonnes of waste. Therefore, there would be up to 3,200 tonnes of waste being processed within the MBT facility at any one time.

The vessels will have concrete walls on three sides and a retractable roof which can be pulled back to allow loading/unloading of the vessels. Within the MBT the temperature inside the waste for optimum biological drying conditions is likely to be in the region of 50 to 60°C.

Upon completion of processing the waste within the biodrying tunnels, it will be unloaded from the tunnels and transported by wheeled loader directly into the MRF reception hopper for further processing as part of the MRF operation. There will be no other storage of bio-dried waste within the MBT building apart from within the MBT vessels.

3.1.3 AD

3.1.3.1 Incoming Waste

The waste reception bunker within the AD Plant has been designed with a waste storage capacity of approximately 150 tonnes. The AD waste reception bunker will be of concrete construction and located within the AD Plant.

The bunker is equipped with two parallel screw conveyors for the discharge of the organic waste. The bunker is V-shaped with a slight inclination. The walls of the AD reception bunker are equipped with rinsing devices to avoid material to be adhered on the walls. The waste is collected in a collecting screw conveyor. This screw conveyor is equipped with a sieve and a pump sump for the leachate, which is pumped to the pulper sump. The waste is further transported to the pulpers by a screw conveyor system.

The AD waste reception bunker and adjacent operational areas for receipt of wastes will be covered by water sprinklers designed for 14.3mm/minute.

The waste types to be treated within the AD Plant are presented in Table 3-3:

Table 3-3 – Organic wastes To Be Processed in the AD Facility

EWC Code	Description
WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING	
wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation	
02 03 04	biodegradable materials unsuitable for consumption or processing (other than those containing dangerous substances)
MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
separately collected fractions (except 15 01)	
20 01 08	biodegradable kitchen and canteen waste
garden and park wastes (including cemetery waste)	
20 02 01	biodegradable waste
other municipal wastes	
20 03 01	mixed municipal waste – separately collected biowastes
20 03 02	wastes from markets

3.1.3.2 Digestate

The digestate storage area will be designed for the storage of up to 3 days of dried digestate from the AD process. The AD plant will generate approximately 3,200m^3 of dried digestate on an annual basis. The dried digestate will be stored in a 40-cubic yard skip prior to transfer off-site. The dimensions of the 40-cubic yard skip are as follows:

- Length – 6m
- Height – 2.7m

- Width - 2.2m

When removing the skip, the waste contractor will deliver a replacement empty skip allowing for uninterrupted operation

3.1.4 CHP

3.1.4.1 Incoming Waste

The CHP bunker is sized as follows:

- Length – 52m
- Height – 22.8m
- Depth - 24.5m

Allowing for stacking within the waste bunker, the maximum waste storage capacity of the CHP bunker is approximately 29,000m^3 which will be the theoretical maximum volume of waste stored. The waste bunker will be a subsurface structure of concrete construction and located within the CHP Plant.

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

The CHP bunker is designed as a 2-hour fire compartment. Water cannons will be installed over the CHP waste reception bunkers, refer to section 4.7.5. The roof steelwork above the bunker is protected with water sprinklers in the event of a fire within the CHP bunker. These measures are in in accordance with the requirement of NFPA and the insurers for EfW plants in the UK.

Bunker management procedures will be adopted to ensure that there is a constant turnover of waste within the CHP bunker to ensure that hot spots or anaerobic conditions do not occur within the CHP bunker. The crane has been sized to ensure that there is up to 45 minutes per hour for mixing and rotating the waste within the CHP bunker. There will be thermal imaging cameras fixed around the perimeter of the bunker to provide the crane driver with a continuous thermal 'map' of the bunker. The crane driver is, therefore, 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 fire water cannons to extinguish any smouldering/burning waste.

The waste types to be treated within the CHP Plant are presented in Table 3-4:

Table 3-4 – Waste To Be Processed in the CHP Plant

EWC Code	Description of Waste
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	
wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)	
19 02 03	premixed wastes composed only of non-hazardous wastes
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09
wastes from aerobic treatment of solid wastes	
19 05 01	non-composted fraction of municipal and similar wastes

Table 3-4 – Waste To Be Processed in the CHP Plant	
19 05 02	non-composted fraction of animal and vegetable waste
19 05 03	off-specification compost
wastes from anaerobic treatment of waste	
19 06 04	digestate from anaerobic treatment of municipal waste *(a solid content greater than 50% is necessary in the digestate for it to be acceptable in the CHP Plant)*
19 06 06	digestate from anaerobic treatment of animal and vegetable waste *(a solid content greater than 50% is necessary in the digestate for it to be acceptable in the CHP Plant)*
wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
19 12 01	paper and cardboard
19 12 04	plastic and rubber
19 12 07	wood other than that mentioned in 19 12 06
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	
Separately collected fractions (except 15 01)	
20 01 01	Paper and cardboard not suitable for recycling/recovery
20 01 38	Wood other than that mentioned in 20 01 37
20 01 39	Plastics not suitable for recycling/recovery
20 01 41	Wastes from chimney sweeping
Garden and park wastes (including cemetery waste)	
20 02 01	Biodegradable waste not suitable for anaerobic digestion
20 02 03	Non-biodegradable wastes not suitable for recycling
Other municipal wastes	
20 03 01	Mixed municipal waste
20 03 02	Waste from markets
20 03 03	Street-cleaning residues
20 03 06	Waste from sewage cleaning
20 03 07	Bulky waste

3.1.4.2 Quarantine Area for Unacceptable Waste

A quarantine area for unacceptable waste will be provided at one end of the CHP bunker at the level of the tipping hall. It will have a concrete floor and push-walls to allow the waste to be collected and loaded into appropriate road vehicles and removed from the site.

