

Dust and Particulate Emission Management Plan

Biomass UK No.2 Ltd
Renewable Energy Generation Facility
Woodham Road
Barry
CF63 4JE

Environmental Permit Reference: EPR/AB3790ZB

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Version	Date	Reviewed by	Change
1	October 2017	Steve Butler	Original
2	March 2018	Steve Butler	Updated to Correct Waste Code

1. Introduction

The purpose of this Dust and Particulate Emission Management Plan D&PEMP is to show that any potential dust produced by the proposed renewable energy generation facility at Woodham Road, Barry will be managed effectively and with no impact to the neighbouring environment. The site is located at Woodham Road, Barry, CF63 4JE.

The site is not located within an Air Quality Management Area, though is within close vicinity of sensitive residential dust receptors.

This D&PEMP should be read in conjunction with the suite of Environmental Management documents and associated operational control documents for the Site. This document provides guidance and information on the additional procedures for the control of other amenity issues, routine monitoring requirements and record management.

Biomass UK No.2 Ltd.'s ('BUK2') management team is committed to manage pollution risk from the permitted activities and will ensure that the facility is operated in full compliance with the conditions stipulated within the Environmental Permit.

This commitment includes making all necessary plant and infrastructure investments required to meet the environmental permit conditions, protect the environment and human health. The proposed design for the Barry development is largely driven by this desire and need to limit potential adverse effects of operations.

This D&PEMP has been written as a separate component of the Environmental Management System, so that it can be reviewed at least annually as a matter of routine and at additional times to reflect proactive improvements in management techniques. In addition, it will be reviewed following any incidents or issues identified on site.

All staff will be trained within the D&PEMP and a copy of the plan will be accessible to all staff at any time.

It should be noted that the site has limited potential to cause offsite dust emissions and impacts under normal operating conditions, due to the low dust generation of site activities and the control measures outlined within this document.

Potential emissions from the facility would only arise from the following sources as a result of abnormal events or emergency activities:

- Unloading, movement and transfer of shredded wood material;
- Storage of shredded wood in fuel storage building;
- Emissions from the combustor flue; and
- Collection and transport offsite of ash material.

The main areas of dust control for this site relate to:

- The Fuel Storage Building;
- External Ash Silos; and
- Plant within the Main Process Building.

The primary control measure on site is the unloading, storage and processing of all wood internally within the Fuel Storage Building which incorporates an air extraction and filtration system. Other dust control measures and a visual monitoring regime are detailed within this document.

A summary of the key control measures on site are as follows:

- Stringent Pre-acceptance and Acceptance Procedures to minimise the presence of high dust content (fines) fuel feedstock materials onsite;
- The reception and storage of all shredded wood feedstocks internally within a sealed enclosed Fuel Storage Building;
- Fast roller shutter doors fitted to the Fuel Storage building;
- The use of an extraction and filtration system within the Fuel Storage Building to prevent emissions;
- Washing of wheels on site for any vehicles which may require it;
- All relevant plant / equipment is fitted with dust abatement technology;
- The boiler system is run under negative pressure;
- Use of sealed silos for ash collection, storage and transfer;
- Continual visual monitoring during plant operation and daily visual inspection during site walkover procedures; and
- General site maintenance and good housekeeping measures.

Site personnel will be trained to be vigilant for dust levels on site and its potential migration and will be instructed to report any such potential or actual emissions immediately to Site Management.

1.1 Sensitive Receptors

The nearest sensitive receptors that have been identified around the site are detailed in the Table 1 overleaf and illustrated in the Figure 1.1.

The distances between the permitted site and the receptors, have been estimated using online maps of the area.

It is generally understood that the greater the distance from the site the less potential impacts of the emissions, due to 'drop out' and deposits.

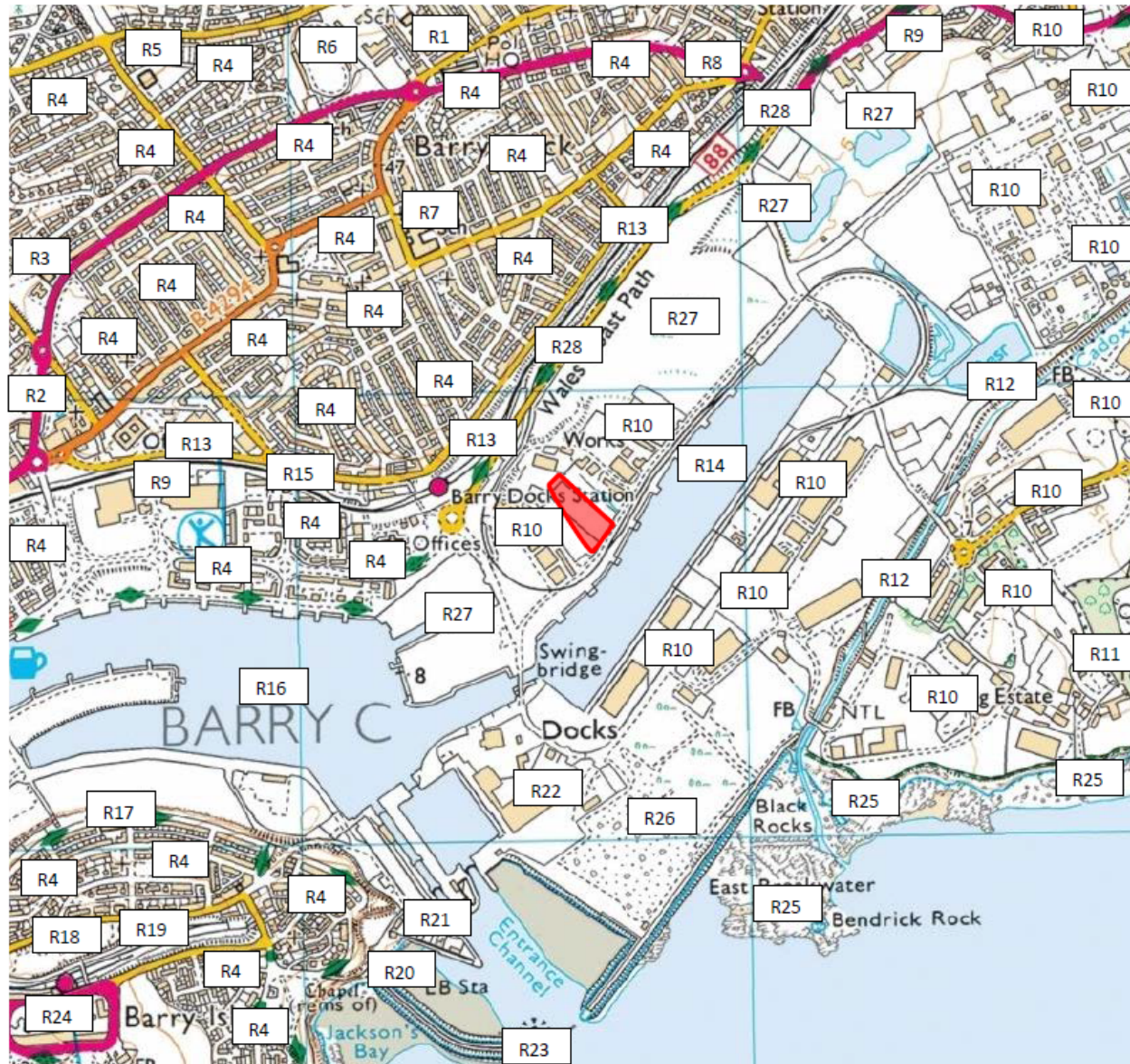
However, the operator also recognises that local ambient weather conditions and surrounding buildings can have an impact on the pathway, by causing eddy-current effects on the prevailing wind.

