

BIOMASS BOILER MANAGEMENT PLAN

in regard to the

BIOMASS FACILITY

at

Sinkfall Farm Barrow-in-Furness

| | | |
|---|-----------------------------|--|
| OMP Manager | Permit Number: | WEQMP Contacts |
| Brian Armistead Brian Armistead Ltd. Sinkfall Farm Rakesmoor Lane Barrow-in-Furness Cumbria LA14 4QE | tba | Brian Armistead Helen Stephens Tony Layfield |
| | Reviewed version 1.0 | 28 th March 2017 |

Revisions

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PREFACE

This document contains supporting information which accompanies the Environmental Permit application being submitted by Brian Armistead Limited for the proposed operation of biomass boilers at:

**Sinkfall Farm
Rakesmoor Lane
Barrow-in-Furness
Cumbria LA14 4QE**

This application has been completed on behalf of Brian Armistead Limited by Recogen Ltd. The location for the installation is a farm holding where various building construction/demolition waste and also the composting of green waste is undertaken. The installation of the boilers addresses the local need for facilities that are able to dry wood-chip and other timber based products and agricultural materials.

The application is for the operation of a duplex biomass boiler installation. The boilers will at times be fuelled by Grade A waste wood, and have an aggregated operational capacity of up to 500kg/hour, generating up to 1,998KW of renewable heat for use on site.

An Environmental Permit is required. The process will be regulated under Part 2, Chapter 1, Section 5.1 Part B(a)(v) of the Environmental Permitting (England and Wales) Regulations 2010 (as amended) ("the regulations"), which is defined as follows:

"(a) The incineration in a small waste incineration plant with an aggregate capacity of 50 kilogrammes or more per hour of the following waste –

(v) wood waste with the exception of wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coatings"

Planning consent is required and has been obtained for the proposed use of the land and operations; and includes for the twin flue stack arrangement for the boilers.

The Planning Reference is: B28/2016/9010

Contents

Figure 1 provides the location of the facility and figure 2 provides the site layout plan

Detailed configuration drawings for the boilers and flues are included in Appendix I.
The boiler system comprises the following principal infrastructure:

- 2 no. 999KW biomass boilers;
- Walking floor fuel loaders
- Biomass fuel storage and processing area; and,
- Elevated flues for dilution and dispersion of residual emissions.

Section 1: Site Location and Operation:

