

**N&P Crayford Materials Recycling Facility Ltd.**

## **Fire Prevention Plan (FPP)**

**N&P Crayford MRF Ltd.**

**Century Wharf**

**Crayford Creek**

**Crayford**

**Kent**

**DA1 4QG**

**Environmental Permit Reference:**

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## 1. INTRODUCTION

### 1.1. Report Context

The operator N+P Crayford MRF Ltd. (previously owned by Viridor Waste Management Ltd.) has prepared this Fire Prevention Plan (FPP) for Crayford Materials Recycling Facility (MRF) under the Environmental Permitting (England and Wales) Regulations 2016.

This report follows the Environment Agency (EA) guidance for FPPs<sup>1</sup> and details the required mitigation and management methods to prevent a fire of combustible materials stored on site.

The information contained within this FPP aim to meet the 3 main objectives of the EA FPP Guidance:

- 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

Under current fire safety legislation<sup>2</sup>, a responsible person must carry out, or appoint a competent person to carry out, a suitable and sufficient fire risk assessment of the risks of fire to employees and others who may be affected by the site. A Fire Risk Assessment was prepared by International Fire Consultants Limited in August 2017. The assessment details potential ignition sources, mitigation and management measures and is kept on site and is available for inspection at any time.

<sup>1</sup> *Fire Prevention Plans, November 2016.*

<sup>2</sup> *Regulatory Reform (Fire Safety) Order 2005*

### 1.2. Programme of Improvements to Site

The Operator has taken a proactive approach to fire prevention and management at the Crayford site and have developed a programme of improvements to meet the 3 main objectives of the EA FPP Guidance. The Operator employed the services of International Fire Consultants Ltd in order to conduct a Fire Risk Assessment and to undertake a review of the fire related technical content of the FPP produced for the site. This took place on 1<sup>st</sup> and 2<sup>nd</sup> August 2017. Following a review of the findings, The operator hosted a meeting with Kerrie Roach and Stuart Powles from the EA that outlined the FPP proposals for the site.

This FPP is based on current operations on site. Scheduled improvements to the site are included within this FPP with a timescale for implementation.

### 1.3. Environmental Permit

The MRF is currently operated under an Environmental Permit (Ref: EPR/KB3806FD) for version numbers, please refer to the sites Electronic Document Management System (EDMS).

### 1.4. Site Location

#### 1.4.1. Surrounding Land Use

The site is located within the London Borough of Bexley, to the north of Crayford and Dartford town centres and south of the River Thames at National Grid Reference: TQ 572 757. The surrounding land within a 1km radius of the site is identified on Drawing FPP1 and in Table 1-1 below.

Table 1-1 Surrounding Land Uses

| Boundary | Description  |
|----------|--|
| North    | Predominately areas of open ground with a single residential property, with the residential area of Slade Green further northwards. A railway line lies to the north-west.                   |
| East     | Predominately areas of open ground which include the Rivers Cray and Darent. The A206 lies beyond, which borders an area of commercial and industrial premises.                              |
| South    | Industrial and commercial premises and a section of the River Cray. Beyond this lies the A206, Crayford Marshes and a residential area within Crayford.                                      |
| West     | The railway line borders the site, with areas of commercial and industrial premises and the A206 beyond. An area of open ground lies beyond a residential area within Crayford and a school. |

The immediate surrounding land use within a 1km radius of the site is described in further detail below.

## 1.5. Residential Properties

The closest residential properties are located along Iron Mill Lane, approximately 330m south-west in Crayford. A single residential property, Howbury Grange, is located approximately 380m north of the site.

### 1.5.1. Industrial & Commercial Premises

The MRF is located within Century Wharf Industrial Estate and is adjacent to other industrial and commercial premises on the northern and southern boundaries.

The FedEx UK Station is located approximately 40m north-west of the site boundary beyond the railway. The engineering firm, Stead & Wilkins, is located 50m south-west.

### 1.5.2. Areas of Open Land

A large area of open ground lies adjacent to the northern and eastern boundaries of the site. The area is a disused former quarry that has been non-operational since 2012. Beyond the railway to the south-west of the site lies a further area of open ground located approximately 20m from the site's boundary.

### 1.5.3. Open Water and Marshes

The closest surface water feature is the River Cray which lies approximately 30m south of the site. The river flows north-east into the River Darent which is located 700m to the east.

Crayford Marshes cover a large area to the south and east of the site and lie 150m from the boundary at their closest point.

### 1.5.4. Educational Premises

The nearest educational premises is Haberdashers' Aske's Crayford Academy, located 600m south-west. The Holy Trinity Church of England Primary School lies approximately 750m south-east of the site's boundary.

### 1.5.5. Recreational Premises

There are several recreational premises within 1km of the site. The closest of these is a recreation ground approximately 320m south-west of the boundary.

### 1.5.6. Major Roads and Transport Links

The A206 lies approximately 300m south-west of the site. The wider local road network is illustrated on Drawing FPPI.

The North Kent Railway Line lies adjacent to the western boundary of the site. The Slade

Green Railway Depot, accessible from the railway line, is located approximately 10m north west of the site.

### 1.5.7. Allotments

There are several allotments within 1km of the site. The closest of these, Crayford Way Allotment, lies approximately 570m south-west of the site's boundary.

## 1.6. Ecology

### 1.6.1. European/International Sites

Searches on the Multi-Agency Geographic Information for the Countryside (MAGIC)<sup>3</sup> website confirm that the site does not encompass any statutory designated habitats or non-statutory land designations for ecological protection.

<sup>3</sup> Multi Agency Geographic Information for the Countryside Map (MAGIC)  
www.magic.gov.uk accessed February 2018

### 1.6.2. Cultural Heritage

Searches on the MAGIC website confirms that there is one Scheduled Monument within 1km of the site's boundary. The Howbury Moated Site lies approximately 830m north of the site.

There are two Grade II Listed Buildings within a 1km radius of the site:

- Coal Duty Boundary Marker: 530m south-east; and
- Large Barn at Howbury Farm: 880m north.

## 1.7. Receptors

Table 1-2 and Drawing FPP1 show the locations of receptors that are potentially sensitive and could reasonably be affected by the activities occurring on site.