The site lies in a predominantly industrial setting. The closest residential development to the site is located on Dock View Road, 370 m north of the site.

In the vicinity of the permitted site, potential emission sources comprise other industrial / commercial operations which have associated areas of unpaved/unsurfaced land.

These sources have the potential to emit dust and will contribute to the ambient dust environment.

Table 1: Receptor Sensitivity				
Receptor No.	Receptor Name	Direction and Approximate Distance from Site	Sensitivity	Risk / Likelihood of Impact
R1	Jenner Park Primary School	1 km north	High Sensitivity	Low
R2	Memo Arts Centre / Theatre	1.1 km west	Medium Sensitivity	Low
R3	Gladstone Primary School	1.1 km northwest	High Sensitivity	Low
R4	Residential Receptors	250 m north, 450 m west, 880 m southwest	High Sensitivity	Medium/ Low
R5	St Helens R.C Junior School	1.2 km northwest	High Sensitivity	Low
R6	Barry Town United FC	1 km north	Medium Sensitivity	Low
R7	Holton Primary School	600 m north	High Sensitivity	Medium / Low
R8	Barry Mosque	980 m northeast	Medium Sensitivity	Low
R9	Retail Units	1 km northeast	Low Sensitivity	Low
R10	Industrial Units	Adjacent east and west, 250 m south	Low Sensitivity	Low
R11	HMS Cumbria	1.1 km southeast	Low Sensitivity	Low
R12	Cadoxton River	600 m southeast	Medium Sensitivity	Low
R13	Railway Line	150 m north	Low Sensitivity	Low
R14	Entrance Channel	780 m southwest	Low Sensitivity	Low
R15	Waterfront Medical Centre (GP)	850 m west	High Sensitivity	Medium / Low
R16	Barry Dock	50 m south	Low Sensitivity	Low
R17	Barry Island Primary School	1 km southwest	High Sensitivity	Medium / Low
R18	Maslin Park	1.2 km southwest	Medium Sensitivity	Low
R19	Barry Island Train Station	1.3 km southwest	Low Sensitivity	Low
R20	Barry Yacht Club	920 m southwest	Medium Sensitivity	Low
R21	Barry Dock Lifeboat Station	890 m southwest	Low Sensitivity	Low
R22	Associated British Ports Barry	475 m south	Low Sensitivity	Low
R23	Barry Docks Light house	1 km south	Low Sensitivity	Low
R24	Barry Island Pleasure Park	1.4 km southwest	Medium Sensitivity	Low
R25	SSSI (Hayes Point to Bendrick Rock)	700 m south	High Sensitivity	Medium / Low
R26	Solar PV Farm	430 m south	Medium Sensitivity	Low
R27	Unoccupied Land	200 m northeast	Low Sensitivity	Low
R28	A4055 Road	980 m north	Low Sensitivity	Low



Receptor No.	Receptor Name
R1	Jenner Park Primary School
R2	Memo Arts Centre / Theatre
R3	Gladstone Primary School
R4	Residential Receptors
R5	St Helens R.C Junior School
R6	Barry Town United FC
R7	Holtton Primary School
R8	Barry Mosque
R9	Retail Units
R10	Industrial Units
R11	HMS Cumbria
R12	Cadoxton River
R13	Railway line
R14	Entrance Channel
R15	Waterfront Medical Centre (GP)
R16	Barry Dock
R17	Barry Island Primary School
R18	Maslin Park
R19	Barry Island Train Station
R20	Barry Yacht Club
R21	Barry Dock lifeboat station
R22	Associated British Ports Barry
R23	Barry Docks lighthouse
R24	Barry Island Pleasure Park
R25	SSSI (Hayes point to Bendrick Rock)
R26	Solar PV Farm
R27	Unoccupied Land
R28	A4055 Road

Figure 1.1: Closest Sensitive Properties

1.2 Weather Conditions

The prevailing wind conditions at the site are predominantly from the west. The site location, on the coast in South Wales, is also considered to be in an area with high precipitation.

Wind direction will determine the distribution of dust if emitted from the plume. As such, the exhaust flue is located in the south west of the site, furthest from the sites eastern boundary. Daily checks of the weather conditions will be undertaken as will visual monitoring of the plume as part of the daily site walkover. Continuous monitoring for dust emissions will also be undertaken during plant operation as part of the CEMS (Continuous Emissions Monitoring System), on the exhaust flue.

The internal nature of the unloading and storage of the shredded wood means that the weather conditions have no impact on this aspect of the sites operations.

2 Operations at Barry Renewable Energy Generation Facility

2.1 Waste Wood Deliveries and Processing

The transport of waste wood into the facility and deposit of materials during delivery has the potential to result in dust emissions in some cases such as;

- the direct escape of material from vehicles;
- the process of unloading vehicles;
- deposits on roads via the wheels when the vehicle leaves the site;
- processing of material (screening and sampling); and
- transferral of material from storage bays to fuel transfer system via mechanical loading shovels.