1.1 Location

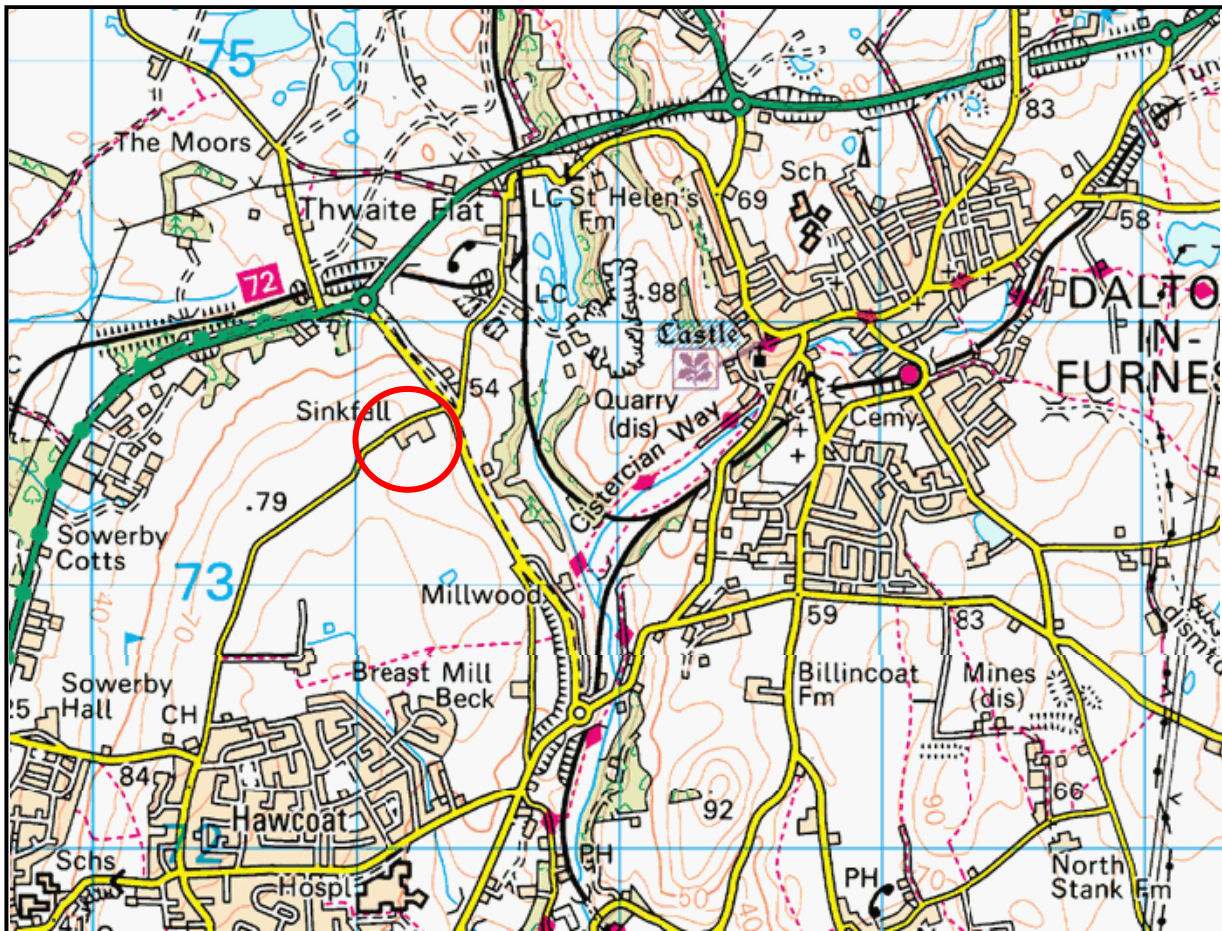
The Land Owner and Operator is:

Brian Armistead.
Sinkfall Farm
Rakesmoor Lane
Barrow-in-Furness
Cumbria
LA14 4QE

Land at OS Grid Ref: Grid ref: SD2118,7358 X: 321200m Y: 473600m

The site is located as shown on Figure 1. Location Plan.

Figure 1: Location Map: Sinkfall Farm, Rakesmoor Lane, Barrow-in-Furness.



1.2 Site Plan Showing Boiler System Location

The site plan is shown at Figure 2. Figure 3 shows the location of the Boiler within the site.

Figure 2. Site Plan including External Pad areas (outlined green ink). Boiler Installation within red lined area.