The quarantine area will be used to temporarily store any unacceptable waste (which has been detected prior to being tipped into the CHP bunker, or identified by the crane driver and removed using the waste crane grab) prior to removal from site.

Unacceptable waste is waste which does not meet the requirements set out in the various fuel supply agreements.

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

3.1.4.3 Incinerator Bottom Ash (IBA)

Bottom ash from the waste incineration process will be stored within the Ash Hall prior to transfer off-site to a suitably licenced waste management facility. The Ash Hall will be an area of concrete hardstanding within CHP Plant. The Ash Hall will have capacity for the storage of 1,750 tonnes of IBA, equivalent to four days production of IBA with both incinerator streams operating continuously at full load.

3.1.4.4 Air Pollution Control Residues (APCr)

APCr will be stored within two APCr silos each of capacity 200m^3, equivalent to approximately five days storage at full load operation of both incineration streams. The silos will be elevated above-ground level so that APCr can be discharged into road tankers parked underneath. The silos will be constructed of carbon steel. Removal of the APCr will be by sealed tankers which will drive underneath with the APCr discharged into the road tankers using telescopic chutes.

3.1.5 Pulp

3.1.5.1 RCP Area (Incoming)

The waste reception area within the Pulp Plant for incoming waste paper and card bales known as "Recovered Paper" (or "RCP") has been designed with a maximum waste storage capacity of 8,450 tonnes, equivalent to approximately 24 days supply.

The total floor area of the RCP hall is 3,920m^2. RCP bales will be stored in stacks/piles not exceeding a volume of 750m^3. Separation between the piles will be minimum of 6m. Delivered RCP will have typical bale dimensions of 1.4 m long x 1.1m wide x 1.1m high. Stacking is considered to be safe up to a height of five bales giving a maximum height of the pile of 5.5 metres.

The RCP will be delivered by road and stored in the area shown as 'A9 Recovered Waste Paper Storage (RCP)' on Drawing 213033-100, refer to Appendix A. The RCP piles will be turned periodically to minimise the risk of self-combustion of the RCP.

RCP will be processed on a 'first-in, first-out' basis. A complete stock turn is expected to occur 15 – 20 times per annum, therefore the RCP should not be stored on-site for any longer than 2-3 weeks.

In accordance with the insurers guidance (ACE Engineering Technical Risks Information Bulletin Guidance Document – Waste Processing Plants – Fire Systems), the RCP storage area is protected with fire detection and water sprinklers designed for 14.3mm/minute.

The waste types to be treated within the Pulp Plant are presented in Table 3-5:

Table 3-5– Waste To Be Processed in the Pulp Plant	
EWC Code	**Description**
WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED	
packaging (including separately collected municipal packaging waste)	
15 01 01	paper and cardboard packaging
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	
wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
19 12 01	paper and cardboard
MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
separately collected fractions (except 15 01)	
20 01 01	paper and cardboard

3.1.5.2 De-inking Sludge

Sludge from the de-inking process will be stored in the De-inking Sludge Storage area. This is a concrete storage bunker of approximate area 560m² with full-height concrete fire walls. The storage area will be covered by water sprinklers designed for 10.2mm/minute.

Production of sludge under normal operation is expected to be 260 tonnes/day at a maximum moisture content of approximately 50%. The sludge will be dewatered prior to export from site. The sludge will be loaded by wheel loader into skips or bulk trailers for transfer off site to a facility which has a contract for the off-take of the sludge. All road transportation will utilise enclosed vehicles/trailers. The sludge will be spread on land as a soil conditioner.

3.1.5.3 MDIP

The final product pulp that is produced in the plant is known as "Market De-Inked Pulp" (or "MDIP") and this is in the form of dried board (i.e. final product - not to be confused with de-inked paper) which is stored in bales for subsequent transportation offsite to paper and tissue mills. MDIP bales will be stored in the Market De-Inked Pulp area prior to transfer off-site to a licenced facility. The storage area is shown as 'A10 MDIP Storage' on drawing 213033-100. Maximum storage will be approximately 6,500 tonnes (equivalent to approximately 4 weeks output). The MDIP storage area will be covered with water sprinklers designed for 14.3mm/minute.

MDIP will be processed on a 'first-in, first-out' basis. A complete stock turn is expected to occur 15 to 20 times per annum.

MDIP is not a waste and therefore the requirements of the FPP guidance do not apply to this product. Nevertheless, the MDIP bales will be stored under similar criteria as the incoming paper bales (RCP), namely in piles no greater than 750 m^3 with spacing between piles of no less than 6 metres. The MDIP storage area will be protected with fire detection and sprinklers designed for 14.3mm/minute.

3.1.6 Waste Water Treatment Plant (WWTP)

3.1.6.1 WWTP sludges

There will be no incoming wastes from external sources being treated in the WWTW.

Sludges from the WWTP processes will be dewatered to a sludge cake. The sludge will be deposited into skips for transport to the CHP Plant bunker. The normal production rate of sludge is expected to be 30 tonnes per day.

The sludge storage area will be covered with water sprinklers designed for 10.2 mm/minute.

3.2 Storage duration

Maximum storage times for all wastes delivered to the facility, prior to receiving treatment, is 29 days in the case of waste paper and 17 days in the case of municipal and commercial RDF, allowing for the incoming waste being treated in more than one of the waste treatment processes undertaken at the IWMF. Procedures for the management of wastes received at the IWMF will be developed prior to the commencement of operations.

3.2.1 MRF

3.2.1.1 Incoming Waste

The incoming waste storage facility within the MRF is the day holding bunker / floor tipping bay ('bunker/bay') referred to in 3.1.1.1. The bunker/bay will be emptied on a daily basis, as all waste which is delivered to the MRF will be processed. Therefore, the waste will be stored within the MRF bunker/bay for a maximum period of up to 16 hours. However, most waste delivered to the MRF will be processed within one or two hours of the delivery occurring.