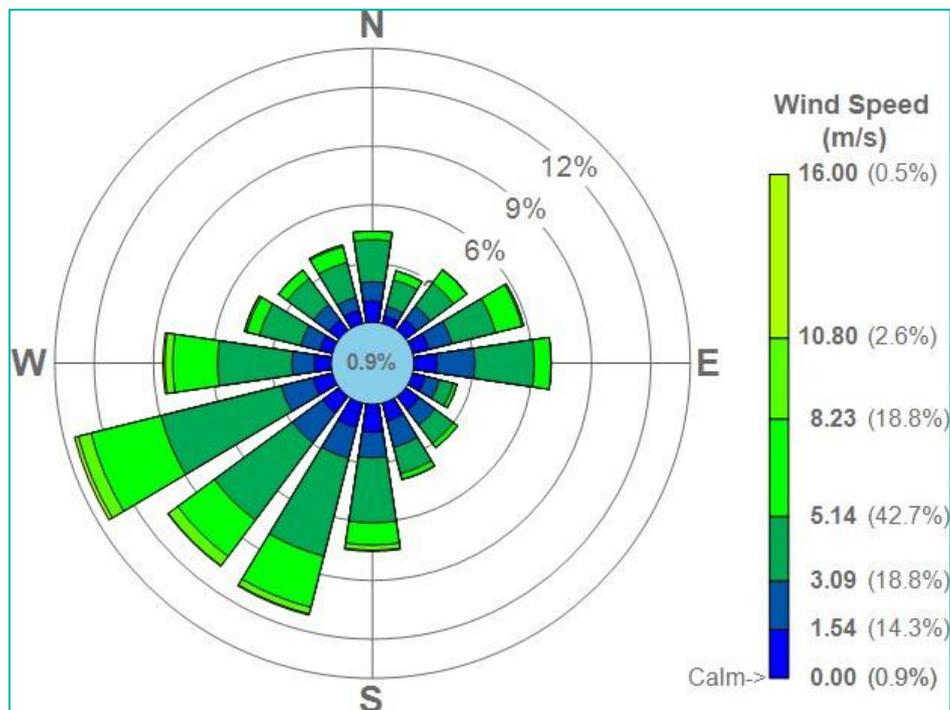
Table 1-2 Identified Receptors

| Receptor Name  | Receptor Type         | Direction from Site | Approximate Distance from Site Boundary (m) |
|--|-----------------------|---------------------|---|
| Identified receptors within 1km of the Environmental Permit Boundary as shown on Drawing FPP1 Site Setting |                       |                     |   |
| Century Wharf Industrial Estate  | Commercial/Industrial | North & South       | Adjacent                                    |
| Area of open land  | Open Ground           | North & East        | Adjacent                                    |
| North Kent Railway Line  | Railway               | West                | Adjacent                                    |
| Slade Green Railway Depot  | Railway Depot         | North west          | 10  |
| River Cray   | Open Water            | South               | 30  |
| FedEx UK Station   | Commercial/Industrial | North west          | 40  |
| Stead & Wilkins  | Commercial/Industrial | South-west          | 50  |
| Crayford Marshes   | Marsh Land            | South & East        | 150   |
| A206   | Major Road            | South-west          | 300   |
| Recreation Ground  | Recreational Area     | South-west          | 320   |
| Iron Mill Lane   | Residential           | South-west          | 330   |
| Howbury Grange   | Residential           | North               | 380   |
| Coal Duty Boundary Marker  | Listed Building       | South-east          | 530   |
| Crayford Way   | Allotment             | South-west          | 570   |
| Haberdashers' Aske's Crayford Academy  | Educational Premises  | South-west          | 600   |
| River Darent   | Open Water            | East                | 700   |
| Holy Trinity Church of England Primary School  | Educational Premises  | South-east          | 750   |
| Howbury Moated Site  | Scheduled Monument    | North               | 830   |
| Large Barn at Howbury Farm   | Listed Building       | North               | 880   |

### 1.8. Windrose

A windrose from Gravesend-Broadness for the period of 2016 providing the frequency of wind speed and direction is presented in Figure 1 below. The windrose shows that winds from the south-westerly quarter are more frequent with winds from the north and south-east occurring less often. Receptors highlighted in bold in Table 1-2 above are likely to be affected in the event of a fire as they are in the path of the prevailing wind (from the south-west).

Figure 1-1 Gravesend-Broadness Windrose, 2016



### 1.9. Site Type

The site is permitted as a MRF and accepts a wide range of different waste types. The site accepts up to 350,000 tonnes per annum of predominantly non-hazardous waste for treatment and/or storage. The maximum storage capacity for mixed waste types is detailed in Table 1.1 of the Environmental Permit which also allows for a maximum storage capacity of 30,000 tonnes of non-hazardous mixed waste.

The site is permitted to physically sort or separate waste into different components.

The site layout, including waste storage locations have been identified on Drawing CFD-MRF2000.

### 1.10. Waste Types

The Environmental Permit allows for the following types of waste to be accepted on site which are defined as 'combustible materials' in the FPP Guidance<sup>1</sup>:

- Paper and cardboard;
- Plastics;
- Rags and Textiles;
- Wood;
- General Waste (Mixed); and
- Scrap Metals.

The full list of wastes permitted for acceptance to the site is included within the

Environmental Permit referenced in Section 1.3 of this FPP. The site does not possess a specific European Waste Code (EWC) list of wastes.

### 1.11. Site Access

The site is accessed via the eastbound carriageway of the A206 (Thames Road).

The closest Fire Station is Bexley Fire Station to the west of the site. Using Google directions and mapping<sup>4</sup>, the drive time is approximately 9 minutes and it is approximately 2.7 miles between the site and the Fire Station.

The access road from the A206 is designed to accommodate large haulage vehicles. As such, the Fire Service will be able to reach the site easily.

The site is operational 24/7 and is therefore manned at all times. In the event of a fire, the Fire Service would be able to gain immediate access.

<sup>4</sup> Google Maps, Accessed in February 2018

### 1.12. Environmental Management System (EMS)

The Operator has an extensive ISO 14001 certified Environmental Management System (EMS) that covers all aspects of the MRF operation. The EMS is managed through an online system and the contents page is shown below:

- Context
- Leadership
- Planning
- Support
- Operation
- Performance Evaluation
- Improvement

Within the operation section of the EMS the Operations, Development and Management Plan (ODMP) is included, which provides the management framework for the permitted activities. Relevant sections from the ODMP are referenced throughout this FPP.