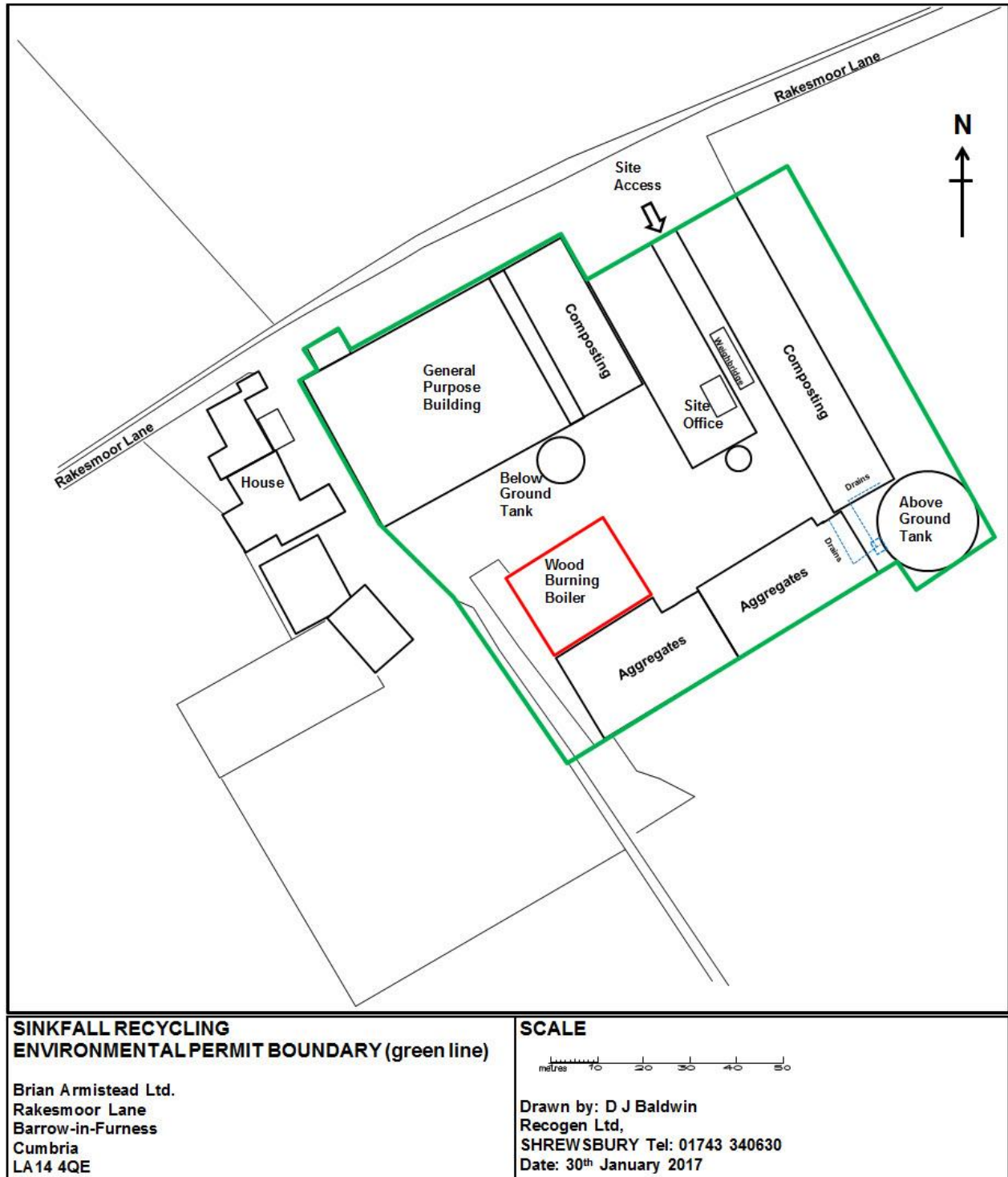


Figure 3. Site Plan including Boiler Installation within red lined area.