3.2.1.2 Recyclates

The storage of recyclates for off-site recovery will be managed depending on the quantities of recyclable material recovered. However, it is expected that collections will be made on a weekly basis with bales being stored for no more than two weeks.

3.2.1.3 RDF_Output

The RDF bunker/bay referred to in 3.1.1.3 will be emptied on a daily basis, and will be transferred to CHP bunker for processing in the CHP plant. Therefore, the RDF will be stored within the RDF Bunker in the MRF for a maximum period of up to 24-hours.

3.2.2 MBT Facility

3.2.2.1 Incoming Waste

Typically, waste which is delivered to the facility will be unloaded from the delivery vehicles and loaded into the MBT vessels as soon as possible after it has been delivered to the IWMF.

The MBT facility will receive waste from 0700 to 1830 hrs Monday to Friday and 0700 to 1300 hrs Saturdays. The facility will be operated to ensure that the quantity of wastes that will be delivered each day will be less than the capacity available in the MBT bio-drying vessels (allowing for the proposed quantity of material that will be removed that day to be processed in the MRF).

The maximum period of time which incoming waste would be held in the reception area, or day holding bunker, awaiting processing would be approximately half the working day, equivalent to 6 hours or 360 minutes. However, most waste delivered to the MBT facility will be processed within one or two hours of the delivery occurring, depending on the 'availability' of the mobile shredder and the MBT vessels when the waste is tipped.

3.2.2.2 Bio-dried Waste

The incoming waste will be processed within the MBT vessels for at least one week and a maximum of 14 days (two weeks).

Upon completion of processing the waste within the biodrying tunnels, it will be unloaded from the tunnels and transported by wheeled loader directly into the MRF reception hopper for further processing as part of the MRF operation. There will be no other storage of bio-dried waste within the MBT building apart from within the MBT vessels.

3.2.3 Anaerobic Digestion (AD) Plant

3.2.3.1 Incoming Waste

Allowing for the processing capacity of the plant, the incoming waste will be stored in the AD reception area for a maximum period of 2 days.

3.2.3.2 Digestate

The digestate storage area will be designed for the storage of up to 3 days of dried digestate from the AD process. The AD plant will generate approximately 3,200m^3 of dried digestate on an annual basis. The dried digestate will be stored in a 40-cubic yard skip prior to transfer off-site. The dimensions of the 40-cubic yard skip are as follows:

- Length – 6m
- Height – 2.7m
- Width - 2.2m

When removing the skip, the waste contractor will deliver a replacement empty skip allowing for uninterrupted operation

3.2.4 CHP

3.2.4.1 Incoming Waste

Allowing for the design capacity of the CHP Plant it is estimated that the maximum period of time which waste will remain in the CHP bunker will be approximately 4 to 5 days. Typically, the CHP bunker will be filled sufficiently by end of business on a Friday, to operate over the weekend without further waste deliveries. By commencement of delivery on the following Monday (or Tuesday on a bank holiday), the CHP bunker will be nearly empty. Therefore, the maximum expected storage period for waste in the CHP bunker will be approximately one week.

The waste will be managed in the bunker in accordance with the procedures outlined in section 3.1.4.1 and 3.5.4.

If, due to an extended unforeseen shutdown of the CHP Plant, waste will be back loaded from the CHP bunker and transferred off-site to a suitably licenced waste management facility.

Infra-red cameras will be mounted on the waste cranes to produce a heat map of the bunker to the operators in the control room. Any areas which are 'hot' will be fed directly into the incinerator furnace.

In the event of a fire starting within the CHP bunker this will be extinguished with the fire mitigation measures identified in section 4.7.5.

3.2.4.2 IBA

The IBA Hall will have capacity for the storage of 1,750 tonnes of IBA, equivalent to four days of production of IBA with both incinerator streams operating continuously at the nominal design capacity of the CHP plant.

3.2.4.3 APCr

APCr will be stored within two APCr silos each of capacity 200 m^3, equivalent to approximately five days of storage at the nominal design capacity of the CHP plant.

3.2.5 Pulp Plant

3.2.5.1 RCP Area (Incoming)

The RCP storage area has been designed for the storage of approximately 24 days production of MDIP.

3.2.5.2 De-inking Sludge

The de-inking sludge storage bunker has been designed for the storage of approximately five days sludge production.

3.2.5.3 MDIP

The MDIP storage area has been designed for the storage of approximately 33 days production of MDIP.

3.2.6 Wastewater Treatment Plant (WWTP)

The WWTP will have capacity for storage of approximately one day's storage of sludge from the WWTP.

3.2.7 Maximum Total Waste Retentions Times

Waste delivered to the IWMF could be treated within a number of the different waste treatment processes within the facility.

Allowing for the design capacity of the CHP Plant it is estimated that the maximum period of time which waste will remain in the CHP bunker will be approximately 4 to 5 days. Typically, the CHP bunker will be filled sufficiently by end of business on a Friday, to operate over the weekend without further waste deliveries. By commencement of delivery on the following Monday (or Tuesday on a bank holiday), the CHP bunker will be nearly empty. Therefore, the maximum expected storage period for waste in the CHP bunker will be approximately one week.

With regard to other municipal and commercial waste processed through the MBT and MRF, the longest period would be via the MBT

Incoming waste to MBT (1 day) -> 7 days in MBT clamps -> 1 day transfer to MRF plus 1 day processing RDF (1 day) to CHP plant (7 days): Total 17 days

Taking into consideration the other timescales detailed above the maximum total retention times for waste (paper) to be be stored and treated within the IWMF is 29 days:

RCP to Pulp plant (24 days) -> Paper de-inking process (1 day) -> Pulp sludge prior to land-spreading (1 day). The Pulp retention on site is not counted as this is a product at this stage and no longer a waste.