All of these sources are prevented and minimised at site through the following measures;

- Prior to wood fuel receipt, inspections are completed by the management team to ensure the quality of wood is acceptable in accordance with site waste pre-acceptance procedures. No inherently dusty or fines materials will be accepted at the site.
- All wood fuel delivered to site via road will be in covered walking floor transporters, which are sealed to prevent any material escape and mechanically deposit the material at slow speed and at low tipping height, reducing potential for dust release and migration;
- Every load received onsite is subject to inspection by trained operations staff. Loads will be rejected in the event of the material being particularly dusty.
- The process of unloading and subsequent transfer takes place internally within the Fuel Storage Building;
- Electrical 'Fast Action' Roller Doors are used for entrance / egress from the Fuel Storage Building;
- Air from within the Fuel Storage Building is extracted via a filtration system in the push floor area which removes dust from the fuel storage building and abated prior to release to atmosphere;
- The fuel storage building is equipped with a push floor which uses a conveyor system to transport waste wood to the gasifier, this minimises double handling and tipping (and hence minimises dust creation) through shovel loaders;
- Prior to leaving the Fuel Storage Building, vehicle wheels will be checked for dust and washed if required;
- None of the materials processed at site will be deposited on site roads or tracked over by vehicles; and
- All roads are constructed of sealed concrete hardstanding, which avoids dust generated from unpaved surfaces during dry weather.

As part of the pre-acceptance / acceptance procedures, no potential dry/fines containing loads will be accepted on site. All wastes accepted on site are subject to stringent waste acceptance criteria in accordance with the site environmental management plan and associated procedures:

- BUK-E01 Pre-acceptance Procedure;
- BUK-E02 Waste Acceptance Procedure; and
- BUK-E03 Waste Rejection Procedure.

All fuel feedstocks will be accepted on site in accordance with the procedures outlined above. If any waste is inspected and found to contain fines, powders or excessively dusty materials above the contracted acceptance specification, then the load will be immediately rejected off site in accordance with site procedures.

Incoming loads are reported to the site manager and respective staff by the weighbridge personnel upon arrival and will be directed to the Fuel Storage Building via the designated access route and electrically operated roller shutter doors. A check will be made that the waste load has been Pre-accepted in accordance with procedure BUK-E01 and the load is inspected for any non-conforming materials.

Details including the following are recorded for each load:

- Date and time of delivery
- Details and description of the vehicle delivering the waste, drivers name and vehicle operator; and
- Description of the waste including type and quantity.

Please refer to Table 2.1 which identifies all fuel grade materials accepted at the site.

Table 2.1: Typical Waste Types brought to Barry Renewable Energy Generation Facility

Table 2.1 Typical waste types					
European Waste Code (EWC)	Waste	Product Description	Tonnes/year	Destination within Facility	Process
19 12 07		'Fuel Grade' Mixed Waste Wood	86,400	Waste Wood will be stored within the Fuel Storage Building prior to use as a fuel for the gasification process.	Combustion

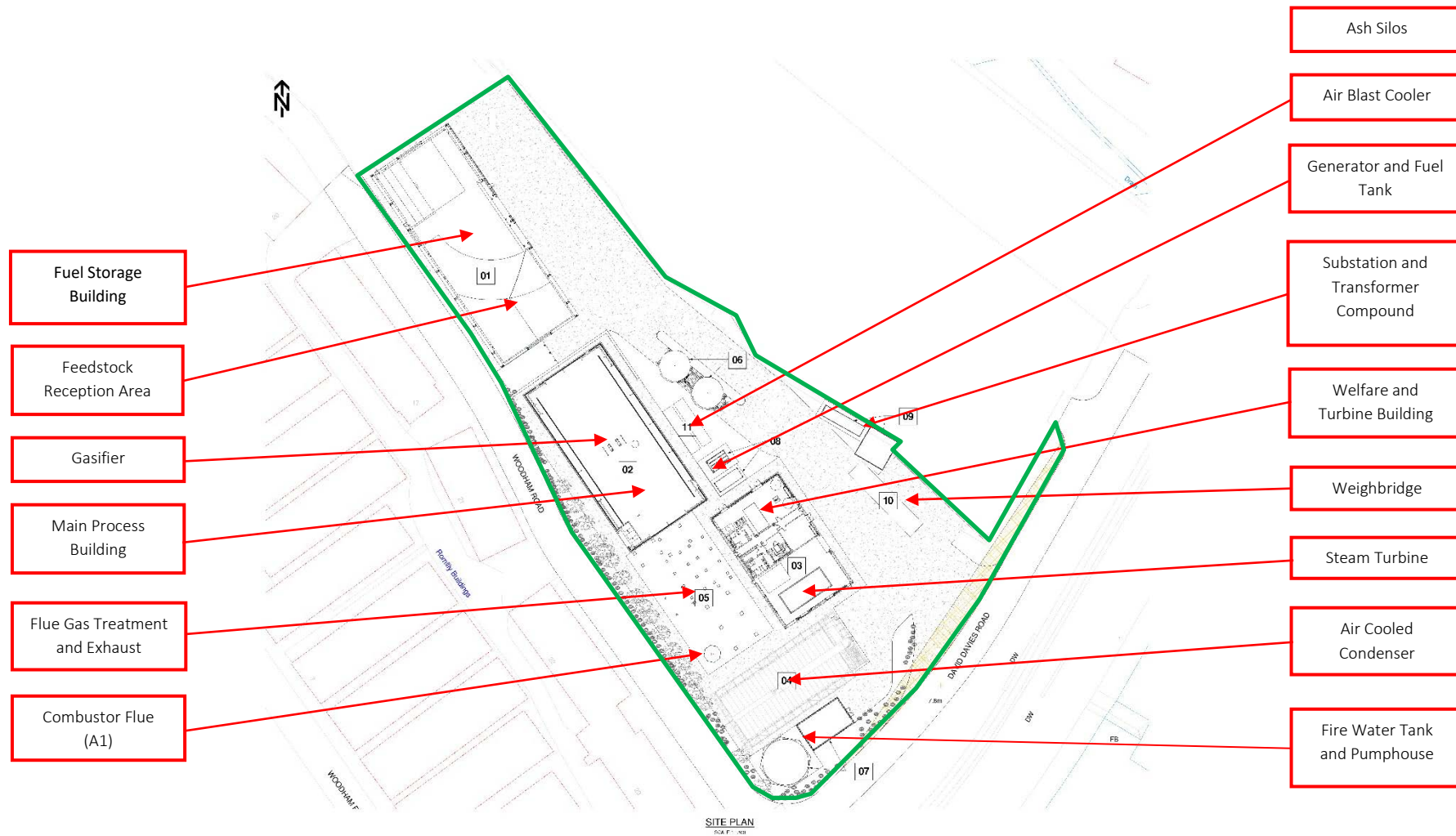
2.2 Overview of Gasification Process and Dust Controls