## 2. FIRE PREVENTION MEASURES

### 2.1. The following measures are implemented on site to minimise the causes of fires.

#### 2.1.1. Fire Detection and Alarm System

The site currently benefits from point smoke detectors distributed around all buildings on site. The fire alarm system can be triggered manually by site operatives via any of the call points located around the site. Site operatives are trained in the detection of fires and therefore provide a secondary fire detection measure as the site is operational 24/7. The smoke alarms are strategically located around the site as shown within the smoke alarms drawing attached within the drawing section of this report.

When triggered, the audible alarm will sound, and the site is immediately evacuated. Site operatives trained in the management of fire incidents will assess the cause of the alarm and implement the appropriate actions.

### 2.1.2. Helios Detection System

Helios Systems Ltd has installed a fire detection and alarm system. The system utilises PYROsmart® panoramic early detection thermal imaging cameras, which constantly scan the area for temperature irregularities in real time. The system is designed to provide full coverage of RSG1/Input Hall and RSG2 including the comingled stockpiles. The Helios system went through a vigorous commissioning period. This involved the system learning the sites normal operating temperatures and setting bespoke warning temperatures.

The initial alert trigger is set at 150°C, the control panel will indicate that there is a heat spot. A secondary alarm system where the Helios system is primed for use is triggered at 300°C. The site is operational 24/7, therefore suitably trained site operatives will investigate the hotspot immediately and determine the best course of action. If for any reason the initial alarm is ignored, and/or if there is instantaneous ignition such as a cylinder or battery ignites immediately with a temp higher than 400° C at 10cm size, the suppression system will automatically initiate following a 30 second warning via visual and audible alarms. The suppression system is discussed further in Section 3.1.

There are also 2 joysticks that allow the fire brigade to remotely control the water cannons.

The full system details are documented in the Helios Outline Specification.

### 2.2. Waste acceptance and Rejection

The site follows strict waste acceptance and rejection procedures ensuring that no non-conforming waste is accepted on site. Section 6 of the ODMP, Waste Acceptance and Control System, details the full procedures.

### 2.3. Inspection and Amenity Monitoring

The site is continually manned and site operatives are always asked to remain vigilant and look out for signs of fire. Staff are trained in how to identify fires and fire hazards on site. Staff also receive training on the use and selection of fire extinguishers, site evacuation and shut down procedures, fire safety and all relevant emergency procedures.

All skips, stockpiles and bays that are not captured using the PYROsmart® panoramic early detection thermal imaging cameras, are visually inspected with the use of hand-held thermal imaging cameras every 4 hours. If the thermal imaging identifies any areas that are notably hotter than the surrounding materiel this is considered a hot spot. Contingency actions to monitor and separate the hot waste take effect. Thermal imaging records and photographs are stored on N+Ps Electronic Document Management System (EDMS). The risk of a potential ignition source is greater at the start of the process than at the end of the process therefore the Pyrosmart® technology is focused at the infeed points. This is deemed necessary as the Helios monitoring system does not monitor all stock piles on site. The high-risk areas where an ignition source is greatest namely before the waste has been through the process. The risk of an ignition following processing is greatly reduced and as such the Helios remote monitoring cameras have not been installed to monitor stockpiles that have been through the MRF process.

Moisture readings of the bales are undertaken as per the requirements of the quality check plan. This is further supplemented by thermographic monitoring undertaken with the use of hand-held thermal imaging cameras.

The site undergoes regular cleaning in line with the Planned Preventative Maintenance (PPM) schedule using mobile plant and wash down hoses/jet wash to prevent a build-up of debris and dust on site. The cleaning of all fixed plant is included within the PPM. The cleaning of all mobile plant is controlled by the Operations and Maintenance (O&M) contracts in place with the relevant suppliers or manufacturers.

Daily and weekly monitoring is recorded in line with the requirements of the Environmental Permit and detailed in the EMS.

## 2.4. Waste Storage and Quantities

Waste storage on site takes place on impermeable concrete surfacing as illustrated on Drawing CFD-MRF2000 within the following areas:

- RSG1/Input Hall;
- RSG2;
- Container storage;
- Indoor and outdoor bale storage; and
- New SRF Bale Storage.

Each of the storage areas on site are discussed further below and should be read in conjunction with Drawing CFD-MRF2000.

### 2.4.1. RSG1/Input Hall

For the purpose of this FPP, RSG1 and the input hall are combined into a single space as there is no inner compartment wall between the two spaces. The building is in the north eastern corner of the site. Although the input hall is open internally to RSG1, it is covered separately by the HELIOS fire detection and suppression systems as discussed further in Sections 2.1.1 and 3.1.1. The building sits on a 1m high plinth on top of the paving alongside 4m high legioblock walls for a total of 5m these are topped with a steel clad frame that reaches 9.1m at the front and 8.6m at the back.

Waste storage volumes are shown in Table 2-1 below.

Table 2-1 RSG1/Input Hall: Waste Types, Storage Time and Dimensions

| Waste Type and Drawing CFD-MRF2000 Reference | Max Storage Time (days) | Length (m) | Width (m) | Height (m) | Max Volume (m <sup>3</sup> ) |
|--|-------------------------|------------|-----------|------------|------------------------------|
| Loose Comingled Recycling                    | 7                       | 51         | 19.2      | 5          | 3813                         |

### 2.4.2. RSG2

RSG2 is located in the south-eastern portion of the site. The building consists of 4 equal sized bays with concrete Legioblock walls at 5m high topped with a steel clad frame that reaches 10m in total. During normal operations 3 of the bays are used for the storage of loose comingled recycling and 1 is split via a segregation wall for the storage of glass and sand (non-combustible). During peak operations bay 4 is used to store co-mingled and as such the decision to have coverage for HELIOS to cover all 4 bays was taken and installed.

Waste storage volumes for the 3 bays of loose comingled recycling are shown in Table 2-2 below.

Table 2-2 RSG2: Waste Types, Storage Time and Dimensions

| Waste Type and Drawing CFD-MRF2000 Reference | Max Storage Time (days) | Length (m) | Width (m) | Height (m) | Volume (m <sup>3</sup> ) | Tonnages |
|--|-------------------------|------------|-----------|------------|--------------------------|----------|
| Loose Comingled Recycling (R1)               | 7                       | 27.1       | 14.9      | 5          | 1825                     | 550      |
| Loose Comingled Recycling (R2)               | 7                       | 27.1       | 14.9      | 5          | 1825                     | 550      |
| Loose Comingled Recycling (R3)               | 7                       | 27.1       | 14.9      | 5          | 1825                     | 550      |
| Residual (R4)                                | 7                       | 27.1       | 14.9      | 5          | 1825                     | 821      |

### 2.4.3. Container Storage

Containers/skips storing sorted waste material are stored on the western side of the main

MRF building in the northwest of the site. The containers hold material that has been processed through the MRF as shown in Table 2-3 below.