In the case of the AD facility there will be less than 7 days storage in the incoming tanks. The removal of digestate should then be completed within another 2 to 3 days; maximum retention time 14 days.

In conclusion, the maximum storage time for waste at the IWMF prior to treatment would be 24 days for the RCP storage area, and up to 17 days for municipal and commercial RDF (ie via the MBT and MRF to the CHP). Total retention times through the storage and treatment systems on site would not exceed 29 days for all wastes.

3.3 Monitoring of Stores for Waste and Recovered Materials

In accordance with the waste acceptance procedures for the installation, unloading of all waste deliveries will be supervised by operational staff.

CCTV will be installed in all areas where there will be vehicles discharging waste into waste reception facilities; and areas where wastes and recovered materials are discharged from the processes. The design of the CCTV systems is subject to detailed design of the waste treatment processes.

Within the CHP Plant, the CHP bunker will be continuously monitored by the fully automatic thermal imaging system linked to the water cannons. During daytime operation, the bunker will be visually monitored by the full-time crane operator. At night-time the control personnel will visually monitor the bunker as part of their responsibilities for operating the CHP plant.

3.4 Actions to limit self-heating

3.4.1 MRF

The incoming waste to the MRF will be stored for less than one day in the reception/holding bunker, so the action of self-heating is not considered to be a concern.

3.4.2 MBT Facility

The incoming waste to the MBT facility will be stored for less than 6 hours in the reception/holding bunker, so the action of self-heating is not considered to be a concern.

3.4.3 Anaerobic Digestion (AD) Plant

The incoming organic waste to be treated within the AD plant will be stored for less than one week and will have a high moisture content, so the action of self-heating is not considered to be a concern.

3.4.4 CHP

There will be thermal imaging cameras fixed around the perimeter of the bunker to provide the crane driver with a continuous thermal 'map' of the bunker. The crane driver is, therefore, 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 fire water cannons to extinguish any smouldering/burning waste.

3.4.5 Pulp Plant

Waste paper is not expected to 'self-heat'. Therefore, the action of self-heating is not considered to be a concern within the Pulp Plant.

3.4.6 Wastewater Treatment Plant (WWTP)

The sludge from the WWTP will be stored for less than one day, so the action of self-heating is not considered to be a concern.

3.5 Contingency

In the event that the IWMF is not able to receive waste due to an unplanned incident across the site, requiring a full shutdown of the whole facility, the waste contractors will be instructed to divert their waste to alternative waste treatment facilities.

If there was a significant fire within the facility which required all waste treatment processes to be shutdown, the Facility would not re-start 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.

The contingency arrangements for each individual waste treatment process is presented in the following sections.

3.5.1 MRF

If the MRF process was not available due to planned or unplanned maintenance of the MRF treatment process, waste will either be diverted to one of the other treatment processes within the IWMF - if it is permitted to receive and is able to process the waste (CHP Plant or MBT plant); or diverted away from the site to an alternative licensed waste management facility.

3.5.2 MBT Facility

If the MBT process was not available due to planned or unplanned maintenance of the MBT plant will either be diverted to one of the other treatment processes within the IWMF - if it is permitted to receive the waste (CHP Plant); or diverted away from the site to an alternative licensed waste management facility.

3.5.3 Anaerobic Digestion (AD) Plant

If the AD plant was not available due to planned or unplanned maintenance of the AD plant the waste be diverted away from the site to an alternative licensed waste management facility.

3.5.4 CHP

If the CHP plant was not available due to a period of extended unplanned maintenance waste can be back-loaded from the bunker for transfer off-site to an alternative licenced waste management facility.

For periods of planned maintenance, the waste levels within the CHP plant will be maintained to ensure that the quantities of waste within the bunker can be combusted within the CHP plant. It should be noted, that the maintenance shutdowns on the two incineration streams will be carried out sequentially with an overlap of approximately 2 to 4 days when both streams will be off-line to carry out maintenance on common systems. For the majority of the year, therefore, there will be at least one incineration stream in operation. The temperature of waste in the waste bunker will continue to be monitored by the thermal imaging system during plant shutdown. Therefore, the operator will be able to continue to mix waste to prevent excessive temperatures in the bunker, or use the fire-fighting cannons if necessary.

3.5.5 Pulp Plant

If the Pulp plant was not available due to planned or unplanned maintenance of the Pulp plant the RCP will be diverted away from the site to an alternative waste paper treatment facility. The annual planned outage is typically 4 to 7 days which will not adversely affect the storage of RCP or MDIP on the site.

3.5.6 Wastewater Treatment Plant (WWTP)

If the CHP plant is not available to receive the sludge, it will be possible to store the skips within the facility for 2 to 3 days. However, if the CHP plant is not available for an extended period, then it may be necessary to transfer the sludge off-site to an alternative waste treatment facility.

It should be noted, if the CHP plant is not available for any extended periods, neither the WWTP nor the Pulp Plant will operate; therefore there will not be any water produced by the Pulp Plant for treatment within the WWTP, and no sludge generated from the WWTP, i.e. the generation of sludge will be minimal at this time, and generated through the plant operating in a standby or recirculation mode.

3.6 Seasonality

The operation of the IWMF is not expected to follow any seasonal variations in the demand for the wastes to be treated within the facility or the residues produced or materials recovered.

3.7 Arson or vandalism

Security measures will prevent access by members of the public and thereby prevent the risk of arson attacks or vandalism. The IWMF will be bounded by security fencing and monitored using CCTV. A barrier will be present at the entrance and exit to site to control vehicular access. There will be gatehouse at the facility which will be manned 24-hours per day (including security guards during night-time hours). Only authorised visitors will able to enter the site.