The site layout includes the following key areas:

Table 2.2: Overview of Proces and Dust controls			
Area	Purpose	Potential for dust releases?	Control Measure
Fuel Storage Building:	For the delivery and reception of mixed waste wood feedstocks including an enclosed transfer system;	YES	<ul style="list-style-type: none"> • Enclosed Building • Covered Delivery • Extraction Systems • Wheelwash
Waste Processing:	For the screening and sampling of the fuel feedstocks before being delivered to the gasification unit;	YES	<ul style="list-style-type: none"> • Internal Process • Building Extraction and Abatement • Covered Enclosed Conveyors
Fluidised Bed Gasification System:	Comprising a gasification line for the thermal conversion and combustion of syngas from the fuel feedstocks;	YES	<ul style="list-style-type: none"> • Fully enclosed ash handling process
Steam Turbine Generator:	Comprising a steam turbine and generator for the conversion of steam into electricity within a steam turbine; and	NO	Fully enclosed process
Gas Cleaning and Pollution Abatement Plant:	Consisting of selective non-catalytic reduction (SNCR) and selective catalytic reduction (SCR) for the reduction of Nitrogen Oxides (NOx), sorbent injection for acid gas neutralisation and activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOC and other harmful substances.	YES	<ul style="list-style-type: none"> • Sealed reagent hoppers • Baghouse filtration • Sealed ash silos

In addition, ancillary infrastructure also includes two externally located ash silos, air cooled codensers / cooling plant and a 44m high exhaust stack.

Please refer to the site layout below which identifies the key areas mentioned above.



The main gasification activity has the potential to produce dust in the form of ash as part of the combustion process. The ash is formed in the following locations:

- Boiler;
- Multicyclone;
- Economiser; and
- Air pollution devices.

Ash Handling and Disposal

A mechanical ash system is provided for continuous collection and transport from each discharge point of the process to a multi-day storage tank. A rapid unloading and conditioning system is included to empty the ash storage tank into sealed articulated vehicles for removal from site.

All ash handling processes are fully contained and have limited potential for dust release.

Ash Pick-up and Conveyance (to Storage)

The Installation has two ash systems.

- The first system handles the ash from the boiler, multiclone and the economiser; and
- The second system will remove and store the ash from the air pollution control devices.

The boiler / multiclone / economiser system starts from the discharge flange of a manual isolation valve and powered seal valve on each ash collection hopper.

Ash from the boiler hopper seal valves discharge to a water cooled mechanical conveyor transporting the high temperature ash to downstream collection conveyors.

A series of mechanical collection conveyors pick up ash from the multiclone and economiser hoppers and transports it to the boiler / multiclone / economiser lift elevator for discharge into the ash silo for storage.

As this is a water cooled conveyor, the ash is transported in wet form, which significantly reduces the potential for dust generation.

The air pollution control ash system is a mechanical system that includes the required components to collect and transport ash from each ash hopper on the pollution control system to a second ash storage tank dedicated to store ash from these components. This generally consists of a bag house filter as part of the flue gas cleaning process.

Ash Storage and Conditioning System

The storage tank for the boiler / multiclone / economiser system provides approximately 212m³ of storage.

The storage tank for the air pollution control equipment provides approximately 141m³ of storage. Each tank is equipped with a fabric filter bin vent that filters the air of particulate prior to venting to atmosphere. The

storage system is complete with supports, fluidising nozzles to enhance mass flow and an isolation slide gate valve in the lower cone section. The discharge is elevated to facilitate unloading into sealed trucks.

An ash wetting system is included to condition the fly ash and suppress fugitive dust during the normal unloading operation from the storage bin.

A pneumatic knife gate and rotary feeder seals the ash tank and discharges ash into the conditioning mixer. The conditioning mixer is equipped with an automated water spray system that wets the ash during the mixing process to reduce fugitive emissions during discharge into truck containers.

A Continual Flue Gas Monitoring System is fitted to the exhaust stack to monitor all dust and gas emissions.

Visual monitoring of the site will be undertaken daily as part of the site walkover, and will include dust sources in the Fuel Storage Building, exhaust stack and ash storage silos.

All site infrastructure, including dust abatement systems will be inspected at least daily and records kept as part of the site routine maintenance inspection programme/procedures.

Site roadways will also be inspected during the daily site walkover and if required a road sweeper will be employed.

For worker, site safety and dust minimisation issues, vehicle speeds will also be limited to 5 mph at all times.

In the event that dust emissions are observed or reported to be leaving the site (i.e. causing nuisance to the sites neighbours), the operation causing the emission will be ceased immediately. This ceasing of operations on site will ensure that the site does not continue to create a nuisance to any nearby receptors.

Please refer to Table 2.2 which identifies the wastes removed from site.

Table 2.2: Typical Destination for Residual Wastes

Table 2.1 Typical Destination for Recovered and Residual Materials: Export from Port Clarence Biomass Processing Plant			
European Waste Code (EWC)	Product Description	Average yearly tonnage	Material End Use
10 01 15	Bottom Ash	3,944	Aggregate
19 01 05*	Fly Ash (Air Pollution Control (APC) Residues)	2,072	Reclaimed and reused offsite
20 03 01	Oversized Particles	88	Reclaimed and reused offsite
02 01 10	Metals	88	Reclaimed and reused offsite
10 01 15	Used Bed Material	400	Aggregate

3 Dust and Particulate (PM₁₀) Management

3.1 Responsibility for Implementation of the D&PEMP

The Site Manager is responsible for the D&PEMP and making sure that the site is compliant at all times.

The technically competent site management team will provide formal training to ensure all site staff are aware of the D&PEMP. Each staff member will receive refresher training on the D&PEMP annually.

The D&PEMP is 'live' and will be reviewed at least annually and after any environmental incidents, significant change to the site activities, or at the request of Natural Resources Wales (NRW).

3.2 Sources and Control of Fugitive Dust / Particulate Emissions

Diffuse emissions from the renewable energy generation facility may arise from abnormal operations regarding the wood storage and processing area, exhaust stack and ash storage and transportation as detailed below:

- *Vehicles entering and/or leaving the site with mud and debris on wheels, and tracking dust on to or off the site.*

Wood is unloaded within the enclosed Fuel Storage Building which prevents fugitive emissions to atmosphere during unloading. Prior to leaving the site, vehicle wheels are checked for dust and washed if required.

