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## Tudor Griffiths Waste Wood Burning Activity

### Part B Environmental Permit Application for Biomass Plant

Prepared for:

Tudor Griffiths Limited



# **Tudor Griffiths Waste Wood Burning Activity**

## **Part B Environmental Permit Application for Biomass Plant**

**November 2020**

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## 1. INTRODUCTION

### 1.1 Non-Technical Summary

- 1.1.1 This Report has been produced in support of a variation application of Environmental Permit Reference EPR/CP3698VW/V003 to incorporate a Part B activity for a Biomass Plant comprising of seven 995kW Linka boilers. The Biomass Plant generates heat in order to dry imported chipped virgin or shredded recycled Grade A wood through the burning of virgin wood chip and Grade A shredded wood at the site at Wood Lane, Ellesmere (grid reference SJ 42305 32531) operated by Tudor Griffiths Limited (Tudor Griffiths).
- 1.1.2 The Biomass Plant is fed through a combination of virgin and Grade A shredded wood (feedstock). The boilers create heat to feed the perforated drying floors to dry various products including wood to reduce moisture to 20 – 25% thus enhancing their suitability for sale and future use as a fuel. The Biomass Plant comprises the seven 995kW Linka Boilers (approximate net rated thermal input 7.5MWth) which are housed in a building measuring approximately 87m by 32m and 14.7m to the ridge. It is estimated that approximately 3,000 tonnes per annum of dried Grade A wood waste is sourced directly from customers. The drying floors are used to dry various products to enhance their suitability for sale, including the drying of Grade A wood and the drying of logs sourced from the operators own woodlands which are then sold through the Builders Merchants and drying crops such as cereal etc. The waste wood drying activities are covered under the existing Environment Agency (the Agency) permit (reference EPR/CP3698VW). A minor technical variation was submitted to the Agency in February 2017 to include drying of Grade A waste wood in the listed activities. The varied permit (ref: EPR/CP3698VW/V003) was issued in March 2017.
- 1.1.3 The Biomass Plant facility consists of totally enclosed combustion chambers supplied with feedstock via integrated walking floors, the 400 mm diameter stacks extend 2.5 metres above the building ridge. The Biomass Plant requires approximately 2,500 tonnes per annum of feedstock. This comprises 1,250 tonnes of virgin wood and 1,250 tonnes of Grade A wood. The capacity of the Biomass Plant exceeds 50 kg/hr but is less than 3 tonnes per hour.
- 1.1.4 Grade A waste wood will be in accordance with the BSI PAS 111:2012 guidance on 'Specification for the requirements and test methods for processing waste wood'. In this instance Grade A waste wood is to be defined as 'clean' recycled waste wood. 'Clean' is interpreted as, "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". Consequently, the Biomass Plant falls to be regulated under Schedule 1, Part 2, Chapter 5, Section 5.1 Part B (a) of The Environmental Permitting (England and Wales) Regulations 2016 (EPR). An application for a Direction from the Secretary of State was approved on 4<sup>th</sup> February 2020 to change the regulatory authority of the Part B activity from the local authority, Shropshire County Council, to the Agency. The Agency is the regulator from the date the direction came into force on 14<sup>th</sup> November 2019. The variation application to include the Part B activity requires consideration of the possible harm from emissions associated with the activity on potentially sensitive receptors.
- 1.1.5 The 'clean' waste wood included within the fuel feedstock is sourced separately from other grades of wood and directly from customers. This is subject to additional checking at the existing permitted MRF at Wood Lane in accordance with the waste acceptance procedures for the site and with the requirements of the permit. The 'clean' waste wood acceptance procedures are detailed in Tudor Griffiths Environmental Management System provided at Appendix A.

1.1.6 This document concerns the operational management of the activity and the identification and management of associated environmental risks.

1.1.7 Reference has been made to Process Guidance Note 5/1(20) (PGN 5/1/(20)) Statutory Guidance Note for the Combustion of Waste Wood.

## **1.2 Activity Location**

1.2.1 Wood Lane Landfill Site MRF is located to the south of Ellesmere on the A528 Ellesmere to Shrewsbury Road at National Grid Reference (NGR) SJ 42265 32502. The town of Ellesmere is located approximately 3.25km to the north-west of the site. The nearest residential receptors are located approximately to the west of the site off A528, and to the north-west of the site in the urban area of Whitemere. The current primary entrance to the site is to the west from Wood Lane. A Site Location Plan (ref: Drawing 3016/1/002) showing the site location and permit boundary accompanies this application.

## **1.3 Proposed Activity**

1.3.1 The Biomass Plant processes a feedstock consisting of dried chipped 'clean' waste wood supplemented with dried shredded virgin wood

1.3.2 The feedstock is transported to the boiler via walking floors located within the building which are supplied by loading shovel from the feedstock preparation area. The feedstock is then fed into the burners by augers.

1.3.3 The process takes place within an enclosed building on a sealed impermeable surface. Ingress and egress to and from the building is via two 6m steel roller shutter doors.

1.3.4 Application forms Part A, C2 and C3 and F1 have been completed and are provided with this application. These supporting documents are provided at Appendix B of this application.

## **1.4 Plant / Equipment**

1.4.1 The Biomass Plant consists of seven Linka 995kW boilers and walking floor feed systems. The boiler package includes:

- Step grate combustion chambers
- Rotary fire valves between the fuel & combustion chambers
- Automatic ash discharge
- 2.5m<sup>3</sup> ash containers with tele-handler lifting brackets
- Multi-cyclone emission filters
- Automatic air-blast cleaning
- Automatic ignition
- Air compressors
- Water suppression fire safety system
- PLC controllers with O<sub>2</sub> meter & remote internet access
- SMS text fault alert
- Stainless steel flues
- 8m x 4.5m moving floor fuel feeders
- Kamstrup RHI compliant heat meters

1.4.2 Additional mobile plant present on site includes a wood shredder, a three way screen, a metal separator and a wheeled loading shovel. All waste wood processing including any

drying is managed in accordance with the extant permit EPR/CP3698VW. Technical specification of the Biomass Plant is provided at Appendix E.