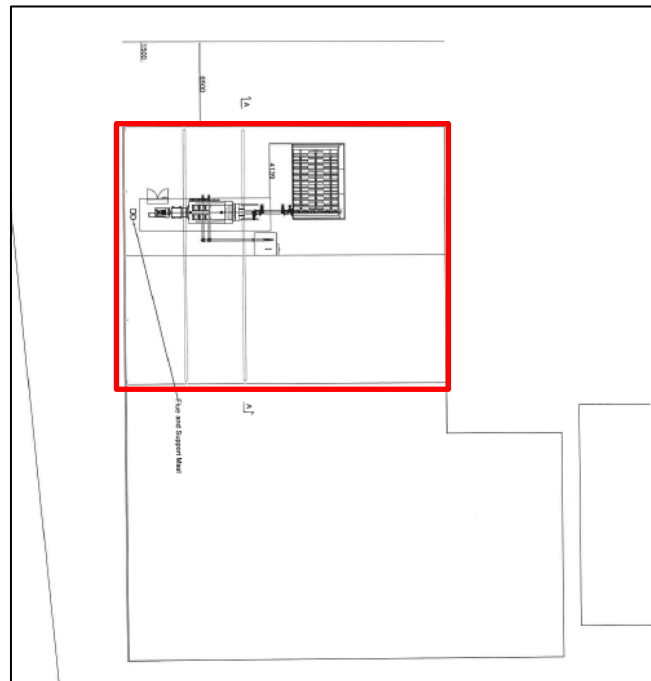
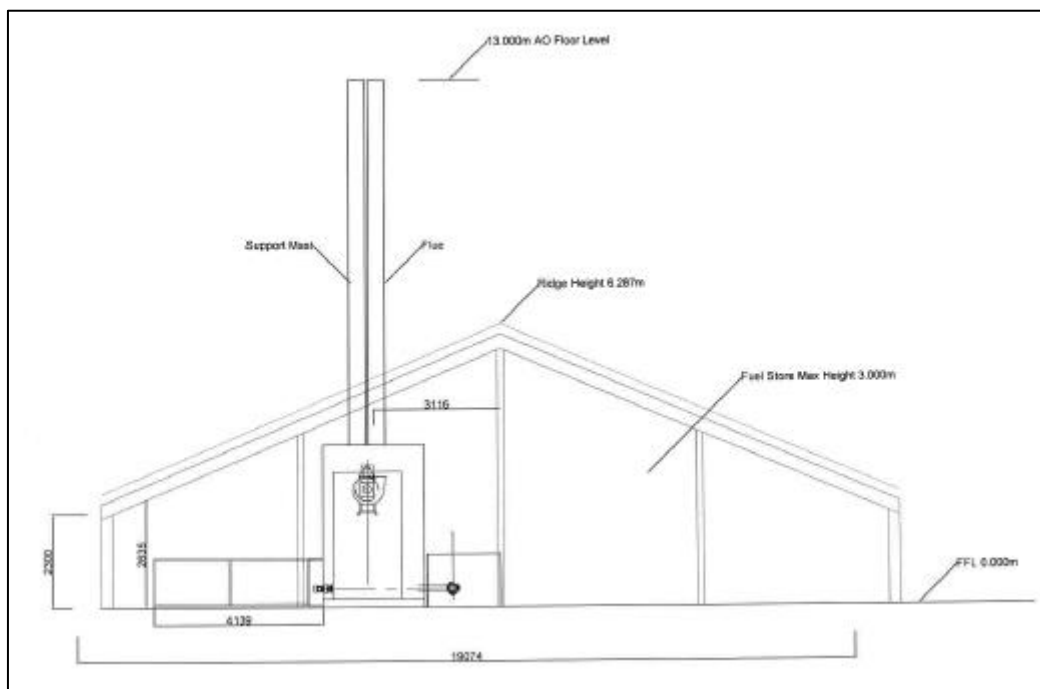


Figure 4. Site Elevation showing the Twinned Stacks of Boiler Installation.



Detailed configuration drawings for the boilers and flues are included in Doc 5.

The boiler systems comprise the following principal infrastructure:

- 2 no. 999KW biomass boilers;
- Walking floor fuel loaders
- Biomass fuel storage and processing area; and,
- Elevated flues for dilution and dispersion of residual emissions.

Section 2: Boiler Wood Fuel:

2.1 Location

The wood to be used in the boilers includes virgin biomass and Grade A waste wood, which is essentially clean, uncontaminated waste wood.

Grade A waste wood was described in a previous WRAP report¹ as 'clean recycled wood', typically used as a fuel in non Waste Incineration Directive (WID) (now Industrial Emissions Directive [IED]) installations. Potential non-wood content prior to processing is described as nails and some fixings and minor amounts of paint and surface coatings.

2.2 Grade A Waste Wood Sources

The Grade A waste wood will be sourced from source segregated waste streams from customers of Sinkfall Recycling's, and therefore will arise from known sources.

However, robust procedures will be in place to ensure that no other waste wood other than Grade A waste wood is used in the boiler, ensuring compliance with the Environmental Permit. Reference should be made to Document 4b Environmental Management System (EMS) for detailed information on the sources of wood, the wood types and the management procedures.