The site is hard paved only which is a recognised method of reducing dust on site from vehicle movements.

A site speed limit of 5 mph will be enforced via signage and site staff and management.

- *Wood dust when unloading waste wood from vehicles*

All vehicles delivering wood to site will be covered walking floor transporters. These vehicles push the material at low level and at low speed into the storage areas. There will be no 'high level' tipping. The dust generated by this process is minimal.

In addition, wood is unloaded within the enclosed Fuel Storage Building with an active air extraction and filtration system which negates fugitive emissions to atmosphere during unloading.

- *Vehicles and plant moving around the site generating dust*

Please see above comments regarding emissions from vehicles entering and leaving site.

A site speed limit of 5 mph will be enforced via signage and site staff and management.

Mechanical loading shovels are used within the Fuel Storage Building for the transfer of wood fuel from storage piles to the push floor feed system. Prior to movement to another area of site, the

wheels of the vehicles are checked and cleaned prior to leaving the building. Due to the design of the push floor, there is no need to 'lift and tip' the wood fuels and thus dust generation will be naturally minimised.

Site roadways will be assessed as part of the daily site walkover and a road sweeper employed from an external contractor should the need arise.

- *Processing waste wood - screening*

The processing of the wood feedstock comprises screening and is undertaken within a sealed system. This consists of a conveyor system equipped with a ferrous and non-ferrous metal separator to remove any metals contained within the feedstock materials. Metals will be separated using an overband magnet and segregated into a dedicated container.

Downstream of the metal separator, the wood chips will travel over a police screen. Oversize feedstock parts will be too large to fall through the screen and will be collected in a separate container. Smaller feedstock parts will be dropped onto a chain conveyor, which will transport the waste wood towards the gasifier metering bins and onwards into the gasifier.

An air extraction system is in place within the Fuel Storage Building. Air is extracted via the push floor area and the system is fitted with filtration to prevent dust emissions.

- *Waste storage in stockpile*

Dust will not tend to be generated by the stockpile due to the very low content of fines. In addition, all storage of shredded wood is undertaken within the enclosed Fuel Storage Building with an active extraction and filtration system.

- *Particulate emissions from the exhaust stack*

A flue gas treatment system is employed to remove particulates from the stack prior to emission to atmosphere. Particulate in the gas stream is captured in a pulse-jet baghouse system. The air passes through the filter media, depositing dust on the outside of the bag. The cleaned air passes inside the bag to the clean air chamber at the top of the unit.

Treated filter ash is retained within the filter unit and is collected directly in a bagging unit located underneath the filter.

The stack is also fitted with a continuous monitoring system which logs the particulate emission and is fitted with an alarm should abnormal operating conditions arise.

Visual monitoring of the plume is undertaken daily as part of the site walkover.

- *Bottom Ash Handling and Disposal*

Bottom ash generated by the combustion process is continually collected from the boiler/economiser/ multicyclone via a series of mechanical conveyors and transported to the

dedicated ash silo for storage. Ash from the boiler is transported in wet form due to the water cooling which acts as effective dust suppression. In addition, the entire system is sealed.

- *APC Residue Handling and Disposal*

The flue gas cleaning system removed fly ash and absorbents from the flue gas as it passes through the baghouse filter leaving them behind as APC ash. This is recovered from the bottom of the filter and transported via a series of mechanical conveyors to the dedicated ash silo for storage. This entire system is sealed.

- *Ash Storage and Loading*

Both ash silos are sealed and located externally. They are fitted with fabric filter bin vents to filter the air of particulate prior to venting to atmosphere.

Both ash types are transported offsite via covered truck containers for offsite recycling. The discharge point on both silos is elevated to facilitate loading of the trucks.

An ash wetting system involving a conditioning mixer and automated water spray system is incorporated into the silos to reduce fugitive emissions during ash discharge.

- *Particulate emissions from the exhaust of vehicles/ machinery on site.*

This will not be an issue with regard to off-site emissions. All equipment used on site will be incorporate the latest low emission types of engine ensuring lowest possible levels of particulate arising from this source. The machinery used on site will be subject to a regular preventative inspection and maintenance programme to maintain fuel efficient operations and avoid interruption to processing.

The dust sources on site, pathways, receptors and measures proposed to interrupt those pathways are summarised in Table 3.2.

Table 3.1: Control of Dust / Particulates (PM₁₀)

Abatement Measure	Description / Effect	Overall Consideration and implementation
Preventative Measures		Low Cost Options
Speed Limit	Vehicle speeds will be limited to 5 mph on site which is a recognised method of controlling dust.	<ul style="list-style-type: none"> Fully Implemented
Type of Vehicle and Minimising Drop Heights of Waste	<p>All vehicles delivering wood to site will be covered walking floor transporters. These vehicles push the material at low level and at low speed into the processing area. There will be no 'high level' tipping.</p> <p>An enclosed feed transfer system in the form of a hydraulic push floor screens and transports feedstock from the storage area to the gasifier. This is a system of conveyors with no significant drop heights.</p>	<ul style="list-style-type: none"> Fully Implemented
Type of Material Stored on Site	All incoming materials are free from fines and dusts as far as possible and purchased in accordance with a strict specification. There are no fines being generated at site.	<ul style="list-style-type: none"> Fully Implemented
Inspection	All plant will be regularly maintained, inspected and kept clean to avoid a build-up of material, which may lead to spillage and emissions.	<ul style="list-style-type: none"> Fully Implemented
Visual monitoring	Daily site checks in the form of a walkover will include monitoring for dust around the site, roadways and the plume, taking note of the weather conditions.	<ul style="list-style-type: none"> Fully implemented
Road Surfaces	All haul roads are constructed of concrete, there will be no unsurfaced roadways, resulting in dust being minimal. This also makes the roads easy to clean. Roads and surfaces are inspected daily and road sweeping may be undertaken by hire in contractors if required.	<ul style="list-style-type: none"> Fully Implemented
Preventative Measures		Medium Cost Options
Wetting of bottom ash during transport	Bottom ash from the boiler is collected via a mechanical system and water cooled during transport which provides a form of dust suppression.	<ul style="list-style-type: none"> Fully implemented
Sealed conveyer systems	Both the feedstock transfer conveyors and the ash collection system conveyors are located internally and additionally sealed systems to prevent loss of material during transport around the site.	<ul style="list-style-type: none"> Fully implemented
Filter bin vents	Both ash silos are fitted with fabric filter ben vents to remove particulates prior to venting to atmosphere.	<ul style="list-style-type: none"> Fully implemented