- 1.4.3 In accordance with PGN5/1(20) the plant design and operation has been considered with regards to Best Available Techniques. Larger thermal input boilers were not considered due to the variability in Grade A feedstock. The installation of seven smaller (<1MW) boilers allows the boilers to be operational based on the amount of feedstock. BAT requires that the heat requirement is matched with the waste load and limiting the potential for the dissipation of unwanted heat. The heat requirement is determined by the volume of Grade A waste wood requiring drying in the drying floors. By installing smaller boilers this ensures that the boilers that are operational are continuously fed in accordance with section 4.2.2. Continuous feed produces better combustion than stop-start burning. By utilising smaller numerous boilers allows drying floors to be closed off to allow product to cool. No more than four or five of the boilers are used at any one time.
- 1.4.4 The design of the Biomass Plant was to enable the best utilisation of the drying floors for which the biomass boilers produce heat. The primary objective of installing seven biomass boilers.

## **1.5 Information & Records**

- 1.5.1 Records are kept of any inspections, tests, monitoring, weather conditions, maintenance and of any complaints about the activity substantiated or otherwise for a minimum of 6 years in accordance with Process Guidance Note 5/1 (20) Statutory Guidance Note for the Combustion of Waste Wood. These records will be retained by the operator and will be made available to the regulators in accordance with permitted requirements and in accordance with the Environmental Management System (EMS) document maintained by the operator.
- 1.5.2 In the case of abnormal emissions, malfunction or breakdown leading to abnormal emissions the operator will:
- Investigate and undertake remedial action immediately;
  - Adjust the process of activity to minimize those emissions; and
  - Promptly record the events and actions taken.
- 1.5.3 The regulator will be informed without delay, whether or not there is related monitoring showing an adverse result:
- If there is an emission that is likely to have an effect on the local community; or
  - In the event of the failure of key arrestment plant, for example, bag filtration plant or scrubber units.
- 1.5.4 A copy of the Environmental Permit, this permit application report and all other relevant supporting documentation will be held by the operator for reference by all relevant staff. All relevant staff will be familiar with the conditions of the permit.

## **1.6 Roles & Responsibilities**

- 1.6.1 The activity will be operated in accordance with the conditions established in this document and Process Guidance Note 5/1 (20).
- 1.6.2 Staff will have clearly defined roles and responsibilities. Appropriate training will be undertaken and appropriate written instructions will be given where necessary. Copies of any such written instructions will be retained and used to investigate any incidents. Any



contractors employed on site will be provided with necessary information before commencing work.

- 1.6.3 All relevant staff will hold relevant valid operating licences for each item of equipment and mobile plant to be used at the activity. The Operator will carry out appropriate risk assessments to the activities.

## 2 PERMITTED ACTIVITIES

### 2.1 Overview

2.1.1 The following section provides a detailed description of each process occurring as part of the activity. Figure 1 illustrates the individual stages of the process and the expected emissions at each stage.

### 2.2 Processes

#### ***Production of Feedstock***

2.2.1 Virgin wood is taken from the virgin wood stockpile at the Wood Lane Landfill Site MRF. 'Grade A' waste wood, in accordance with BSI PAS 111:2012 is shredded and screened on site on a concrete yard adjacent to the Biomass Plant building which consists of a concrete surfaced operational yard. Any virgin chip for boiler fuel is shredded on a designated area away from the Grade A waste wood to avoid mixing. The resulting shredded (Grade A & Virgin) wood feedstock is then transferred and loaded into the walking floor feeders for the biomass boilers using a loading shovel. Any emissions of noise or dust as a result of this activity will be managed under the existing EMS and be regulated by the extant permit referenced EPR/CP3698VW/V003.

2.2.2 The list of waste types to be considered as a feedstock will be limited to source segregated Grade A waste wood from the following EWC Codes as listed in Table 4.1 of PGN 5/1 (20):

<b>EWC code</b>	<b>Description</b>	<b>Further Restriction</b>
02 01 03 02 01 07	Plant tissue waste from agriculture, horticulture and forestry	
03 01 01	Waste bark and cork from wood processing and the production of panels and furniture	No chemical treatments applied
03 01 05	Sawdust, shavings, cuttings, wood, particle board and veneer that is fixed to the board, other than those mentioned in 03 01 04	No chemical treatments applied
03 03 01	Waste bark and wood from pulp, paper and cardboard production and processing	No chemical treatments applied
15 01 03	Wooden packaging	Visibly clean wooden packaging, including pallets, no chemical treatments applied
19 12 07	Wood other than wood containing hazardous substances (19 12 06) from waste management facilities	Source segregated visibly clean single waste wood streams such as pallets, where no chemical treatments have been applied Post-segregation of mixed waste wood streams from civic amenity sites or skip hire Operators is not sufficient

#### ***Burning of Feedstock***

2.2.3 The burners provide heat to the biomass boiler while automatically removing wood ash to a storage compartment via the automatic ash extraction system. This is a stainless steel,

laterally-mounted ash auger which is fitted in the base of the boiler and transports the ash out to the inclined auger which is then moved to an ash container. Water inside the boiler system is heated before being piped to the drying system.