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

In accordance with the planning permission, '*no waste or processed materials*' are permitted to be delivered to/or collected from the Rivenhall IWMF between the following hours:

- 07:00 and 18:30 hours Monday to Friday; and

- 07:00 and 13:00 hours on Saturdays, and not on Sundays, Public or Bank Holidays except for clearances from Household Waste Recycling Centres on Sundays and Bank and Public Holidays between 10:00 and 16:00 hours as required by the Waste Disposal Authority and previously approved in writing by the Waste Planning Authority.

An Emergency Preparedness procedure will be developed for the facility, prior to the commencement of operations as part of the detailed Environmental Management System, which will detail the response to a number of different emergency situations on site, including unauthorised personnel on site.

3.8 Plant and equipment

The proposed outline operating structure for the IWMF is presented in Annex 11. This names the proposed O&M Contractors for all of the main processes within the IWMF. Each process manager would report to the Technical & Operations Director of GFC.

The O&M contractors responsible for the day-to-day operation of the different waste treatment processes within the IWMF will be responsible for operating planned maintenance systems for each of the waste treatment processes. Operating and Maintenance Manuals will be developed and completed through commissioning of the different waste treatment processes. These manuals will set out detailed operating and maintenance instructions for all the plant and equipment on site that requires maintenance.

The O&M contractors will develop maintenance procedures and will adopt existing and subsequently develop further bespoke Work Instructions to cover all Plant and Equipment installed at the site. 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 Plant and Equipment on site.

The O&M contractors as part of the maintenance system will keep records of maintenance undertaken and any action taken following a problem.

3.9 Infrastructure and site inspections

Regular site inspections will be undertaken in all operational areas by the relevant O&M contractors as part of the normal operating procedures of the site and records of these checks will be retained on-site. Inspections will be carried out on a continuous basis, but as a minimum an inspection of the site and equipment will be carried out during every operating shift with maintenance work instructions raised for any items identified.

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

- The use of an enclosed fuel reception/unloading building with air extraction and filtration system.
- Mechanical ventilation of waste processing areas to prevent fugitive emissions from the building facade.
- Dust suppression system in the CHP bunker.
- A vacuum cleaning system within the CHP Plant to allow dust and fluff to be cleaned up.

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

There will be regular cleaning of dust and fluff using the installed vacuum cleaning system as required.

3.10 Electrical faults

The risk of electrical fault 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.

Electrical equipment located in areas that could result in a fire from hot surfaces will have built in thermistors to monitor the temperature of the equipment and will automatically cut out to prevent hot surfaces that could cause fires.

3.11 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 zoning drawings.

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

Naked sources of ignition will be controlled on site through a hot work management system, which will cover: *'Any temporary operation involving the introduction of open flames or production of heat or sparks including, but not limited to Brazing, Cutting, Grinding, Soldering & Welding'.*

This system will cover both staff and contractors on site. The system will also include requirements for the site to train and authorise 'hot work risk assessors' for the purposes of eliminating, reducing and managing the risks associated with hot work.

All visitors will be informed about the site fire safety precautions as part of the site induction procedure.

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. 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. Some potential sources of ignition are covered in more detail below.

3.12 Industrial heaters

It will be confirmed during detailed design of the different waste treatment processes whether industrial heaters will be permanently installed. 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 assessed and implemented to ensure their use is safe.

3.13 No smoking policy

The site will adopt a no smoking policy. 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.

3.14 Heat and spark prevention

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

3.15 Gas bottle and other flammable items

Gas cylinders will be stored within purpose-built dedicated storage facilities. 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 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 site inspection regime.

3.16 Fire watch

Operational staff will be briefed on the need for monitoring for the early signs of fires. The CHP waste reception and bunker and all main process areas have CCTV to allow remote monitoring from the control rooms on a continuous basis.

All waste delivered to the site will be supervised by operational staff for the different waste treatment processes, who will be responsible for the inspection and monitoring waste deliveries to the waste treatment processes.

3.17 Smoke/heat/flame detectors

An outline Fire Strategy (Refer to Appendix C) has been developed for the CHP Plant, Pulp Plant and WWTP and details the choice of fire detection system (Smoke/heat/flame and carbon dioxide detectors) in the different areas of site depending on the suitability of each detection type in each waste processing area. The Fire Strategy will be extended to include the AD, MRF and MBT and will be incorporated into this Fire Prevention Plan.

4 MANAGEMENT AND STORAGE OF WASTE

4.1 Incompatible/hot loads

Waste acceptance procedures will be developed for the facility. These will include considerations for incompatible wastes and hot loads.

Contracts with dedicated waste companies will be put in place for the delivery of all wastes to the IWMF. The Contracts will have detailed waste specifications for the wastes to be delivered to the facility. This will restrict the incompatible wastes to be delivered to the facility. Upon arrival at the gatehouse, the waste vehicles will be directed to the relevant waste treatment reception area.

Non-permitted wastes or incompatible waste will be identified by the delivery driver or by the operator through examination of the fuel prior to it being discharged and as it is being unloaded into the waste reception areas. Wastes which are rejected will be transferred to dedicated quarantine areas. Quarantine areas will be designed in accordance with the requirements of the EA's fire prevention plan guidance.

4.2 Waste acceptance - permitted waste

Waste acceptance procedures will be developed for the facility. This fire prevention plan will be updated following development of procedures. This will include arrangements for the management of wastes which are permitted to be treated within the facility.

4.3 Waste storage – separation distance

Following consultation with the Environment Agency, it is understood that the storage requirements relating to pile separation distances only applies to external storage of wastes. As detailed in section 4.6, all wastes which are delivered or stored within the site will be within buildings. Taking this into consideration, the pile separation distances will be adopted as good practice where feasible.