Preventative Measures		High Cost Options
Dedicated enclosed building for storage and processing of waste wood	The reception, processing and transfer of waste wood takes place within a fully enclosed Fuel Storage Building. Access to this building is via electronically operated fast roller shutter doors. The building includes an air extraction system with included filtration to prevent escape of fugitive emissions from the building.	<ul style="list-style-type: none"> Fully Implemented – Dedicated Fuel Storage Building has been incorporated onsite.
Flue Gas Treatment System	The removal of particulates from the flue gas prior to emission to atmosphere via a bag house filter system. Removal of the APC ash is undertaken by a mechanical ash conveyor system and transported to the sealed ash silos for disposal. A Continuous Emission Monitoring System (CEMS) is fitted to the flue to monitor emissions of dust and gases to atmosphere.	<ul style="list-style-type: none"> Fully implemented
Ash conditioning	Both the ash silos (one for bottom ash and the other for APC) are fitted with ash conditioning mixers which wets the ash prior to discharge to covered trucks for removal offsite, thereby minimizing potential for dust release offsite.	<ul style="list-style-type: none"> Fully implemented
Remedial Measures		Low Cost Options
Wheel Washing	<ul style="list-style-type: none"> All vehicles will be inspected prior to leaving the site. Should dust / mud / debris be present, vehicle wheels will be washed before the vehicle leaves site, thereby reducing the risk of dust being tracked offsite. 	<ul style="list-style-type: none"> Fully implemented
Remedial Measures		Medium Cost Options
N/A		
Remedial Measures		High Cost Options
N/A		

Table 3.2: Source – Pathway – Receptor Routes

Source/Activity on Site	Pathway	Receptor	Type of Impact	Measures to break Source-Receptor Pathway can be interrupted
Mud/Dust from vehicles entering and leaving site	Tracking mud on wheels of vehicles	Residential Properties / Roads	Visual Soiling Resuspension as PM ₁₀	<ul style="list-style-type: none"> The carriage of mud from the site onto the public highway is unlikely to occur due to the material types handled and concrete hard-paving proposed for the entire site. Vehicles wheels are inspected prior to leaving the site and washed if necessary. All vehicles passing through the weighbridge will be stopped and inspected. Any debris or other fugitive material to be removed from the wheels. Should it become apparent that debris from site is being deposited on the public highway, sweeping of the haul roads and other relevant areas of the site will be organised immediately to prevent further mud emissions to the public highway. Site surfaces will be inspected daily by site staff. The trigger for any repairs will be where any areas become damaged or worn to the extent which require diversion by site traffic. Any repairs will be undertaken by suitable contractors.
Dust generated when Unloading	Atmospheric Dispersion (Inhalation and Deposition)	Residential, School, Commercial and Industrial Premises (Humans and Property)	Respiratory irritation, surface soiling and nuisance	<ul style="list-style-type: none"> All unloading activities are undertaken within the fully enclosed Fuel Storage Building, with electrically controlled roller shutter doors and an active air extraction and filtration system. Material will be delivered in walking floor trailers offering full enclosure until delivery, minimising loss of material on surrounding road network prior to entering or upon exiting site. Any spillages of material will be internal and cleared by the loading shovel or manually by site operatives.
Dust generated during Vehicle Movements on Site	Atmospheric Dispersion (Inhalation and Deposition)	Residential, School, Commercial and Industrial Premises (Humans and Property)	Respiratory irritation, surface soiling and nuisance	<ul style="list-style-type: none"> Entire site hard paved as above. Site speed limit of 5mph enforced via signage and site management. Vehicle movements are minimised on site via the usual operational need for efficiency and reduction of fuel use.
Dust generated during processing	Atmospheric Dispersion	Residential, School, Commercial and Industrial	Respiratory irritation, surface soiling and nuisance	<ul style="list-style-type: none"> There is no pre-processing carried out on site.

of wood feedstocks	(Inhalation and Deposition)	Premises (Humans and Property)		
Dust generated from stockpile	Atmospheric Dispersion (Inhalation and Deposition)	Residential, School, Commercial and Industrial Premises (Humans and Property)	Respiratory irritation, surface soiling and nuisance	<ul style="list-style-type: none"> All storage of waste takes place within the fully enclosed Fuel Storage Building, with electrically controlled roller shutter doors and an active air extraction and filtration system. In addition, dust will not tend to be generated by the stockpile or its forming, due to the material size and low content of fines.
Particulate from the exhaust stack	Atmospheric Dispersion (Inhalation and Deposition)	Residential, School, Commercial and Industrial Premises (Humans and Property)	Respiratory irritation, surface soiling and nuisance	<ul style="list-style-type: none"> A flue gas treatment system removes particulates from the stack prior to emission to atmosphere via a pulse-jet baghouse system. The stack is fitted with a continuous emissions monitoring system which logs the particulate emission and is fitted with an alarm should abnormal operating conditions arise. Visual monitoring of the plume is undertaken daily as part of the site walkover.
Bottom ash generated during combustion	Atmospheric Dispersion (Inhalation and Deposition)	Residential, School, Commercial and Industrial Premises (Humans and Property)	Respiratory irritation, surface soiling and nuisance	<ul style="list-style-type: none"> Bottom ash is continually collected from the boiler/economiser/ multiclone via a series of mechanical conveyors and transported to the dedicated ash silo for storage. The boiler system is operated at negative pressure thereby diminishing fugitive emissions. Ash from the boiler is transported in wet form due to the water cooling which acts as effective dust suppression. In addition, the entire mechanical ash transport system and storage silo is sealed. The storage silo is fitted with a fabric filter bin vent to prevent emissions to atmosphere during venting.
APC residue generated during flue gas cleaning	Atmospheric Dispersion (Inhalation and Deposition)	Residential, School, Commercial and Industrial Premises (Humans and Property)	Respiratory irritation, surface soiling and nuisance	<ul style="list-style-type: none"> The flue gas cleaning system removes fly ash and absorbents from the flue gas as it passes through the baghouse filter leaving them behind as APC ash. This is recovered from the bottom of the filter and transported via a series of mechanical conveyors to the dedicated ash silo for storage. This entire system is enclosed, preventing any fugitive emissions during transportation. The storage silo is sealed and fitted with a fabric filter bin vent to prevent emissions to atmosphere during venting.