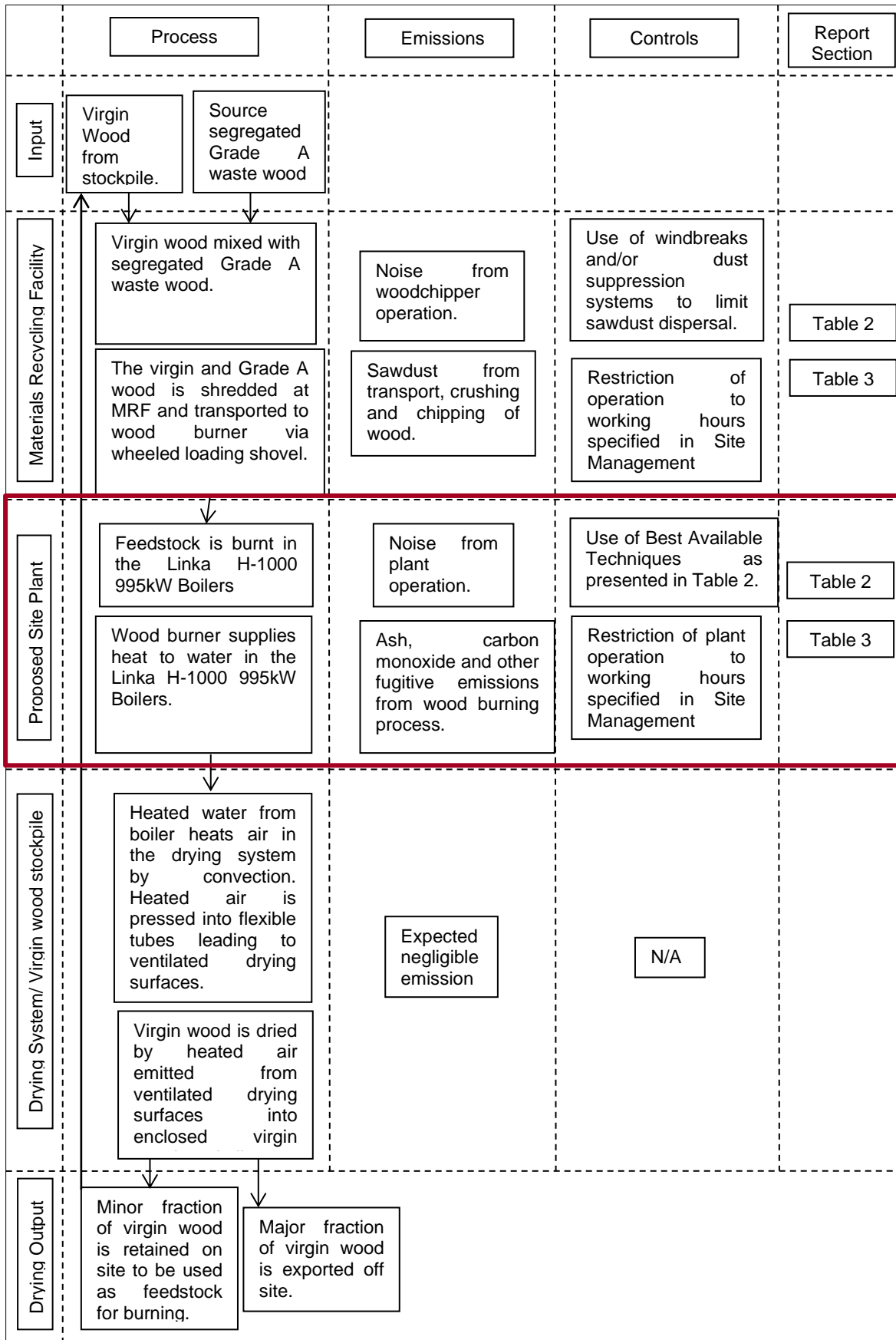
***Application of Heat Output***

- 2.2.4 Heat energy produced by the boiler system is transmitted from water to air in the drying system by convection. The heated air is passed through flexible insulated tubes to ventilated drying surfaces beneath the drying bays for virgin wood and crops. Fugitive emissions from this system are limited to water vapour from the wood drying process.
- 2.2.5 The dried wood is primarily exported off site as a fuel, although a proportion of dried virgin wood is retained on site for use as a feedstock for the Biomass Plant.

**2.3 Process Outputs**

- 2.3.1 Outputs of the activity include heat energy which is directly utilised to dry wood. The Linka biomass boilers come equipped with automatic flue pipe cleaning. A number of pressure tanks are mounted on the boilers along with soot valves. These inject air into the boilers flue pipes to clean them resulting in manual cleaning being rarely necessary. A small volume of wood ash is also produced as a by-product of the burning process. Ash is removed from the boiler within the building, limiting the risk of fugitive emissions in the form of windblown ash. The wood ash is removed to a storage compartment via the automatic ash extraction system. Wood ash from the process is contained within an enclosed container prior to removal from site for disposal. The impact from fugitive emissions is assessed in Section 4 and 5 of this application.
- 2.3.2 An Air Quality Assessment was undertaken for the Biomass Plant as part of the planning application supporting documentation. A copy of the Air Quality Assessment is provided at Appendix C of this application.

**Figure 1: Process Flow Chart**





### 3 EMISSIONS & MONITORING

#### 3.1 Potential Emissions

- 3.1.1 The operator will monitor the wood burner for any emissions in accordance with PGN 5/1 (20) provides emission controls to be implemented for plants with a maximum burn rate of 90kg/hour or more but with a rated thermal input of less than 1MW.
- 3.1.2 Point source emissions are expected to be generated by the wood burner and released in flue gas through the vertical stack. Fugitive emissions may also be released from the wood burner itself, though these are expected to be of negligible quantity and will be minimised by confinement in the building. Fugitive emissions of dust and particulate matter may also be generated by production and transport of feedstock. These emissions will continue to be managed under the extant permit EPR/CP3698VW/V003 and will not be considered in this report. The Biomass Plant and drying system are not expected to produce emissions other than water vapour. The permit was varied in March 2017 to include the drying activities within the permitted list of activities at the Site. Best Available Techniques (BAT) for the reduction of point source emissions are provided in Table 2.
- 3.1.3 The risk to sensitive receptors by point source emissions is provided in Table 3. An Air Quality Assessment was undertaken to assess the impact on local air quality of combustion emissions from the proposed Biomass Plant. A copy of the Air Quality Assessment is provided at Appendix C.