4.4 Fire walls

Fire walls will be installed between the different waste treatment processing areas. A drawing showing the location of the fire walls is included in Appendix A (Ref: 1552-010-R1), the fire walls are shown in red. Areas with a higher risk of fire will be protected in accordance with the requirements of NFPA 850. These areas are separated through fire-resistant construction (indoor) or by separation distance (outdoor):

- Pulp Plant;
- Material Deinking Pulp (MDIP) Despatch;
- Recovered Waste Paper (RCP) Storage;
- RCP feed to process area;
- Sludge Storage;
- RDF Reception Hall;
- CHP Waste Bunker;
- Boiler House;
- Turbine Hall;
- Ash Hall;
- Transformer Rooms;
- Switchgear and Battery Rooms;
- Electric Rooms;
- Oil tanks and flammable stores;
- Vehicle circulation areas;

- Stores;
- Workshops;
- Treatment Plant; and
- Offices and Welfare.

NFPA 850 recommends that fire-resistant barriers rated to 2 hours are installed to provide separation of these areas from each other and the rest of the building. Any doors, shutters or penetrations through these walls also have a fire-resistance rating of 2 hours of protection in accordance with NFPA 850. Where fire-resistant barriers are installed, the supporting structure will also be protected to at least the same rating as the barrier itself.

Firewalls will be installed with a 'freeboard' space at the top and sides to contain any fires within the individual waste treatment facilities.

Where firewalls are present, the separation distances stated in the Fire Prevention Plan guidance will be implemented in the design of the facility.

Where firewalls are not being used, there will be a separation distance of at least 6 meters between waste piles and the site perimeter, any buildings, or other combustible or flammable materials.

The design and compartmentalisation of the IWMF's site operations means that between processing areas full height fire walls will be installed.

4.5 Quarantine areas for unacceptable waste

Unacceptable waste is waste which does not meet the requirements set out in the various fuel supply agreements. The location of quarantine areas within the waste treatment areas are subject to detailed design, however it can be confirmed that the quarantine areas will be have a suitable clearance around the perimeter.

Following completion of detailed design of the waste treatment processes 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.

As a minimum, it is expected that, in addition to the quarantine area provided for the CHP Plant, as described in Section 3.1.4.2 above, there will be at least one other quarantine area established in the MBT building that would be suitable to temporarily store any unacceptable waste that is detected prior to being tipped into the MBT vessels or MRF hopper or the AD process. These will be identified by the wheeled loader driver or the AD operative and removed using the site backhoe and placed into the quarantine bunker.

The MBT building quarantine area will be provided near to (but with minimum 6 metres spacing) the day holding bunkers at the level of the tipping hall. It will have a concrete floor and push-walls to allow the waste to be collected and loaded into appropriate road vehicles and removed from the site.

Fire detection and protection measures (e.g. smoke / flame detectors, hose reel, sprinklers, or water cannon) will be installed in this area, the final design being 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, however it can be confirmed that all incoming wastes and residues following processing will be stored within buildings.

As part of the detailed design of the facility, the fire system design for the facility 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. 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 2 hours.

4.7 Active fire fighting

The site has been designed to ensure that active fire-fighting measures are installed. The fire-fighting system on site has been subject to a detailed design and further details can be seen in the Fire Strategy as provided in Appendix C. The active fire-fighting measures at the site will ensure that resources are available at all times to fight a fire. The main features of the fire system are described in the following sections.

4.7.1 Fire prevention standards

The IWMF will be design and operated in accordance with the following fire prevention and detection standards:

- 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 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 9999 - Code of Practice for Fire Safety in the design, management and use of Buildings; and
- Building Regulations.

4.7.2 Fire detection systems

Procedures will be developed to detect a fire in its early stages to enable the impact of the fire to be reduced. There will be a fire detection and alarm system which will cover the whole IWMF.

The fire detection systems will include the following, where appropriate:

(1) smoke and heat detectors including temperature probes;
(2) CCTV visual flame detection systems; and
(3) spark, infrared and ultraviolet detection.

The fire alarm systems will include the following:

(1) local detectors/transducers and call points;
(2) sounders/high intensity flashing beacons;
(3) cabling and containment systems;
(4) local control and indication panels; and
(5) remote control and indication panel (incorporating integral printers) will be in the control room.

It is proposed that the details of the fire detection and alarm systems for each process area are confirmed prior to the commencement of commissioning.

Automatic fire detection and alarm systems will be designed and maintained by a suitably qualified, experienced and registered fire protection engineer.

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.

It will be the responsibility of the shift team leaders to monitor the fire alarms for the IWMF.

4.7.3 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 across the IWMF. The fire suppression systems will include the following:

(1) Automatic sprinkler/water deluge systems - Waste reception and storage areas, CHP Plant waste feed system, step-up transformer area, 33 kV series circuit reactor, fire pump container and the emergency diesel generator.

(2) Automatic foam systems – turbine generator and lube oil systems, CHP auxiliary burners.

(3) Inert gas suppression – electrical rooms, CEMS container.

(4) CO_2 gas suppression system – For the bag filters in the flue gas treatment system.

The automatic fire suppression systems will be designed and maintained by a suitably qualified, experienced and registered fire protection engineer (Tyco). All automated fire suppression equipment will be covered by an appropriate UKAS-accredited 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 have been produced. Further details can be found in the Fire Strategy in C.

4.7.4 Provision of firewater

The firewater provision for the facility has been designed in accordance with the requirements of ACE and NFPA850, which require that fire-fighting systems should be based on providing a two hour supply for the following items:

(1) Either of items below, whichever is larger:

- The largest fixed fire suppression system demand; and
- Any fixed fire suppression system demands that could reasonably be expected to operate simultaneously during a single event; and

(2) The hose stream demand of not less than 1,890 litres per minute.

All waste treatment process areas will have two hour fire walls, as detailed in section 4.4. Therefore, it is assumed that any fire within the facility will be contained in the individual waste treatment process areas.

Applying the requirements of ACE guidance, titled '*ACE Technical Risks - Engineering Information Bulletin Guidance Document*', the waste treatment process which will have the greatest firewater demand will be the Pulp Plant.