2.3 Wood Fuel Reception, Storage and Processing

The management system provides details of proposed management procedures for the reception, handling and processing of wood. These are summarised below.

The Grade A waste wood will be delivered to site in Skips Roll-on-Offs or trailers.

The incoming loads will be weighed at the weighbridge located within the permitted waste transfer station at the site. Once weighed, the driver is instructed by the weighbridge operator to deliver the wood to the wood-reprocessing centre adjacent to where the biomass boilers are to be installed. Upon arrival at the storage building, the driver must announce that he/she has wood to unload to either the Site Supervisor or a Fork Lift Truck Driver. The driver is instructed where to unload the wood and once unloaded, the visual inspection of the load will be undertaken to ensure that the wood comprises Grade A waste wood only. If the wood has been delivered by a third party, the driver must wait on site until the visual inspection has been completed, after which time they are free to leave the site. The site layout plan provides details of vehicle routing through the site.

The wood shall be stored within a purpose designed, enclosed building. Within this area, wood will be picked up using a mechanical handler/ Grab and loaded to a static wood shredder, which shreds the wood to a suitable size for use in the biomass boilers. The shredded wood will be loaded to feed hopper systems, which include walking floor loaders to continuously provide wood fuel to the boiler. Fugitive dust emissions shall be controlled given that all the wood processing operations are undertaken within the enclosed building.

2.4 Boiler Operation

The boilers to be used are two 999KW Arterm Boilers, located as shown on the site layout plan. Drawings of the boiler configuration are contained within Doc 5.

Wood is to be transferred to a walking floor fuel feed system by mechanical handler/Grab. Wood is loaded via continuous feed to the boilers. Each boiler is continuously loaded at a rate of up to 250kg/hour, generating up to 999KW of renewable heat for use on-site.

Residual exhaust emissions from the boilers are released via an elevated flue. The boiler manufacturer has undertaken calculations to verify the height of the flue. These are included in Document 6.

This provides detailed dispersion modelling which has demonstrated the stacks to be of a suitable height to prevent any significant adverse impacts on local air quality.

Waste ash arising from the boilers will be collected in enclosed vessels and removed on a daily basis, taken to a permitted waste facility for further management/disposal.

Section 3: Potential Atmospheric Emissions and Control

3.1 Emission Sources

The main potential sources of air emissions have been identified as follows:

- Residual emissions from flues serving the biomass boilers; and,
- Fugitive dust from handling, processing and storage of wood.

The biomass boiler flue locations (A1 and A2) are shown on the site infrastructure plan. The flues will be 14.78m in elevation.

3.2 Biomass Boiler Flue Emissions

Table 1 below contains an outline of the emission limits that will apply to the boilers, which are based upon the relevant sector guidance.

Table 1 Boiler Emission Limits
Pollutant Emission Limits (mg.m⁻³) Expressed at Reference Conditions of 11% O₂, 273K, no correction for moisture

| Emission | value | units |
|------------------------------------|--------------|--------------------|
| Carbon Monoxide (CO) | 250 | mg.m ⁻³ |
| Total Particulate Matter | 60 | mg.m ⁻³ |
| Nitrogen Oxides (NO _x) | 400 | mg.m ⁻³ |
| Organic Compounds | 20 | mg.m ⁻³ |

Reference should be made to Document 6 for results from emissions monitoring undertaken for the proposed boilers operated under full load.

The following abatement methods will be used to control emissions from the biomass boilers:

- Cyclone to control emissions of particulate matter;
- Use of Lambda probe to ensure fuel/air mixture is optimised during operation
- control combustion related pollutants; and,
- Use of compressed air mechanism which is controlled via boiler control unit to
- clean the heat exchanger, ensuring optimal efficiency.

In addition to the physical abatement methods used, regular servicing and preventative maintenance will be undertaken on the boiler to maintain efficient boiler operation. This will include the following methods/procedures:

- Monthly cleaning in accordance with manufacturer specification/instruction;
- and,
- Bi-annual boiler services.