Dust generated during collection of ash for offsite recycling	Atmospheric Dispersion (Inhalation and Deposition)	Residential, School, Commercial and Industrial Premises (Humans and Property)	Respiratory irritation, surface soiling and nuisance	<ul style="list-style-type: none"> Ash is collected from the silos for transportation offsite via sealed articulated vehicles. The discharge points on each silo are elevated to facilitate discharge into truck containers. Prior to discharge the ash is conditioned via an ash wetting system to suppress fugitive dust during normal unloading operation from the storage silo. The ash collection process shall be overseen by a trained and competent site operative.
Particulate from exhausts of equipment and vehicles on site	Atmospheric Dispersion (Inhalation and Deposition)	Residential, School, Commercial and Industrial Premises (Humans and Property)	Respiratory irritation, surface soiling and nuisance	<ul style="list-style-type: none"> All equipment on site will incorporate the latest low emission types of engine. All machinery will be subject to a routine inspection and preventative maintenance programme to ensure smooth efficient running and avoid unnecessary emissions.
Litter	Atmospheric Dispersion (Deposition)	Residential Properties, Local School and Industrial Premises	Visual Soiling Resuspension as PM10	<ul style="list-style-type: none"> The primary control measure proposed for litter is picking. This will be undertaken when required as identified by the daily site walkover inspections.

3.3 Dust Monitoring

Monitoring of dust will be undertaken at the site consisting of regular visual inspections of the site operations.

3.3.1 Visual Monitoring

Visual monitoring will be carried out as part of the daily site checks, with results recorded on Daily Site Checklist BUK-E08. Any incidents of dust appearing to leave the site boundary will be recorded and immediately reported to Site Management.

The recorded checks will take place once per day, however site staff will be monitoring dust throughout the day. Any dust emissions with the potential to migrate from site will be reported to site management immediately.

The visual monitoring will be undertaken all around the site perimeter, with particular focus on the areas downwind of any area which had been viewed as a potential source of off-site dust emissions. (The precise location of the downwind monitoring points would move dependent on wind direction, hence it is not possible to mark these monitoring points on a site plan). Results will be recorded on the Daily Site Checklist.

All plant and equipment will be subject to daily inspections and usual checks to ensure that all dust controls are effective.

Site staff will be able to judge whether there is a risk of dust migrating from site and report it accordingly to Site Management. Site staff will be trained by the Site Manager in undertaking their responsibilities for dust monitoring. All records for training will be held on site. The relevant procedures in which staff will be trained are:

<i>BUK-E06</i>	<i>Environmental Records</i>
<i>BUK-E07</i>	<i>Environmental Management and Monitoring</i>
<i>BUK-E08</i>	<i>Infrastructure Management and Monitoring</i>

Site staff will also be trained in recording observations on the Daily Site Checklist and any remedial actions undertaken will also be recorded in the site diary. Refresher training on these and any other relevant procedure will be undertaken on at least an annual basis.

3.3.2 Trigger for Enacting Control Measures

The trigger for enacting further control measures will be observations by site staff of dust emissions with the potential to migrate beyond the site boundary. This in turn will depend upon the volume of dust present, the location of the dust on site and current weather conditions.

In any event, site staff will alert site management to areas where dust is being released on site, so that these can be monitored for dust migration and need for control.

A brief visual check (<1 minute) at each location will be carried out to determine dust levels. This combined with the visual checks throughout the day by operations personnel will efficiently identify any dust emissions from site. The site will be manned at all times during processing and deliveries. Any obvious signs of dust will be reported to the site management immediately.

If there is a potential for dust beyond the site boundary, the relevant activity will be ceased immediately to allow investigation by Site Management and appropriate dust control measures to be implemented.

4 PM₁₀ Monitoring

The plant will have continuous emissions monitors (CEMS) located on the exhaust flues of the gasification plant. These will monitor stack emissions and provide data reporting and will include continuous monitoring for particulates.

The continuous monitoring equipment will operate on a 24-hour basis and will include the facility for on-line monitoring of the gas concentrations and provide for any out-of-tolerance indications to be monitored by remote staff.

All CEMS equipment and associated platforms and sampling ports installed on site will meet the requirements of the NRW Technical Guidance Note M2. All CEMS equipment shall be MCERTS approved.

Procedures will be created for monitoring undertaken at the site. These procedures will conform to M1 and M2 guidance and those required by the operator monitoring and assessment scheme and are incorporated into the sites EMS system.

The CEMS will be used such that:

- The values of the 96% confidence intervals of a single measured result at the daily ELV shall not exceed the following percentages:
 - Carbon Monoxide – 10%
 - Sulphur Dioxide – 20%
 - Oxides of Nitrogen (NO and NO₂) – 20%
 - Particulate Matter – 30%
 - Total Organic Carbon – 30%
 - Hydrogen Chloride – 40%
- Valid half-hourly average values or 10-minute averages shall be determined within the effective operating time from the measured values;
- Where it is necessary to calibrate or maintain the monitor resulting in data not being available for a complete half hour period, the half-hourly average or 10-minute average shall in any case be considered valid if measurements are available for a minimum of 20 minutes or 7 minutes during the half-hour or 10-minute period respectively;
- Daily average values shall be determined as the average of all valid half-hourly average or 10-minute average values within a calendar day; and
- No more than ten daily average values per year shall be determined not to be valid.

5 Actions when alarm is triggered

Should any activities be seen to be generating dust which, combined with weather conditions, could result in its migration off site, the operation shall be ceased until adequate measures are in place to prevent further dust emissions. The Site Manager has the ability to cease operations at any time in order to achieve this control.

Control measures used on site and this D&PEMP will be reviewed at least annually by Biomass UK No 2 Ltd Management, or after any incident of dust migration off site. NRW will be notified of any changes to site arrangements or permit documentation.

The visual monitoring regime will identify any dust emissions. Should any visible dust emissions be seen emanating from the site, or in the event of a substantiated dust complaint, the site will immediately investigate the source and initiate remedial action.

Any operations on site which are observed to have the potential for dust migration beyond the site boundary will be ceased until adequate control measures are in place (i.e., to prevent migration beyond the boundary).

6 Reporting and Complaints Response

Any instance of visible dust emissions or occurrence of any external complaint will be actioned immediately and responded to within 2 working days.