Table 2-3 Container: Waste Types, Storage Time and Dimensions

| Waste Type and Drawing<br>CFD-MRF2000 Reference | Max Storage Time<br>(Days) | Length<br>(m) | Width<br>(m) | Height<br>(m) | Volume<br>(m <sup>3</sup> ) |
|---|----------------------------|---------------|--------------|---------------|-----------------------------|
| Metal   | 7                          | 6.1           | 2.4          | 2.6           | 36.06                       |

#### 2.4.4. Bale Storage

Bales of processed material are currently stored inside within the bale storage shed and outdoors in the areas illustrated on Drawing CFD-MRF22000. Under normal operating conditions, bale storage time is minimised to 7 days.

#### Bale Storage Scheduled Improvement

N+P have prepared and completed detailed plans to the layout of the bale storage area. SRF bales will be stored in bays 6 and 7. Drawing CFD-MRF22000 illustrates how the bale storage areas are designed and constructed.

The bale storage quantities are illustrated on Drawing CFD-MRF72. N+P will ensure that the bales will be stored with the following fire prevention measures in place:

- Bale storage areas will be segregated by 80cm thick concrete Legioblock walls at 4m in height – the fire resistance of these walls is outlined in Section 2.6;
- Bales will be stored a maximum of 3 high giving a maximum overall height of 3.4m (3 x 1.14) Bales storage areas will maintain a separation distance of at least 6m as illustrated on Drawing CFD-MRF22000
- Bale storage limits and road markings will be marked out in thermoplastic; and
- All Legioblock wall joints segregating adjoining waste streams will be sealed with intumescent sealant on one face.

#### 2.4.5. Non-Waste Materials

The site stores non-waste materials that are not covered by the FPP Guidance but are considered in this FPP due to the potential for them to cause or increase the impact of a fire on the site. The materials and their storage arrangements are shown in Table 2-4 below and illustrated on Drawing CFD-MRF2000.

Table 2-4 Non-Waste Materials: Storage Arrangements

| Material Type & Drawing CFD-MRF2000 Reference | Storage Location  | Storage Arrangement   |
|---|---|---|
| Gas Bottles Propane, Oxygen & Argon)          | Southern side of the bale storage building with a minimum of 6m to any combustible waste. Western side of the workshop, outside of the EP boundary with a minimum of 6m to any combustible waste. | Locked gas cylinder cage  |
| Fuel (10,000 Litre Diesel)                    | Southern side of the bale storage building with a minimum of 6m to any combustible waste.   | Tanks surrounded by a leakage containment bund capable of containing at least 110% of the volume of the largest tank within the bund. |
|   | South-eastern corner of the site beyond the glass crushing plant. Combustible wastes are stored a minimum of 6m away from the fuel storage.   | Tanks surrounded by a leakage containment bund capable of containing at least 110% of the volume of the largest tank within the bund. |
| Oils  | Southern side of the bale storage building with a minimum of 6m to any combustible waste.   | Tanks surrounded by a leakage containment bund capable of containing at least 110% of the volume of the largest tank within the bund. |

## 2.5. Management of Hotspots

### 2.5.1. Stockpiles

As detailed in this FPP, suitably qualified site operatives carry out daily checks of the site to identify the risks and inspect the storage bays, stockpiles, bale storage areas and skips.

In order to reduce the likelihood of hotspot development within waste storage areas, stockpiles are sufficiently rotated, and waste storage time is minimised. Under normal operating conditions, all waste received on site is processed and removed within 7 days. Additional shifts are scheduled for the weekend if waste received during the week remains on site. This ensures that the ‘first in, first out’ principle is adhered to as all waste is turned over and removed from site within 7 days.

During normal operation conditions, wastes are not driven over by on site plant to avoid compaction, which may contribute to a build-up of heat within the pile.

Stockpiles are visually inspected throughout the day and the findings logged within the site diary at the start and end of each shift as a minimum.

To summarise, stockpiles are managed as follows to minimise self-combustion:

- Stockpile storage times are minimised;
- Risk factors (e.g. mixing of materials and heat generated during treatment) are reduced;
- Stockpile sizes are minimised;
- Stored materials are rotated, on a first in and first out basis; and
- Hotspots are detected and controlled within stockpiles by;
- Routinely monitoring stockpiles with the use of hand-held thermal imaging cameras;
- Routinely turning stockpiles; and
- Scheduled Improvements to Stockpile Hotspot Management

### 2.5.2. Bales

As detailed in Section 2.3, moisture readings of the bales are undertaken as per the requirements of the quality check plan. This is further supplemented by thermographic monitoring undertaken with the use of hand-held thermal imaging cameras.

As indicated in Section 2.4.6, bale storage time is minimised to 7 days under normal operating conditions. Due to these short storage times, the potential for hotspots within the baled material is low as the material has a low degree of contamination.

## 2.6. Bay Wall Construction

Walls used for waste segregation on site are constructed from 80cm thick concrete Legioblocks. The fire resistance rating of the concrete wall has been estimated using the ‘Standard Method for Determining Fire Resistance of Concrete and Masonry Construction Assemblies’ (American Concrete Institute, ACI Standard 216.1- 97). Table 2.1 of the ACI Standard is reproduced (converted to SI units) as Table 2-5 below.

Table 2-5<sup>5</sup> Fire Resistance of Singular Layer Concrete Walls, Floors and Roofs

| Concrete Aggregate Type | Minimum equivalent thickness for fire resistance rating (cm) |          |        |        |        |
|-------------------------|--|----------|--------|--------|--------|
|                         | 1-hour   | 1.5-hour | 2-hour | 3-hour | 4-hour |
| Siliceous               | 8.9  | 10.9     | 12.7   | 15.7   | 17.8   |
| Carbonate               | 8.1  | 10.2     | 11.7   | 14.5   | 16.8   |
| Semi-lightweight        | 6.9  | 8.4      | 9.7    | 11.7   | 13.7   |
| Lightweight             | 6.4  | 7.9      | 9.1    | 11.2   | 13.0   |

<sup>5</sup>Table 2.1, page 4, Standard Method for Determining Fire Resistance of Concrete and Masonry Construction

*Assemblies, American Concrete Institute (converted from inches to cm).*

As shown above, a fire resistance rating of 4 hours is achieved by a concrete wall with a thickness of 13 - 17.8cm. The concrete Legioblocks used on site are 80cm thick, therefore providing a fire resistance rating of over 4 hours<sup>6</sup>.