#### 3.2 Point Source Emissions

##### *Visible Plumes*

- 3.2.1 Smoke fumes may be produced by burning of excessive loads of feedstock and may be released as a point source from the plant's stack. Daily visual inspections of emissions from the stack will be carried out during operation of the wood burner in accordance with PG 5/1(20). These inspections will be undertaken using Ringelmann Shade charts. During normal operation, emissions should be free from visible smoke (Ringelmann Shade 1).
- 3.2.2 If visual inspections reveal routine visible plume generation, the composition of wood feedstock will be reviewed as will the rate of wood input and the automated air intake setting. Hourly inspection of stack emissions will be carried out until successful mitigation of visible plumes is achieved.

##### *Particulate Matter*

- 3.2.3 Particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) are produced by poor combustion of feedstock, resulting in ash or soot that may be released as a point source from the plant's stacks. The Air Quality Assessment has identified that the annual mean PM<sub>10</sub> and 24 hour mean PM<sub>10</sub> is less than 1% and less than 10% respectively of the relevant Environment Agency / Air Quality Objectives at all receptors and can be considered insignificant. In accordance with the PG 5/1(20), the Emission Limit Value (ELV) for particulate matter is 90 mg/Nm<sup>3</sup> for existing plant. A deviation from Best Available Techniques is proposed by applying a conservative emission limit value of 34 mg/Nm<sup>3</sup> consistent with the modelled emission in the AQA. The plant is fitted with a filter leak monitor to assess the performance of abatement equipment (multi-cyclone). The multi-cyclone emission filters allow particulates to be removed resulting through the capture of coarse particulates (PM<sub>5</sub> and PM<sub>10</sub>). Where a failure of abatement equipment is detected, a visual and audible alarm will be triggered.

3.2.4 In addition to continuous indicative monitoring, manual extractive testing is conducted on an annual basis as described by standard EN 13284-1. Records of any continuous monitoring alarms and of all samples taken during annual extractive sampling will be made and kept on site by the operator for at least two years. These records will be made available to regulators upon request.

#### ***Carbon Monoxide***

3.2.5 Carbon monoxide can be produced by incomplete combustion of carbonaceous fuels, usually by insufficient oxygen in the process. Carbon monoxide may be emitted in flue gas from the plant as a point source emission from the stack. The process uses a consistent feedstock of chipped virgin wood and clean waste wood, fed continuously into plant by the walking floor feeders. The plant controls automatically regulate air intake and operate continuously during normal working hours. As such, continuous carbon monoxide monitoring is not required. The Biomass Plant can accept both dry (moisture 20%-25%) and moist (moisture 20-50%) wood chip, however in order to ensure only dry wood is combusted both virgin and 'clean' waste wood are dried at the on-site drying facility prior to combustion.

3.2.6 Manual extractive testing is conducted on an annual basis. Manual extractive testing for carbon monoxide is carried out as described in standards EN15058. The ELV in PG5/1(20) for carbon monoxide is 375 mg/Nm<sup>3</sup>. Initial testing undertaken on wood chip combustion indicated carbon monoxide concentrations of 28 mg/Nm<sup>3</sup> which is below the relevant ELV.

#### ***Sulphur Dioxide***

3.2.7 According to MCPD an ELV for sulphur dioxide is not required to be applied where the feedstock comprises exclusively 'woody solid biomass'. As the proposed activity will use a consistent feedstock of virgin and chipped 'clean' waste wood, it is expected that there will be no potential for emissions of this type. As such, no monitoring for sulphur dioxide emissions is carried out.

#### ***Oxides of Nitrogen***

3.2.8 PG 5/1(20) the ELV for NO<sub>x</sub> is 600 mg/Nm<sup>3</sup> for existing plant and should be monitored in accordance with standard EN 14792. A deviation from Best Available Techniques is proposed by applying a conservative emission limit value of 152 mg/Nm<sup>3</sup> consistent with the modelled emission in the AQA.

#### ***Volatile Organic Compounds (VOCs)***

3.2.9 Manual extractive testing is carried out on an annual basis and will be carried out using the same method and sampling schedule as for particulate matter and carbon monoxide. The ELV for VOCs is 30 mg/Nm<sup>3</sup> as specified in PG 5/1(20).

#### ***Chlorine/Hydrogen Cyanide/Formaldehyde***

3.2.10 A Hydrogen cyanide ELV of 7.5 mg/Nm<sup>3</sup> as specified in PG 5/1 (20) would only be applicable when melamine faced wood was utilised in the fuel. A Formaldehyde ELV of 7.5 mg/Nm<sup>3</sup> would only be applicable when chipboard, plywood and fibreboard woods are used in the fuel as detailed in PG 5/1(20). As the activity uses a consistent feedstock of virgin and chipped 'clean' waste wood, it is expected that there will be no potential for emissions of this type. As such, no monitoring for these emissions is carried out.

### **3.3 Fugitive Emissions**

3.3.1 Based on the nature of the feedstock and plant to be used in the activity, the emissions that may be produced by the activity include noise, dust and visible plumes. It is considered

highly unlikely that there will be any potential for odour and it will not be considered further as a point source emission. A risk assessment for each of these emissions is presented in Table 4 and the best available techniques for mitigation of each potential emission are detailed in Tables 2 and 3.