3.3 Fugitive Dust Emissions

There is potential for dust emission to arise as a result of the proposed activities, as follows:

- Fugitive dust emission from HGVs transferring Grade A wood to the fuel storage and processing area;
- Fugitive dust from wood storage and processing area.

A series of dust mitigation measures will be implemented on site to ensure dust emissions are controlled as far as is practically possible. The measures include:

- Sheeting of vehicles delivering materials to the site (if necessary);
- sheeting of vehicles transporting potentially dusty loads off site;
- use of mobile bowser to damp down materials stockpiles, vehicle running surfaces, vehicle loads and areas on and around machinery which may give rise to dust, especially during dry and windy conditions;
- Cleaning of any spillages using wet cleaning methods;
- Enclosure of wood processing operation to prevent fugitive emission; and,
- Drop heights minimised to prevent dust emissions.

A permanent water supply will be made available on site in all climatic conditions to ensure that the dust suppression systems can function effectively. Any external water pipes will be lagged to prevent frost damage during winter months.

Any spillages will be cleaned using wet cleaning methods. HGVs transferring wood to the fuel storage and processing building will be sheeted to prevent dust release during transfer. The wood storage and processing area is enclosed to minimise risk of fugitive dust emission.

3.4 Emissions Monitoring

Boiler Flue Emissions Monitoring

Excess air will be continuously monitored and controlled by means of a Lambda probe and control system. Boiler emissions will be monitored using an approved flue gas analyser during each service inspection.

Given that the boiler will be fuelled by a consistent type of feedstock (Grade A waste wood), will be continuously loaded with fuel, and have sensors in place to monitor and control excess air, it is argued that continuous monitoring of CO emissions is not required, in accordance with the relevant guidance. Emissions of CO would be monitored at least annually during service inspections using approved methods.

Particulate matter and organic compounds will be monitored at least annually during services by a suitably qualified contractor, using approved methods.

NO_x emissions will be monitored upon commissioning of the boiler and after any subsequent substantial change to the installation using approved methods.

Oxygen will be continuously monitored using a Lambda probe.

Given the nature of the feedstock, which is essentially clean, uncontaminated waste wood, it is not considered that emissions monitoring will be required for any other pollutants outlined in the Process Guidance Note.

All monitoring will be undertaken in accordance with the methods detailed in DEFRA Process Guidance Note 1/12(13), or by alternative, equivalent method agreed with the Local Planning Authority.

Reference should be made to the EMS in Appendix VI for details of proposed emissions reporting procedures.

3.5 Visual Monitoring

Visual Monitoring of Dust from Wood Preparation/Shredding Activities Site operatives will continuously monitor dust emissions whilst the site is in operation and will report back to the site supervisor for advice if required. Given that the wood processing operations are to be enclosed, no dust issues are anticipated in terms of fugitive dust from processing operations.

3.6 Visual Monitoring of Stack Exhausts

Emissions from the combustion process should be free from visible smoke. During start up and shut down of the boiler, emissions should not exceed the equivalent of Ringelmann Shade 1 as described in British Standard BS 2742:2009. All emissions from air should be free from droplets and persistent visible emissions. Stack emissions will be visibly monitored on an ongoing basis by site staff.

Within the site EMS there is a complaints procedure that will be implemented during the day to day operation to ensure full investigation and remedial action for air emission related issues, such as dust.

Reference should be made to the EMS for a detailed outline of proposed visual monitoring and reporting procedures.

3.7 Potential Impacts on Environment

The flue heights (14.7m) have been calculated by the boiler provider. Detailed dispersion modelling has also been undertaken to assess potential impacts on local air quality. Reference should be made to document ref: 3454-2075-C in Appendix II for a copy of the modelling report. This has demonstrated that impacts on local air quality will not be significant.

3.8 Environmental Management Systems

Existing management systems for the site are in place for the provision of skip hire, waste disposal and recycling services. Senior Management Personnel are suitably trained qualified to COTC (WAMITAB) standards, which provides demonstration of the competence of the site operators.