Taking the design of the Pulp Plant into consideration, the fire protection measures could be required to operate simultaneously for the following areas:

- MDIP Storage and Vehicle Circulation Area;
- Pulp Processing Plant;
- RCP Storage & Vehicle Circulation;
- Workshop;
- Stores;

- Sludge Process Area;
- Sludge Bunker Area; and
- Offices.

The following table, applying the requirements of the ACE guidance presents the firewater requirements for the Pulp Plant:

Table 4-1 – Firewater Demand for the Pulp Plant

Process Area	ACE Firewater flow rate (mm/min)	Floor Area (m^2)	Fire Fighting Provision (m^3/hr)	Firewater requirements for two hours (m^3)
MDIP Storage	14.3	3600	120	6177.6
Process area for de-inking and drying	10.2	5350	120	6548.4
RCP Storage	14.3	602	120	1033.0
Workshop	10.2	300	120	367.2
Store	10.2	400	120	489.6
Sludge process area	10.2	400	120	489.6
Sludge bunker	10.2	900	120	1101.6
Offices	10.2	50	120	61.2
Total Firewater Demand (m^3) for 2 hrs				**16,300**

The recommendations of NFPA850 include that a minimum of 2 hours of supply should be available and that any water supply should be replenishable within an 8-hour period. Taking into consideration the requirements for firewater supply for the Pulp Plant, the supply of firewater is significantly greater than the two hours required to satisfy the requirements of ACE.

Furthermore, it is acknowledged that the Fire Prevention Plan guidance requires a provision of three hour supply of water for fire fighting. Taking this into consideration, the firewater provision for the Pulp Plant would be approximately 24,450m^3 of water.

Applying the requirements of the Fire Prevention Plan guidance, that a "worst case scenario would be your largest waste pile catching fire", this would apply to the RDF bunker. The EA guidance states that "*a water supply of at least 2,000 litres a minute for a minimum of 3 hours for a 300 cubic metre pile of combustible material*". As stated in 3.1.4.1, the capacity of the bunker is approximately 29,000m^3. Therefore, applying the requirement of the EA guidance, the requirements for the provision of firewater is 34,800 m^3 of water for fire fighting.

Firewater will be provided from the Upper Lagoon. The capacity of the Upper Lagoon will be maintained at a minimum of approximately 25,000 m^3 (by automatically pumping top-up water as and when required from New Field Lagoon into Upper Lagoon). This system will be maintained by topping up New Field Lagoon by pumping water from the River Blackwater, in accordance with the EA abstraction licence (Environment Agency Licence Serial No: AN/037/0031/001/R01). It should be noted that whilst Upper Lagoon has a minimum storage capacity of 25,000 m^3, New Field Lagoon has an additional storage capacity of 250,000m^3 (minimum) Therefore, there is a total available capacity of 275,000m^3 (minimum) of water at all times available for firefighting. This is far in excess of the requirements of the Fire Prevention Plan guidance.

4.7.5 Bunker cannons

Thermal Cameras will be installed over the CHP waste reception bunkers to detect any hot spots in the waste. If the temperature of any hot spot exceeds 90ºC water cannons installed around the bunker will automatically operate to prevent the potential for fire within the bunker. The water cannons within the CHP bunker will operate automatically, although can also be operated remotely from the control room.

The 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.

Throughout the detailed design of the CHP Plant waste bunker, the number and position of the fire monitors and cannons will be established, alongside the automatic and remote control systems. Continuous fire monitor (or hot spot) screens will be installed within the main control room.

4.7.6 Fire hose reel system and wet riser system

A pumped fire hose reel system will be installed at the facility. The fire hose reel system will be designed to ensure that all internal areas and rooms are within the range of a fire hose. Following detailed design of the facility a plan identifying the location of the fire hose reels will be developed and presented in Appendix A.

4.7.7 Fire hydrant and mains

Standard fire hydrants of the underground type will be provided within a concrete pit, housing a sluice gate valve and handle key for opening and shutting off water supply to the fire hydrant. Appropriate signage shall be supplied for the fire hydrant system. The fire hydrants will be designed in accordance with the requirements of the Building Regulations and spaced at no greater than 90 metres apart, approximately 12 metres from the building.

The standard hydrant of the underground type provided shall be completed with a concrete pit housing a sluice gate valve and handle key for opening and shutting off water supply to the fire hydrant. Appropriate signage shall be supplied for the fire hydrant system. Hydrants shall be spaced at no greater than 90 metres. The location of fire hydrants is subject to detailed design. Following detailed design of the facility a plan identifying the location of the fire hose reels and hydrants will be confirmed. A drawing showing the indicative locations of the fire hydrants is presented in Appendix A.

Fire hydrants and mains will be designed in accordance with the requirements of the Building Regulations.

4.7.8 Fire extinguishers

Fire extinguishers will be strategically located throughout the IWMF. The location of the fire extinguishers will be subject to implementation of the recommendations of the Fire Officer for the facility. Following detailed design of the facility a plan identifying the location of the fire extinguishers will be developed and presented in Appendix A.

4.7.9 Containment of fire water

The site drainage system has been designed to contain all discharged firewater onsite, in the Upper Lagoon and within the site drainage systems. The installation has been designed for zero liquid discharges, and there will be no discharge of contaminated waters from fire-fighting from the Upper Lagoon.

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

Upper Lagoon will have a storage capacity of approximately 25,000 m^3 with a water level 32mAOD. It should be noted that above the water level of 32mAOD Upper Lagoon has an additional 20,481 m^3 of storm water storage capacity.