#### ***Odour***

- 3.3.2 It is considered unlikely that the process will generate a significant odour, as feedstock that is combusted will consist of only virgin and 'clean' waste wood. Any odour generated is expected to be limited by the operation of proposed plant inside a building. As a conservative measure, staff will carry out regular informal odour assessments around the perimeter of the building. Management of odour emissions will be carried out under the existing EMS for Wood Lane and will not be considered further in this report.

#### ***Noise & Vibration***

- 3.3.3 The proposed activity may generate some noise and vibrations. This is expected to result primarily from the loading of feedstock into storage trays. In general, the activity is not expected to significantly contribute to noise and vibration emissions from activities currently operating on site, as plant associated with the proposed activity is unlikely to be inherently loud, and loading of chipped feedstock into storage trays is expected to produce significantly less noise than transport of unprocessed wood to and from stockpiles at the extant MRF on site. Management of noise and vibration emissions will be carried out under the existing EMS for Wood Lane and will not be considered further in this report.

#### ***Fugitive Dust/ Particulate Matter Emissions***

- 3.3.4 In addition to point source emissions of particulate matter as ash and soot from the stack of the proposed plant, fugitive emissions of soot and ash may be released from directly from the plant. These emissions are likely to be negligible however, and the plant's automated cleaning system and attached ash compartment, in addition to operation of the plant inside a building are expected to minimise the risk of emissions to air. Management of fugitive dust and particulate matter emissions will be carried out under procedures detailed in the EMS for Wood Lane and will not be considered further in this report.

### **3.4 Accident Scenarios**

#### ***Fire***

- 3.4.1 A Fire Prevention Plan has been approved by the Environment Agency for the MRF, see environmental permit EPR/CP3698VW, Table S1.2 – Operating techniques. The Fire prevention Plan has been updated to specifically address the storage of the Grade A waste wood and the associated with the activities of the Biomass Plant. A copy can be found in Appendix 8 of the EMS.
- 3.4.2 Naked flames and smoking are not allowed on site, other than in designated areas.
- 3.4.3 No waste material shall be burned within the boundaries of the Site.
- 3.4.4 Any fire at the Site will be regarded as an emergency and immediate action shall be taken to extinguish it with the appropriate fire extinguisher, provided that the person feels competent to tackle the fire.
- 3.4.5 In the event that the fire cannot be tackled with the equipment provided the Fire Brigade should be called. The Fire Brigade have been to site and have a key to access the main gates. A Fire Plan is in the Emergency box located at the front of the weighbridge as shown in Drawing TGE/08/A.

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3.4.6 All outbreaks of fire shall be notified to the Agency.



## 4 RISK ASSESSMENT

### 4.1 Hazard Pathways

- 4.1.1 When choosing the receptors, the closest and the most sensitive (if different from the closest) have been considered in each direction from the noise or dust source term. Account has been taken of the mechanism of transport to the sensitive receptor e.g. proximity to highway access and wind direction for airborne dust.
- 4.1.2 Probability of exposure is determined by the distance of the receptor to the activity and the likelihood of the hazard reaching the receptor (e.g. frequency of prevailing wind in that direction). This stage of the assessment assesses the likelihood that exposure has resulted from an uncontrolled emission i.e. without mitigation.

### 4.2 Hazard Receptors

- 4.2.1 The nearest sensitive receptors to the activity were previously identified on Drawing AQ1 Modelled Sensitive Receptors; Figure EC01 Statutory Ecological Designations within 5km, Figure EC02 Non-Statutory Ecological Designations within 2km and Figure EC03 2016 Phase 1 Habitat Map – Biomass Plant Site. A revised list of potential receptors has been identified within 2km of the Site, their direction relative to the activity area and the frequency the wind blows in the direction of the receptor is detailed in Table 1 below. Due to protected habitats being identified within the screening distance of 2km<sup>1</sup> of the Site (for any fuel), it was necessary to complete an air emissions risk assessment<sup>2</sup>. Residential receptors, roads and surface water were identified up until 500m from the boundary. A conservative assessment of the distance has been made by taking the distance as measured from the activity boundary.
- 4.2.2 A habitat search using Magic<sup>3</sup> was carried out to identify protected areas and species in and around the proposed activity. This search was conducted to determine the potential detrimental impact that constructing the proposed installation could have on the surrounding environment.

**Table 1. Sensitive Receptors**

No.	Receptor	Category	Approx. Distance from Boundary (m)	Direction from Site	Freq. (%) down wind
1	Wood Lane Nature Reserve	LWS	72	N	6.27
2	Water bodies within Wood Lane LWS	Surface Water	73	E	2.63
3	Water bodies on Wood Lane Sand and Gravel pit	Surface Water	149	SE	3.62
4	A528	Road	150	SSW, SW, WSW, W, WN W, NW	2.02-7.57
5	Ponds	Surface Water	270	S, SSW, SW	2.02-2.61
6	Water bodies on Wood Lane site	Surface Water	280	N	6.27
7	Wood Lane Farm	Residential	407	WNW	5.15
8	Unnamed Road	Road	451	N, NNE, NE,	6.27 -14.55

<sup>1</sup> <https://www.gov.uk/guidance/medium-combustion-plant-apply-for-an-environmental-permit>

<sup>2</sup> SLR (2016) Proposed Biomass Plant, Wood Lane, Ellesmere - Air Quality Assessment, document reference 403.03441.00006