<sup>6</sup>*Assuming 25% water absorbed and 50% evaporated. Assuming most water hitting the target area will be evaporated with drainage increasing during the damping down operation.*

## **2.7. Plant and Equipment on Site**

The following items of fixed and mobile plant are held on site:

### **2.7.1. Mobile Plant**

- 7 x Counter Balance Forklift Trucks;
- 7 x Wheeled Loading Shovels;
- 2 x Telescopic Forklift Trucks;
- 1 x Material Handlers;
- 1 x Mobile Elevating Work Platform; and
- 3 x Gator Truck.

### **2.7.2. Fixed Plant**

- Main MRF;
- Mini MRF;
- Plastic Plant;
- 3 x Baler;
  
- SRF Line;

The machinery is maintained in line with N+P's maintenance procedures. All plant and equipment receive annual Lifting Operations and Lifting Equipment Regulations (LOLER) and Provision and Use of Work Equipment Regulations (PUWER) inspections carried out by a 3<sup>rd</sup> Party contractor. Daily checks are carried out on all mobile plant and any findings are recorded and actioned accordingly. All mobile and fixed plant servicing and maintenance is carried out as per the manufacturer's instructions. Any defects that might harm the environment are entered into the incident management system.

All mobile plants are fitted with fire extinguishers.

The site is operational 24/7 therefore mobile plant is continuously in use. Any mobile plant requiring maintenance is temporarily stored outside of the permit boundary beyond the workshops in the northwestern corner of the site. The storage area is located at over 6m from any combustible waste.

### **2.7.3. Firefighting Equipment**

Firefighting equipment consists of but is not limited to:

- 2 x Fire Tenders; and
- Fire extinguishers (throughout).

The integrity of all firefighting equipment is checked monthly and recorded in the monthly site inspection sheet. Plant and equipment are visually inspected prior to every use to ensure it is fit for purpose.

## **2.8. Training**

Staff receive training on the use and selection of fire extinguishers, site evacuation, fire

safety and all relevant emergency procedures.

All staff and contractors working on site are made aware of the contents of the FPP and the procedures that are in place in the event of a fire on site during their induction. The staff training is regularly refreshed particularly in the event of non-compliance.

Certain staff members on site are trained as Fire Marshals. There is always at least one Fire Marshal present on site.

The procedures for fires discovered on site are provided both on the N+P Crayford EDMS and on-site notice boards.

N+P Crayford MRF Ltd. conduct a test of the FPP once a year, or in the event of any significant changes to site operations, to ensure that the contents are still relevant and that all staff members' knowledge is current and up to date.

## 2.9. Security Measures

The site is enclosed by perimeter fencing and site entrance gates designed to prevent unauthorised access. The site is operational 24/7 with a significant amount of site operatives always present.

The gates, fencing and walls are inspected weekly to identify any weaknesses or defects. Any defects identified are repaired with a temporary solution within 24 hours, with a permanent fix implemented within 7 days, unless a timescale is otherwise agreed with the EA.

Approximately 100x CCTV cameras are in operation around all areas of the site.

The site benefits from security lighting triggered during the hours of darkness. All doors to buildings and containers are locked when not in use.

## 2.10. Fire Sources & Prevention Measures

Table 2-6 below provides a summary of the potential causes of fire on site and associated preventative measures and is taken from the Fire Prevention Plan guidance.

Table 2-6 Fire Sources and Preventative Measures

| Cause                      | Preventative Measure   |
|----------------------------|--|
| Arson and Vandalism        | <p>The site has several security measures in place to limit the likelihood of arson or vandalism including:</p> <ul style="list-style-type: none"> <li>• Perimeter fencing with a gated entrance which is locked if appropriate;</li> <li>• CCTV cameras across the site;</li> <li>• Lockable doors on the skips and office/welfare facilities;</li> <li>• A motion sensor security lighting system;</li> <li>• Inspection and maintenance procedures;</li> <li>• A manned security operation on night shifts and weekends; and</li> <li>• A visitor sign in system.</li> </ul> <p>The site is enclosed on 3 sides, as illustrated on Drawing FPP1, by commercial and manufacturing premises and the railway.</p> <p>In the event of a breach of security at the site, the cause will be investigated, and appropriate mitigation measures implemented. This will be recorded in the Daily Site Log and Incident Management System. Records maintained will include inspections and maintenance of doors and locks, breaches of security, investigations and actions taken.</p>  |
| Self-Combustion            | <p>Effective stock management limits the likelihood of the self-combustion of materials stored on site. As such, the site has waste acceptance and stock management procedures which are upheld by all employees at the site, as detailed in Section 2.1. Only wastes included in the Environmental Permit are accepted at the site. Non-waste materials that pose a risk of self-combustion are stored as indicated in Table 2-4.</p>   |
| Plant or equipment failure | <p>Plant and equipment are maintained in accordance with the manufacturer's recommendations. All new plant on site is fitted with telematics, which automatically highlights any faults, and local suppression as part of the minimum design specifications. Plant and equipment are operated in accordance with the manufacturer's instruction manuals. Instruction manuals for plant and equipment are held either on site or online if a hardcopy is not available from the manufacturer.</p> <p>No industrial heaters are utilised on site. Wall mounted convection heaters are provided in the office areas. There is no heating provided in the MRF areas.</p> <p>Induction training and refresher training is provided to staff in the safe operation of plant and equipment relevant to their role, in accordance with the EMS.</p> <p>Inspection of plant and equipment is undertaken daily to check for faults and ensure appropriate safeguards are in place. The procedure also covers general housekeeping and cleaning of plant and all equipment on site.</p> <p>Storage of mobile plant is detailed in Section 2.7 above. In the event of a failure or suspected fault with an item of plant or piece of equipment, the operator will ensure that the equipment is shut off in a safe manner and not used until the equipment can be repaired or replaced.</p> |