An Environmental Management System (EMS) will be implemented during the day to day operation of the biomass boilers to ensure compliance with the Environmental Permit. Specific information included in this document set has been added to the EMS which has been revised in

relation to this operation. This will provide an extension of existing management systems on-site. The EMS outlines the following:

- Procedures for the receipt, inspection and processing of wood;
- General site management procedures;
- Training procedures;
- Emissions control procedures;
- Emissions monitoring procedures; and,
- Record keeping procedures.

Section 4: Sources of Wood

4.1 Sources of Wood shall include:

- a) Fresh cord wood from the forestry e.g. supplied by Tilhill Forestry Ltd. This to be chipped and dried to G30 and G50 woodchip.
- b) An agreement with a Local Biomass Supply company is well advanced, this is where they will provide wet G30/G50 wood-chip to be dried.
- c) Contracts for removal, or acceptance of landscaper and tree-surgery thinnings and branches (virgin wood) are being escalated e.g. a recent one for tree thinnings from schools will produce over 250 tonnes.
- d) In the past there has been no outlet for tree roots and other wood that is too large or mis-shapen to go into the composting system, but with new size reduction equipment, these will be a valuable feedstock.
- e) A separately run operation deals in forestry products generates 'sawmill' type waste. Arrangement with other sawmills will enable the sawmills residues such as fence post offcuts, sawdust and shavings which amount to 5 – 10 tonne per week.
- f) The site has contracts for the removal of surplus timber pallets from the paper manufacturing Industry and local Councils; these shall be Grade A.
- g) For the woodchip, logs and other biomass materials the site will join the national BSL scheme that considers the source and supply route of biomass.

5.0 Wood-Fuel Quality Specification

5.1 Boiler Wood-Fuel Types

In addition to virgin wood/biomass, the boilers will be fuelled by Grade A waste wood. **No use of Grades B, C and D waste wood will be permitted.**

This document outlines the procedures that will be implemented by the site operator to ensure that the requirements for permitted fuel types can be complied with, e.g. assurance that in addition to virgin wood/biomass, only Grade A waste wood will be used to fuel the boiler.

6.0 Wood-Fuel Quality Management

6.1 Procedures for Wood Inspection and Processing

The following describe procedures for the receipt and processing of waste wood at Sinkfall Farm to ensure that in addition to virgin wood/biomass, only Grade A waste wood is used in the boiler, e.g. wood that is predominantly clean and uncontaminated.

The management shall strictly prohibit the use of any other grades of waste wood in the boiler apart from Grade A (clean, uncontaminated) wood.

The following table outlines a description of the different types of waste wood, which has been obtained from DEFRA research/Wood Recyclers Association/PAS111 and can be used as a guide for identifying Grade A waste wood.

Waste wood colour coded green in the table below is the only waste wood permitted for use in the boilers (Grade A).

Grade A “Clean” Recycled Wood

Includes Waste Wood described as:

Solid softwood and hardwood, packaging waste, scrap pallets, packing cases and cable drums. Process off-cuts from joinery/manufacturing.

May include the following Non- Wood Materials to be removed so far as reasonably possible described as:

Nails and metal fixings. Minor amounts of paint, and surface coatings

MUST NOT INCLUDE the materials classed as Grade B, Grade C or Grade D.

Table 2. Criteria for Specification and grading of Waste Wood

| Waste Wood Grade | Materials Within Waste Wood | Typical Non-Wood Content Prior to Processing |
|----------------------------------|---|--|
| Grade A “Clean” Recycled Wood | Solid softwood and hardwood, packaging waste, scrap pallets, packing cases and cable drums. Process off-cuts from joinery/manufacturing | Nails and metal fixings. Minor amounts of paint, and surface coatings |
| Grade B Industrial Feedstock | May contain up to 60% Grade A, plus building and demolition materials and domestic furniture made from solid wood | Nails/metal fixings. Some paints, plastics, glass, grit, coatings, binders and glues |
| Grade C Fuel Grade | All above, plus fencing products, flat pack furniture made from boards products and DIY materials. High content of panel products such as chipboard, MDF, plywood, OSB and fibreboard | Nails and metal fixings. Paint coatings and glues, paper plastics and rubber, glass, grit. Coated and treated timber (non CCA or creosote) |
| Grade D Hazardous Waste | Fencing, transmission poles railway sleepers, cooling towers | Copper/chrome/arsenic preservation treatments, creosote |