<sup>3</sup> <https://magic.defra.gov.uk/MagicMap.aspx>

No.	Receptor	Category	Approx. Distance from Boundary (m)	Direction from Site	Freq. (%) down wind
9	Residential Property on A528 (Wood Lane cottages)	Residential	478	NW	7.57
10	Lee/ Yarnest Woods	Ancient Woodland/BAP habitat (Deciduous woodland)	530	WSW	5.33
11	Protected habitat near The Birches	Priority habitat (Deciduous woodland)/(No main habitat)/(Traditional Orchard)/(Semi-improved Grassland)	554	NNE,NE	8.7-14.55
12	Midland Meres & Mosses – Phase 1 (White Mere)	Ramsar	559	NW	7.57
13	White Mere	SSSI	559	W	6.73
14	Protected habitat near White Mere	BAP habitat (Deciduous woodland) & Priority habitat	705	W, WNW, NW	5.15-7.57
15	Protected habitat near Baysil Wood	Priority habitat (Deciduous woodland)/(semi improved grassland)	759	N, NNW, NW	6.27-9.81
16	Colemere Nature Reserves	LNR	840	NE	14.55
17	Protected habitat near Colemere	Priority habitat (Semi-improved Grassland)	893	E, ESE	2.04-2.63
18	Midland Meres & Mosses – Phase 2	Ramsar	1053	ENE	16.19
19	Cole Mere	SSSI	1053	ENE	16.19
20	Protected habitat near The Lyth Cottage	Woodpasture and Parkland BAP Priority Habitat/Priority habitat (Deciduous woodland)	1293	WNW,NW	5.15-7.57
21	Protected habitat near Smithy Moor	Priority habitat (Lowland Fens)/ (No main habitat)	1340	SW	2.02
22	Protected habitat near Whattal Moss	Priority habitat (Deciduous woodland)/ (Lowland Fens)/(Good quality semi-improved grassland)/ (No main habitat)	1391	S, SSE, SE	0-3.62
23	Clarepool Moss	SSSI	1762	NE	14.55
24	West Midlands Mosses	SAC	1762	NE	14.55
25	Midland Meres & Mosses – Phase 1 (Clarepool)	Ramsar	1766	NE	14.55
26	Sweat Mere and Crose Mere	SSSI	1810	S	2.61
27	Midland Meres & Mosses – Phase 2 (Sweat Mere & Crose Mere)	Ramsar	1810	S	2.61
28	Motte Castle (Crose Mere)	Scheduled Monument	1950	SSE	0

4.2.3 A number of receptors were identified within 2 km of the activity and consisted of primarily residential premises and ecological receptors including Local Wildlife Sites (LWS), Sites of Special Scientific Interest (SSSIs) and agricultural land. Residential properties may have high sensitivity to visible plumes, dust and noise and are regarded as being occupied at all times. Livestock on agricultural land may be sensitive to noise. Agricultural land is

otherwise not regarded as being sensitive to dust, noise or visible plumes. Ecologically important sites may have sensitivity to dust and air emissions.

4.2.4 There are currently only 2 Air Quality Management Zones (AQMA) within Shropshire Council (Bridgenorth and Shrewsbury). The Site is not located within an Air Quality Management Zone (AQMA). The closest AQMA to the Site is a Nitrogen Dioxide (NO<sub>2</sub>) AQMA located at the area comprising parts of Shrewsbury Town Centre approximately 21 km from the Site<sup>4</sup>.

### 4.3 Risk Assessments

4.3.1 An Air Quality Assessment (AQA) (Document ref: 403.03441.0006 dated November 2016) has been undertaken for the Site in support of the planning application for the Biomass Plant. The AQA was produced to assess the impact of combustion emissions in relation to the relevant Air Quality Objectives (AQO) and Environment Assessment Levels (EALs) for the protection of human health and vegetation and ecosystems. Dispersion Modelling was undertaken based on the pre-application discussions with the Environmental Resilience department within Environment Agency to agree upon the scope and methodology of the AQA. A copy of the AQA is provided at Appendix C. In many cases there is an interrelationship between these specific risk assessments and meteorological conditions and where relevant this has been identified. The pathway is determined by the location of the receptor relative to the activity, the distance from the activity area (m) and the frequency (likelihood) the prevailing wind will blow in the direction of the receptor. The frequency of the receptor being positioned downwind is extrapolated from the windrose<sup>5</sup> for Oteley for a five year period.

4.3.2 An Ecological Impact Assessment (EclA) was undertaken in November 2016 (Document Ref: 403.03441.00006) to provide an assessment of the ecological effects of the proposed development in support the planning application for the Biomass Plant. The EclA involved liaison with Air Quality specialists to consider the potential for deposition of combusted materials to result in impacts to ecologically designated sites. The EclA and AQA have not predicted any significant ecological impacts, either directly or indirectly, to ecologically or notable species. As no significant ecological impacts are predicted, no specific mitigation or compensation is deemed required as a result of the proposed Biomass Plant. A copy of the EclA is provided at Appendix D of this application.

4.3.3 The risk assessment tables below represent the risk of exposure to a hazard before controls are put in place. The probability of exposure is therefore not necessarily a reflection of the severity of the impact on the receptor, which may not be sensitive to the hazard. The severity of the unmitigated consequence presumes the receptor has been exposed to the hazard. If the receptor is unlikely to be exposed, then the overall unmitigated risk is low and vice versa. The mitigated risk is the residual risk presented by the hazard after control measures have been instigated. This is the most realistic representation of the risk as effective controls will be maintained under the requirements of the environmental permit, planning consent and Best Available Techniques.

4.3.4 The variation application requires evidence of the proposed techniques to be utilised in preventing or reducing fugitive emissions to air. The techniques that will be used at the installation are detailed in the appropriate Risk Assessment tables (Table 2) for the duration of the proposed activity.