Upper Lagoon will be constructed below surrounding ground levels and within areas of previous quarry working. The side slopes of Upper Lagoon will be constructed largely within in-situ London Clay (Permeability $<10^{-10}$ m/s) and backfilled Boulder Clay. The slopes will be shaped to a maximum gradient of 1V:3H. Upper Lagoon will be constructed wholly within in-situ London Clay, constructed at a gradient of 1V:3H.

Furthermore, it should be noted that the facility will be constructed within the footprint of a former quarry, below surrounding ground level.

4.7.10 Fire exercises

Regular fire exercises will be carried out at the site. These will consist of routine drills, practice evacuations and training of site personnel. During periods of planned (or unplanned) maintenance and shutdown, full fire and evacuation procedures will be tested.

4.7.11 Contingency during the incident

Emergency procedures for the facility will be developed by the O&M contractors during the commissioning phase of waste treatment processes. The Emergency Procedures will include, but not be limited to, the following considerations:

- Fire identification and reporting procedures;
- An evacuation plan;
- Emergency communication procedures;
- Responding to chemical spillages;
- Containment of firewater; and
- Requirements for diverting incoming waste.

All staff and contractors will be trained in the emergency response procedures for the relevant waste treatment process as well as the site-wide emergency procedures for the facility. 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.

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.

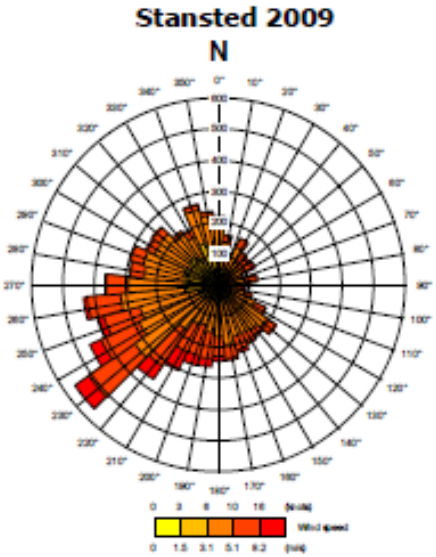
A copy of the emergency procedures, will be maintained at the gate house, which will also include the fire system mimic panel to allow co-ordination of the emergency response to a fire in the event that the main offices are unavailable.

Dependent on the nature and scale of the fire, it may be necessary to notify local residents and businesses of the fire. 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 agreed.

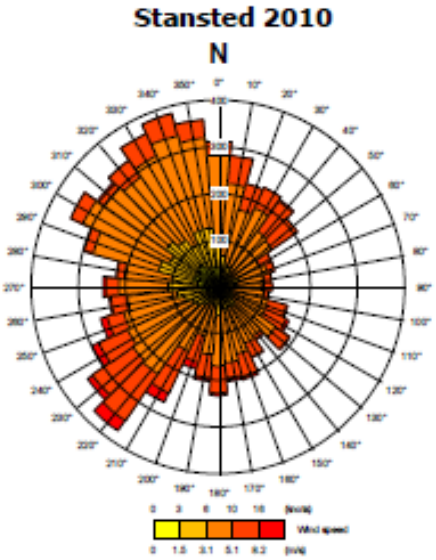
Appendix A – Plans and Drawings

Appendix B - Wind Rose

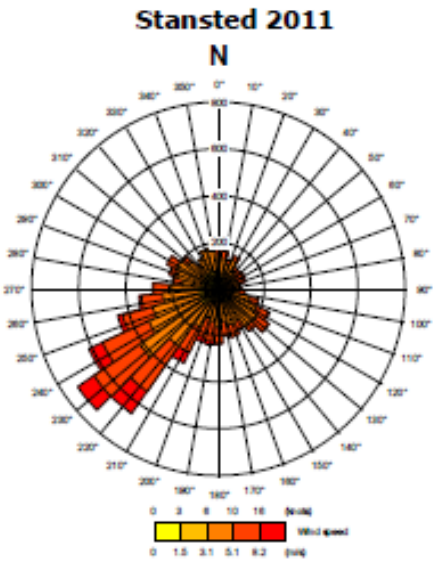
Stansted 2009



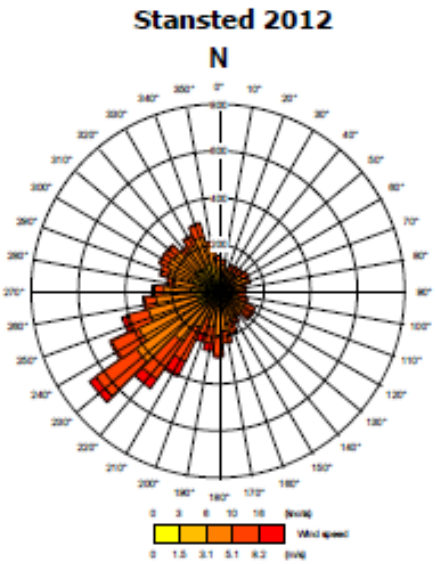
Stansted 2010



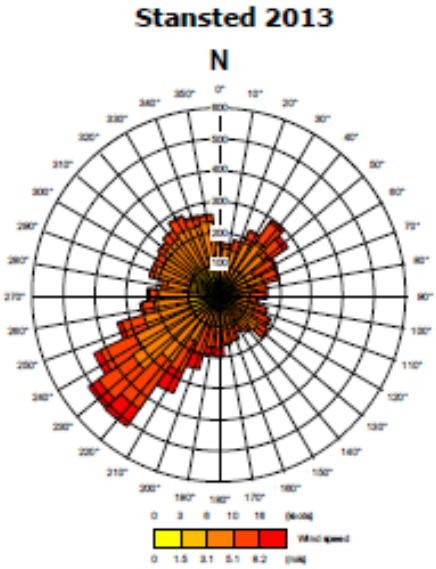
Stansted 2011



Stansted 2012



Stansted 2013



Appendix C – Fire Strategy

FICHTNER

Consulting Engineers Limited

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