| Cause   | Preventative Measure   |
|---|--|
| Electrical faults (including damaged or exposed electrical cables)      | Regular safety checks and daily site inspections are recorded in the site diary. All building electricians are fully certified by a qualified electrician.<br>Fixed Electrical Condition Monitoring and assessment is completed via 100% testing every 3 years.<br>Annual PAT testing of any on site portable electrical appliances is carried out.  |
| Naked lights  | No naked lights are permitted on site.   |
| Discarded Smoking materials   | Designated smoking shelters are provided around the site. All shelters are located a minimum of 6m from any combustible waste. No smoking outside of the designated shelter is permitted on site.  |
| Hot works   | N+P operates a permit to work system which includes a 60-minute fire watch by a competent person at the end of the works. No hot works are undertaken by staff unless they are trained and competent and have the relevant permit to work understanding.<br>Any works conducted outside of dedicated workshops takes place in a cleared area of the site at least 6m from any combustible wastes. A site operative performs a continuous fire watch during the hot work and for a minimum of 60 minutes after the work is completed.   |
| Hot Exhausts  | Vehicles are turned off when not in use. Consideration will be given to the high- risk time for hot exhausts (one hour after switching off when dust can settle on hot surfaces) and wherever possible vehicles are given time to cool down prior to site staff leaving site at the end of a shift.<br>Visitor and staff parking are located to the south of the site, illustrated on Drawing CFD-MRF2000.   |
| Open Burning  | Burning is not permitted on site.<br>If any fires are found at sites located near, N+P will report the incident to the Fire Service and Police authorities.  |
| Reactions between incompatible materials                                | Strict waste acceptance procedures implemented on site ensure only permitted wastes are accepted. Unauthorised wastes are quarantined, and incompatible wastes are separated.  |
| Neighbouring sites  | The site is located within an area of mixed commercial and industrial properties and large areas of open ground.<br>Employees always remain aware and report activities or behaviour which could represent a fire risk from neighbouring sites to the Site Manager. The manager will then act as appropriate to address the risk.  |
| Incompatible wastes Including reactions between incompatible materials) | All wastes arriving onsite are checked in accordance with the waste acceptance procedure included within Section 2.1 to ensure no materials of unknown composition are accepted at the site.<br>Spillages and leakages of fuels and oils are prevented through the application of measures detailed within the Unit Emergency Plans referenced within Section 5.2 of the ODMP. In the event, of a leak or spill of fuels or oils, the procedure within the Unit Emergency Plan is followed.  |
| Hot loads deposited at site   | No burning, reactive / reacting or visibly hot (producing steam or heat) loads are accepted on site. In accordance with the Waste Acceptance Procedure included within Section 2.1, each load is visually inspected at the site entrance to ensure compatibility with accompanying delivery notes, therefore minimising prohibited wastes and the acceptance of hot loads.<br>Instructions are given to customers to ensure no hot loads are accepted on site.<br>Should a hot load be deposited on site, it will immediately be removed to the dedicated quarantine area and removed from site the same day to a suitably licenced facility for disposal. |

### 3. FIRE MANAGEMENT

#### 3.1. Containing and Mitigating Fires

##### 3.1.1. Scheduled Improvements for Automatic Water Based Fire Suppression

N+P Crayford MRF is considering installing local suppression to the infeed hopper.

Based upon the most recent WISH burn trials, N+P have elected to add a wetting agent to the suppression system in order to more efficiently suppress a fire. The Hydro Navitas ES200 Cold Fire Wetting Agent (dilution strength 0.3%) will be used. This works by

removing the heat element of the combustion triangle (oxygen, heat and fuel) thereby reducing the flashpoint whilst simultaneously removing the fuel source.

The thermal detection cameras are strategically located to provide the designed coverage with the feeds from these cameras being monitored from within the control room located within the main offices. Details of the camera locations and their fields of vision are detailed within the drawings section of this FPP.

Full details of the automatic water-based fire suppression system is included within the Helios Outline Specification.

### 3.1.2. Manual Fire Suppression

The locations of all fire extinguishers on site are illustrated on Drawing CFD-MRF2000. Foam, water, carbon dioxide and powder extinguishers are provided on site as follows:

- 27 x Foam Extinguishers;
- 5 x Water Extinguishers;
- 10 x CO2 Extinguishers; and
- 14 x Powder Extinguishers.

The extinguishers are inspected annually.

The waste reception buildings are constructed to the appropriate standards. Should fire compromise the stability or integrity, the buildings and site will be immediately evacuated.

### 3.1.3. Site Plans

Up-to-date site plans are on display in the site office and detail; Site layout;

- Waste storage arrangements;
- Firefighting equipment locations (Pollution Control Equipment);
- Fire detection and suppression equipment; and
- Personal Protection Equipment (PPE).

In addition, all procedures relating to emergency procedures on site, including fires, are held within the site office and can be easily found and are readily available.

## 3.2. Fire Drills on Site

A fire drill is carried out and documented on a 6-monthly basis.

This FPP is implemented across the site and all fire management equipment is tested on an annual basis.

If any issues are found during these fire drills, the FPP will be updated or amended accordingly and site operatives will be re-trained.

Regular checks are made of all escape routes and equipment.

Fire boxes are located at the entrance gate containing site drainage information and isolation points. Emergency contact details and water connection points all displayed within a large A1 drawing.

## 3.3. Emergency Contact Details

An emergency contact sheet is included in the site Unit Emergency Plan (UEP). In the event of a fire the following procedure will be followed:

- The Site Manager or individual nominated by the Site Manager will locate the

- emergency contact list included within the UEP.
- In the event of a large fire, 999 will be dialled first;
- The Site Manager or individual nominated by the Site Manager will phone each of the local businesses included in the UEP, followed by the sewage service if appropriate to do so; and
- Finally, the EA incident hotline will be dialled once the situation is under control.

### 3.4. Site Procedures

#### 3.4.1. Fire within Storage Areas Covered by Helios

As detailed in Section 2.1.1, upon alert, the Helios control panel will indicate that there is a heat spot and the nominated contacts will be alerted via mobile phone.

Suitably trained site operatives will investigate the hotspot immediately and determine the best course of action. Potential courses of action include:

- Utilising mobile plant to pull the affected waste into the open away from other waste that the fire could spread to;
- Extinguish immediately utilising fire extinguishers stored on site; or
- Utilising mobile plant to move the affected waste to the most appropriate quarantine area to be extinguished.