<sup>4</sup> <https://uk-air.defra.gov.uk/aqma/maps/>

<sup>5</sup> <https://wind.willyweather.co.uk/wm/shropshire/oteley.html>

## 5 MITIGATION OF ENVIRONMENTAL IMPACTS

### 5.1 Emission Impacts

#### ***Ecological Impacts***

- 5.1.1 There are a number of ecological receptors within 2km of the site. There are ten Local Wildlife Sites (LWS) (only one of which is within 500m), four Sites of Special Scientific Interest (SSSIs), four Ramsar sites, one ancient woodland, one BAP habitat, one Special Area of Conservation (SAC) and one Local Nature Reserve identified. The closest Local Wildlife Site, Wood Lane Reserve, is located approximately 72m to the north of the site. Wood Lane Reserve is a former sand and gravel extraction site operated by the Tudor Griffiths Group that has been restored to a wetland and grassland. The Site is adjacent to the larger site operated by Tudor Griffiths at Wood Lane Quarry comprising landfill and quarrying activities. Woodland near Colemere has been designated as a LWS and is located approximately 660m to the east north east of the site. White Mere SSSI is located approximately 559m to the west of the site and is designated for its aquatic plants.
- 5.1.2 An area of woodland to the south west corner of White Mere SSSI is designated as a LWS. Whitemere forms part of the Midland Meres & Mosses – Phase 1 and Phase 2 Ramsar Site and West Midlands Mosses SAC. The Meres and Mosses of the North West Midlands form a nationally important series of open water and peatland sites. This comprises of a mix of open water bodies known as ‘meres’ or ‘pools’ and a small number of peatland sites or mires known as ‘mosses’. The ecological receptors in Table 1 comprise a mix of meres, mires, mosses and pools which are associated with the Midlands Meres and Mosses. The risk posed to the site by emissions from the activity is detailed in Table 3 and discussed in further detail in the AQA provided at Appendix C.
- 5.1.3 No listed buildings were identified within 500 m of the Site however there was a scheduled monuments identified in proximity to Crose Mere approximately 2km to the south-southeast of the site.

#### ***Amenity Impacts***

- 5.1.4 The Site is located in a rural, sparsely populated area, and many of the residential properties present are located at a significant distance from the site. In addition, the emissions generated by the proposed activity are expected to be minimal and will be further limited by confinement of the activity to a building. Some agricultural land and residential properties in the area may be susceptible to noise. The LWS at Wood Lane Reserve may also be susceptible to noise however the activities will be confined within the building. By restricting operations to normal working hours and ensuring that all equipment is properly maintained according to the EMS in order to limit noise emissions, it is expected that the disturbance to these premises would be minimised.

### 5.2 Techniques for Limitation of Emissions

- 5.2.1 The Best Available Techniques (BAT) for limitation of emissions to air from the proposed activity are presented in Table 2 and applied to Table 3 to assess the reduced impact as a result of their implementation at the activity. In the event of abnormal emissions, malfunction or breakdown leading to abnormal emissions, the operator will;
- Investigate and undertake remedial action immediately;
  - Adjust plant operation to minimise emissions;
  - Record the events and actions taken; and
  - Inform the Agency in the event of failure of key abatement plant or emissions that may affect the local community.



**Table 2. Point Source Emission Mitigation Best Available Techniques (BAT)**

Nature of Emission	Dust Mitigation BAT
<p><b>Dust/Particulate Matter</b></p> <p>Generated by:</p> <ul style="list-style-type: none"> <li>Agitation of burnt feedstock</li> <li>Incomplete combustion</li> <li>Insufficient cleaning of plant</li> <li>Loading, unloading and transportation of dust materials</li> </ul>	<ul style="list-style-type: none"> <li>Good combustion techniques will be used, including addition of majority of feedstock at optimum temperature, control of oxygen at optimum levels, and continuous charging of feedstock at an appropriate rate.</li> <li>Dust, ash and particulate matter will be removed in accordance with manufacturer's recommendations for plant operating procedure and retained within the building or suitable enclosed containers prior to removal from site.</li> <li>Filtration systems appropriate to plant will be used and maintained, and a suitable supply of consumable components will be kept on site.</li> <li>Loading of chipped wood and removal of ash will take place inside a building to limit emissions to air.</li> <li>Ash is automatically collected in 2.5m<sup>3</sup> ash containers via the automatic ash extraction system</li> </ul>
<p><b>Carbon Monoxide</b></p> <p>Generated by:</p> <ul style="list-style-type: none"> <li>Incomplete combustion of carbonaceous fuel</li> <li>Insufficient oxygen</li> <li>Insufficient temperature</li> </ul>	<ul style="list-style-type: none"> <li>Good combustion techniques will be used, including addition of majority of feedstock at optimum temperature, control of oxygen at optimum levels, and continuous charging of feedstock at an appropriate rate.</li> <li>Idling of plant will be minimised.</li> </ul>
<p><b>Oxides of Nitrogen</b></p> <p>Generated by:</p> <ul style="list-style-type: none"> <li>Excessive temperatures</li> </ul>	<ul style="list-style-type: none"> <li>Good combustion techniques will be used, including maintenance of oxygen, feedstock and temperature at optimum levels.</li> </ul>
<p><b>Volatile Organic Compounds (including PAHs)</b></p> <p>Generated by:</p> <ul style="list-style-type: none"> <li>Incomplete combustion</li> <li>Burning of moist, irregular feedstock</li> <li>Burning of waste wood (other than 'clean')</li> </ul>	<ul style="list-style-type: none"> <li>Good combustion techniques will be used, including maintenance of oxygen, feedstock and temperature at optimum levels.</li> <li>Feedstock will be dried and chipped prior to burning.</li> <li>Feedstock will consist only of virgin and 'clean' waste wood, with all other waste wood types manually segregated.</li> </ul>
<p><b>Smoke/Visible Plumes</b></p> <p>Generated by:</p> <ul style="list-style-type: none"> <li>Excessive burning of feedstock</li> </ul>	<ul style="list-style-type: none"> <li>Automatic fuel loading will be used during charging of burner with feedstock.</li> <li>Feedstock will be loaded at a manageable rate, and good combustion techniques will be observed to ensure complete combustion of all loaded feedstock.</li> <li>Regular visual inspections will be carried out on stack emissions using Ringelmann Shade charts. Upon observation of visible plume (excluding 30 mins after start up), loading rate of feedstock will be adjusted until plume is no longer visible.</li> </ul>