Non-hazardous wood treatments include the following:

- Ammoniacal copper quaternary;
- Copper azole (CA);
- Copper citrate and copper organic compounds;
- Borate preservatives;
- Light organic solvent preservatives (LOSP);
- Micro-emulsions;
- Wood stain;
- Paints;
- Varnish; and
- Fire retardants.

6.2 Wood Acceptance Procedures

The presence of small quantities of wood containing the above treatments would not render a load of wood as Grade B and C. As defined in the table above, clean recycled Grade A wood may contain minor amounts of paint and surface coatings.

The site will receive source segregated Grade A waste wood from external sources. The following outlines the operational procedures that will be in a place to inspect wood delivered to site.

- a) Grade A waste wood is delivered to site in Wagons, Skips or trailers. The loads are weighed using the weighbridge facility.
- b) Once the load is weighed, it is directed to the wood recycling reception area.
- c) Upon arrival at the reception area, the driver must announce arrival on-site and report to the Site Supervisor or Loading Shovel Driver.
- d) The vehicle driver is instructed where to unload the wood and once unloaded, a visual inspection of the load is undertaken to ensure that the wood comprises Grade A material only. Wood of Grade A quality will be visibly identifiable using the criteria in Table 1 above and will typically include untreated and uncoated pallets, packing cases, cable drums and process off-cuts.
- e) If the wood has been delivered by a third party, the driver is required to wait on-site until the visual inspection has been completed. Once the load has been verified as comprising Grade A waste wood only, the driver is permitted to leave the site.
- f) The unloaded wood is transferred to the internal wood storage and processing area as shown on the site layout plan.

6.3 Wood Rejection Procedure

In the unlikely event that contaminated wood is identified within a load, this is Immediately quarantined on site and removed pending further treatment/disposal as soon as possible.

6.4 Wood Processing Procedure

- a) Within the wood processing building, wood is loaded to the shredder using a 360 Grab. The shredder shreds the wood to an appropriate size for use in the boilers.
- b) The shredder also has magnets which extract metal contaminants during the shredding process.
- c) The shredded Grade A wood is then transferred to the walking floor fuel loaders, which transfer the shredded wood to the boilers on a continuous basis.

Section 7.0- Wood Supplier Quality Assurance & Registration System

With Reference to **Section 2.0 ' Input Wood Specification'**, this form is to provide the means to Assess and Confirm the Supplier as a bona fide source/supplier of feedstock, and assure statutory compliance and appropriate management systems and controls for feedstock quality.

7.1 Details of Supplier

| | | |
|----|-----------------------------------|--|
| 1 | Company name of Supplier | |
| 2. | Supplier Official Trading Address | |
| 3. | Company Registration No. | |
| 4. | Person Responsible | |
| 5. | Position in company | |
| 6. | Local or Operational address | |
| 7. | Contact details; telephones | |
| 8. | Contact email address | |

7.2 Details of Source

| | | |
|----|---|--|
| 1 | Description of Source Nature of activities and Wood types | |
| 2. | WRA Wood Class | |
| 3. | Source Trading Address | |
| 4. | Source Operational address | |
| 5. | Source QA Contact Person | |
| 6. | Contact details; telephones | |
| 7. | Contact email address | |

7.3 Details of haulier

| | | |
|----|------------------------------|--|
| 1 | Haulier Trading Name | |
| 2. | Haulier Operational address | |
| 3. | Waste Carrier Reg. No. | |
| 4. | Haulier Contact Person | |
| 5. | Contact details; telephones | |
| 6. | Contact email address | |
| 7. | Vehicle Registration Numbers | |