If for any reason the initial alarm is ignored, and/or it immediately escalates to a surface fire the targeted water cannon suppression system will automatically initiate following a 30 second warning via visual and audible alarms.

#### 3.4.2. Fire within Bale Storage Area

##### Small Fire

A small fire or area of smouldering waste will be dealt with as follows:

- A fire or area of smouldering waste will not be dealt with in-situ, mobile plant will be utilised to pull the affected bale(s) into the open and away from any further waste that could become a light on contact; and
- Depending on the size / nature of the fire the bale(s) will either be:
  - Extinguished immediately<sup>7</sup> utilising the fire extinguishers; or fire tenders.
  - Moved to the appropriate quarantine area and extinguished<sup>8</sup>.

<sup>7</sup> Should a single item of the waste stream be alight, and the fire is well contained, then the waste will be doused by use of extinguisher as it is pulled from the waste pile. The burned / fire-damaged portion is then removed to the quarantine area and the remaining waste returned to the pile.

<sup>8</sup> If the fire is not easily contained to a single item, then the obviously alight portion of the waste will be removed to the quarantine area.

Depending on the size, location and nature of the fire the burning waste will be pulled into the flexible quarantine area following the procedures detailed in section 3.7.1.

Once a small fire is dealt with the remaining area will be visually inspected immediately by site operatives for any signs that a fire / smouldering waste remains. The same procedure, detailed in this section, will be implemented should this be the case. A small fire is defined within this fire prevention plan as a fire that is brought under control by the onsite team without the assistance of the fire service and this is expanded further within section 3.6 of this FPP.

##### Uncontainable Small Fire or Large Fire

The following procedure is in place on site that will be followed in the event of a small fire

becoming uncontrollable or in the event of a major fire onsite;

- The Site Manager and Fire Service will be contacted immediately. The local sewerage service and EA will be notified at the first opportune moment.
- Following arrival of the Fire Service, all site staff will take instructions from the Fire Service which may include any of the following:
  - If possible, bales that are unburnt will be dampened down to prevent the fire from spreading further;
  - If possible, unburned bales will be separated from the fire using heavy plant;
  - The burning area will be isolated, attempts will be made to extinguish the fire utilising the onsite fire extinguishers if safe to do so; and
  - The site and buildings will be evacuated.

### 3.5. Fire Waters

The site has the benefit of impermeable surfacing throughout. A maintenance schedule for the inspection and repairs of the impermeable surface are detailed within the ODMP for Crayford.

#### 3.5.1. Waste Storage Areas

Under normal operating conditions there is very little run off generated within RSG1/Input Hall and RSG2 as the buildings are walled on 3 sides and enclosed with a watertight roof. Any runoff generated falls to the rear of the building and the concrete upstand at the front of the buildings prevents release into the yard area.

#### 3.5.2. External Yard Area

The operator has prepared a provisional secondary containment design to ensure that firewater can be contained within the wider site boundary. The design of these schemes are illustrated on Drawing CFD-MRF73 showing the proposed kerb line and Drawing CFD MRF-007 showing the bale storage area kerb line.

All run off generated within the external yard area is collected via drains into a sealed underground pipework system. All surface water drains to a Class 1 separator which benefits from a penstock valve which can be closed in the event of an emergency. All clean surface water is discharged to River Cray under discharge consents TH/CASM.0965/001 and TH/CASM.0987/001.

#### 3.5.3. Firewater

##### Calculations Areas Covered by Helios

The Helios system is designed to provide localised suppression via the Rosenbauer water cannons. Each water cannon delivers up to 1500 litres/minute and further benefits from the addition of the Hydro Navitas ES200 Cold Fire Wetting Agent. A dedicated 100,000 litre water tank connected to a fire main will supply a continuous stream of water up to 1500 litres/minute to 2 cannons for 45 minutes. The fire service has the ability to top up this tank using their fire tenders and consideration is being made to connect the Helios tank from the fire ringmain.

##### Bale Storage Area

Based upon the FPP guidance firewater calculations, it is estimated that approximately 967,212 litres of water would be required to put out the largest combustible stockpile on site<sup>9</sup>.

<sup>9</sup>Based on a 3813 m<sup>3</sup> bale storage area being the largest combustible pile on site it has been calculated that 4576 m<sup>3</sup> of water would be required. It is calculated that with a 50% evaporation and 25% of water being absorbed that the remaining water volume to be contained and removed would be 1144 m<sup>3</sup>.

### Sources of Water

Sources of water currently available onsite are:

- 8 x fire hydrants connected to mains water;
- 540,000 litre water tank;
- 100,00 litre water tank; and
- The on-board water supply from Fire Service vehicles.

The Fire Service will collect, and reuse firewater run off as part of normal operating procedures.

N+P have installed a 150mm MDPE water ring main around the perimeter of the site feeding 8 fire hydrants, which is connected to mains water. The hydrants have been installed but are awaiting commissioning.

### **3.5.4. Firewater Containment**

The figures quotes represent a worst-case scenario. The HELIOS system with the very early detection along with the targeted suppression gives the site the most state of the art system available on the market ensuring minimum sufficient water discharges for any individual fire event.

### Surface Water

Surface water storage calculations show that approximately 729 m<sup>3</sup> of water can be safely contained on site via an engineered containment system consisting of a storage ramp and raised kerbing. Drawing CFD-MRF73 illustrates the water storage area and the location of the proposed ramp.

In accordance with Section 3.5.3 above, 100,000 litres of firewater would require containment if 2 cannons fired for 45 minutes and this is well within the containment capacity of the site.

If continuous water discharge was required for longer than 114 minutes, then a tanker would be required to remove water to ensure the sites ability to store water was not exceeded.

This could be extended should it be deemed appropriate by Kent FRS to recirculate the used fire water.

### Bale Storage Area

Surface water storage calculations show that approximately 100 m<sup>3</sup> (100,000 litres) of water can be safely contained on site via an engineered containment system consisting of a storage ramp and raised kerbing. Drawing CFD-MRF73 illustrates the water storage area and the location of the proposed ramp.

In accordance with Section 3.5.4 above, approximately 1144 m<sup>3</sup> litres of firewater would require containment in the case of the largest bale storage area catching fire. The water storage area illustrated on Drawing CFD-MRF73 will contain the first 100,000 litres. Any firewater deemed likely to exceed this capacity will be tankered offsite during active firefighting to ensure no escape of firewater outside the boundary occurs.