**Table 3. Point Source Emissions Risk Assessment and Action Plan**

Hazard/ Pathway	Receptor				Probability of exposure	Consequence	Overall Risk	Risk Management	Residual Risk
	No	Dist. (m)	Direc.	Down-wind Freq.					
Dust generated by site operations	1	72	N	6.27	High - Close to site, moderately downwind	Low- Site not sensitive to fugitive emissions	Medium	Good combustion techniques will be used according to plant manufacturer's specifications.	Low
	2	73	E	2.63	Medium - Close to site, infrequently downwind	Low- Site not sensitive to fugitive emissions	Medium		
	3	149	SE	3.62	Medium - Close to site, infrequently downwind	Low- Site not sensitive to fugitive emissions	Medium		
	4	150	SSW,S W,WS W,W, WNW, NW	2.02- 7.57	High - Close to site, moderately downwind	High- Potential impact to users	High	Appropriate emission monitoring is proposed.	
	5	270	S, SSW, SW	2.02- 2.61	Medium - Close to site, infrequently downwind	Low- Site not sensitive to fugitive emissions	Medium	Plant will be operated according to BAT.	
	6	280	N	6.27	High - Close to site, moderately downwind	Low- Site not sensitive to fugitive emissions	Medium	Site plant will be operated within an enclosed building.	
	7	407	WNW	5.15	High - Close to site, moderately downwind	High- Potential impact to residents	High	Only virgin wood and 'clean' waste wood will be used as feedstock.	
	8	451	N,NNE , NE,	6.27 - 14.55	Medium - Medium proximity to the site, frequently downwind	High- Potential impact to users	High	All incidents or complaints received associated with dust will be documented in records retained by operator.	
	9	478	NW	7.57	Medium - Medium proximity to the site, moderately downwind	High- Potential impact to residents	High		
	10	530	WSW	5.33	Medium - Medium proximity to the site, moderately downwind	Low- Site not sensitive to fugitive emissions	Medium		
	11	554	NNE,N E	8.7- 14.55	High - Medium proximity to the site, frequently downwind	Low- Site not sensitive to fugitive emissions	Medium	Dust will be managed in accordance with the procedures outlined in the site EMS.	
	12	559	NW	7.57	Medium - Medium proximity to the site, moderately downwind	Low- Site not sensitive to fugitive emissions	Medium		
	13	559	W	6.73	Medium - Medium proximity to the site, moderately downwind	Low- Site not sensitive to fugitive emissions	Medium		
	14	705	W, WNW, NW	5.15- 7.57	Medium - Medium proximity to the site, moderately downwind	Low- Site not sensitive to fugitive emissions	Medium		
	15	759	N,	6.27-	Medium - Medium proximity to the site,	Low- Site not sensitive to fugitive	Medium		

Hazard/ Pathway	Receptor				Probability of exposure	Consequence	Overall Risk	Risk Management	Residual Risk
	No	Dist. (m)	Direc.	Down-wind Freq.					
			NNW, NW	9.81	moderately downwind	emissions		<p>Good combustion techniques will be used according to plant manufacturer's specifications.</p> <p>Appropriate emission monitoring is proposed.</p> <p>Plant will be operated according to BAT.</p> <p>Site plant will be operated within an enclosed building.</p> <p>Only virgin wood and 'clean' waste wood will be used as feedstock.</p> <p>All incidents or complaints received associated with dust will be documented in records retained by operator.</p> <p>Dust will be managed in accordance with the procedures outlined in the site EMS.</p>	Low
16	840	NE	14.55	High - Medium proximity to the site, frequently downwind	Low- Site not sensitive to fugitive emissions	Medium			
17	893	E, ESE	2.04-2.63	Low - Medium proximity to the site, infrequently downwind	Low- Site not sensitive to fugitive emissions	Low			
18	1053	ENE	16.19	Medium - Distant from the site, frequently downwind	Low- Site not sensitive to fugitive emissions	Medium			
19	1053	ENE	16.19	Medium - Distant from the site, frequently downwind	Low- Site not sensitive to fugitive emissions	Medium			
20	1293	WNW, NW	5.15-7.57	Low - Distant from the site, moderately downwind	Low- Site not sensitive to fugitive emissions	Low			
21	1340	SW	2.02	Low - Distant from the site, infrequently downwind	Low- Site not sensitive to fugitive emissions	Low			
22	1391	S, SSE, SE	0-3.62	Low - Distant from the site, infrequently downwind	Low- Site not sensitive to fugitive emissions	Low			
23	1762	NE	14.55	Medium - Distant from the site, frequently downwind	Low- Site not sensitive to fugitive emissions	Medium			
24	1762	NE	14.55	Medium - Distant from the site, frequently downwind	Low- Site not sensitive to fugitive emissions	Medium			
25	1766	NE	14.55	Medium - Distant from the site, frequently downwind	Low- Site not sensitive to fugitive emissions	Medium			
26	1810	S	2.61	Low - Distant from the site, infrequently downwind	Low- Site not sensitive to fugitive emissions	Low			
27	1810	S	2.61	Low - Distant from the site, infrequently downwind	Low- Site not sensitive to fugitive emissions	Low			
28	1950	SSE	0	Low - Distant from the site, rarely downwind	Low- Site not sensitive to fugitive emissions	Low			

## **DRAWINGS**

## **Appendix A**

### Tudor Griffiths Environment Management System



## **Appendix B**

Environment Agency Application Forms Part A, B2, B3 and F1

## **Appendix C**

### Air Quality Assessment

**Appendix D**  
Ecological Impact Assessment

## **Appendix E**

### Technical Specification