### **3.6. Management after a Fire Event**

After a fire event, the following procedure will be implemented depending on the severity of the fire:

1. A small and containable fire that can be safely dealt with in-house using suitably trained staff and firefighting equipment located on site: The fire will be recorded in the site diary, including the causes of the fire and methods used to manage the fire. If the HELIOS system alarm is activated, it will automatically record via video image for the duration of the event. An assessment will be carried out to determine whether further mitigation measures could have prevented the fire. Any outcomes to be implemented onsite will be incorporated within this FPP and the site's EMS as required.
2. A larger fire that requires the presence of the Fire Service: If the site operatives have been told to evacuate or cease operations by the EA and/or Fire Service, the site will wait until told safe to re-enter site and resume operations. Any closure of the site will be followed by informing customers and the regulatory authorities. The fire will be recorded in the Daily Site Log and in an online incident report and will detail the causes of the fire and methods used to manage the fire. An assessment will be carried out to determine whether further mitigation measures could have prevented the fire. Any outcomes to be implemented onsite will be incorporated within this FPP and the site's EMS as required.

Should damage be sufficient to prevent the site from being able to store waste, the site will cease accepting waste and will divert to a suitably licensed facility. Such facilities will be subject to either a site audit or a desktop audit to ensure their suitability as a waste facility.

The Site Manager will liaise with the EA to determine a plan-of-action to introduce normal operations at the site, and the timescales involved to achieve this.

### **3.7. Fire Damaged Waste**

A visual assessment will be carried out by the Site Manager to determine whether the waste can be treated on site. Wherever possible, unburnt wastes will be separated from fire damaged piles. If waste piles have become mixed, then it is likely that the waste will be removed from site to a suitably permitted facility.

The Site Manager will determine what decontamination measures will be required to be carried out proportionately to the impact caused by the fire. The time taken to restore the site or affected part of the site to operational status will be determined by the nature and extent of the fire. If the affected area does not impact the rest of the site's operation, operations will re-start as and when appropriate.

After a significant incident, an assessment will be undertaken by a suitably qualified individual. Technically competent managers and/or engineers will assess the degree of damage caused by a fire and the residual risk from fire damaged waste, emissions or equipment. Burnt waste material will be kept on site for a short period of time if required for a subsequent internal investigation. Following this, the material will be transferred off site to a suitably licensed disposal facility.

#### **3.7.1. Quarantine Area**

The site benefits from both a dedicated and flexible quarantine area that combined can hold half of the largest stockpile as required by EA guidance. Although the flexible quarantine area may be subject to vehicular traffic during general operations, it will be cleared as necessary in the event of a fire. Having both dedicated and flexible quarantine areas provides N+P Crayford MRF with flexibility during a fire event.

In the event of non-compliant waste being identified within the waste load, the vehicle will

be requested to remove the load off site immediately. If the vehicle has already unloaded the waste, it will be moved to the dedicated quarantine area and removed off site within 72 hours. In the event of a fire, the dedicated quarantine area will be cleared within 1 hour.

The locations of the dedicated and flexible quarantine areas are illustrated on Drawing CFD-MRF2000. N+P Crayford MRF will use the following areas:

Table 3-1 Quarantine Area Dimensions

| Quarantine Area | Primary Use  | Length (m)               | Width (m) | Height (m) | Volume (m <sup>3</sup> ) |
|-----------------|--|--------------------------|-----------|------------|--------------------------|
| Dedicated       | Temporary storage of burnt waste prior to removal offsite or temporary storage of non-compliant waste. | 9.5                      | 5.5       | 4          | 209                      |
| Flexible        | Dousing of burning/smouldering waste and/or separation of unburnt waste.                               | Area: 1545m <sup>2</sup> |           | 4          | 6,180                    |

With best endeavours, the burnt waste will be removed off site within 24 hours if safe to do so. The flexible quarantine area benefits from a 6m separation distance from any combustible materials or buildings. N+P Crayford MRF maintain good housekeeping procedures and the site is kept clean at all times.

The placement of the dedicated and flexible quarantine areas is based on the following factors:

- The flexible quarantine area provides an open area of the site to allow for the prompt and direct removal of smouldering, burning or fire damaged wastes from the waste storage and to allow access by the Fire Service;
- Lessons learnt from fires on similar sites show that the Fire Service will pull burning waste out a short distance from an area and douse it – the flexible quarantine area allows the Fire Service to implement this firefighting technique easily on site;
- The dedicated quarantine areas provide N+P Crayford MRF with an area of the site that can store fire damaged waste during or after a fire event, so to provide enough space for the Fire Service and any further on-site assistance vehicles (tankers);
- Proximity to flammable liquids – the dedicated quarantine and flexible areas are situated at least 6m from any potentially flammable liquids on site such as diesel tanks; and
- Firewater containment – the flexible quarantine area is located in the north eastern area of the site therefore, due to the natural fall of the site, any firewater used in this area will pool within the fully bunded area in the south-eastern corner.

The Site Management will instruct all site operatives when and how the burnt/burning waste, or any hot loads delivered accidentally to site, will be moved to the appropriate quarantine area. The following procedure will be implemented on site:

- When it is safe to do so, the waste will be moved by on-site plant to one of the quarantine areas;
- The movement of the waste will always be overseen by the Site Manager to minimise any spillages and ensure the area is not overfilled;
- To limit any spillages, plant will not be overfilled when moving the waste;
- The burning/smouldering waste will be doused in the flexible quarantine area using the relevant fire extinguisher, a fire hose supplied by the fire service connected to the water tank or water pumped from the fire engine;
- When the burning/smouldering waste has been fully extinguished it will be moved to the dedicated quarantine area awaiting removal from the site; and
- Burnt waste will be taken off site to a suitably licensed facility within 48 hours.

All site operatives will be trained to follow this FPP and all procedures listed in the above

sections.

#### 4. CONCLUSION

This FPP is a 'working' document that is reviewed and updated annually or as required should any of the following occur:

- A fire on site;
- A change or review of legislation; or
- If the site is instructed to do so by the EA.

It is the responsibility of the Site Manager or nominated person to maintain this FPP and to ensure it is adhered to in the event of a fire on site.

Annex A – Fire Prevention Plan Drawings