In the event that any ongoing significant off-site dust problem is identified which the site cannot control by other means, the operations will be reduced or ceased until such a time as other control or mitigation measures can be put in place; or the circumstances have changed to reduce impact as identified in this plan.

In addition to the above, all incidents, accidents and complaints will be recorded and all relevant site managers and where necessary NRW will be informed.

6.1 Engagement with the Community

Neighbours will be advised of the most effective method of communicating with the site and site contact details will be presented on the site notice board.

Biomass UK No. 2 Ltd will engage proactively with neighbours and complaints will be responded to effectively and dealt with as a matter of priority. Biomass UK No. 2 Ltd will contact all immediate adjacent neighbours prior to commencement of the operation.

6.2 Reporting of complaints

Compliments, complaints or environmental incidents received at the site will be processed using the relevant complaints form and procedures.

6.3 Management Responsibilities

The site manager will be responsible for delivery of the actions and controls included within this Plan.

Emission complaints will be taken seriously and regarded as providing a useful insight into public perception and concerns. They will be used to inform the annual review of the Management System to aid the development of site controls. All complaints will be investigated immediately and action taken swiftly following the assessment.

Clear feedback will be given to the informant via the nominated single point of contact. All staff will be fully trained in the feedback process and how to handle complaints to ensure swift and appropriate action is taken.

6.4 Summary

The control measures presented in this Dust Management Plan reduce the potential for emissions from the Barry site to a point where there is very low risk of nuisance or exposure of the local receptors.

This document is 'live' and will be reviewed at least annually and also after any environmental incidents or at the request of Natural Resources Wales (NRW).

Appendix A Site Plans



1. Do not scale off this drawing
2. All dimensions to be confirmed on site
3. This drawing is copyright of Sol Environment Ltd
4. This drawing is to be read in conjunction with relevant consultant drawings and specifications

Rev:	Date:	Desc:
0	OCT 16	Original

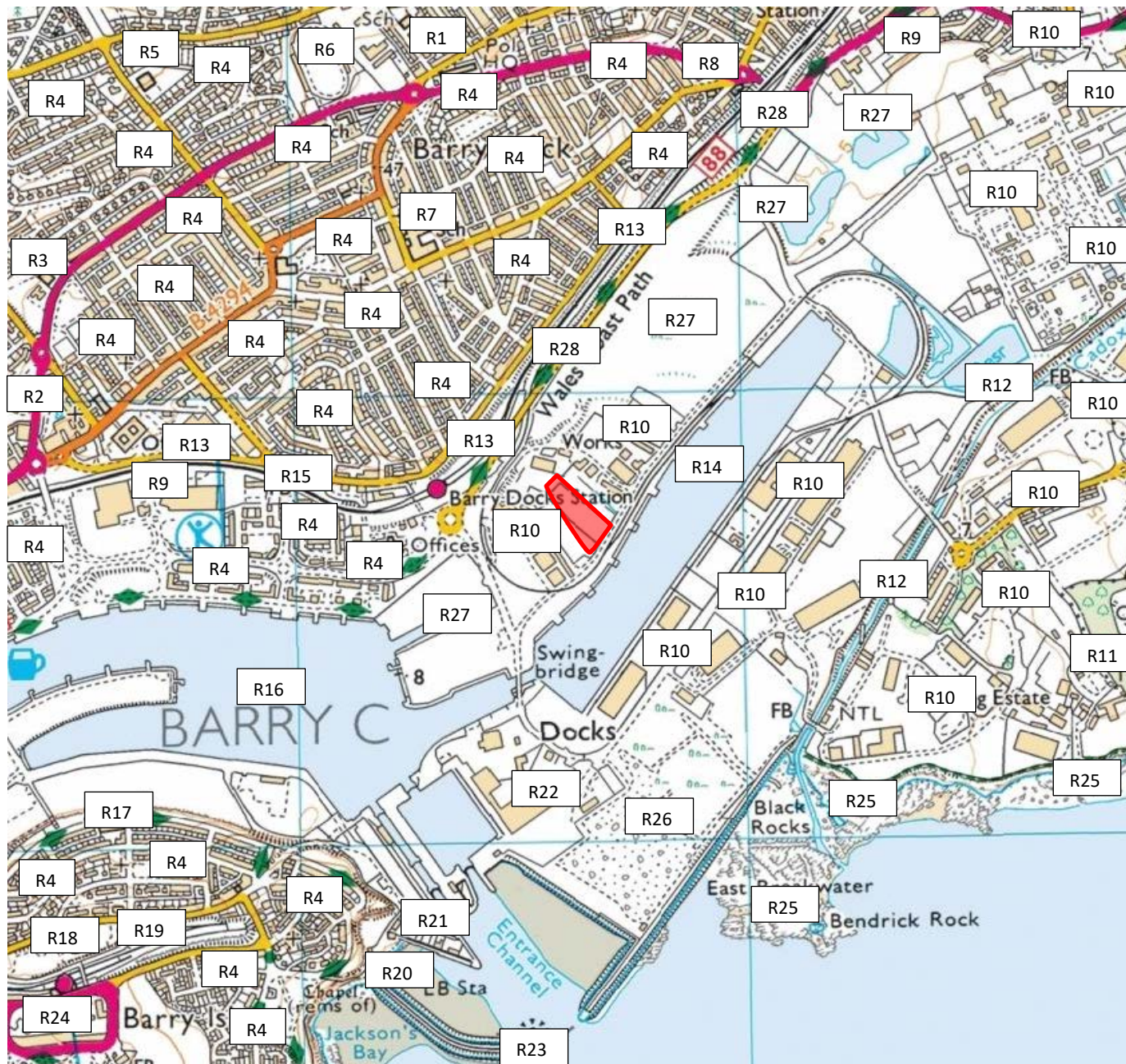
Client:	BIOMASS UK NO.2 LTD
Project:	BARRY ENERGY RECOVERY FACILITY
Drawing Title:	SITE LOCATION

Job No:	SOL1605BUK201
Date:	OCT 16
Drawn By:	STEVE BUTLER

Drawing No:	BUK201
Revision:	0
Scale:	NTS



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Receptor No.	Receptor Name
R1	Jenner Park Primary School
R2	Memo Arts Centre / Theatre
R3	Gladstone Primary School
R4	Residential Receptors
R5	St Helens R.C Junior School
R6	Barry Town United FC
R7	Holton Primary School
R8	Barry Mosque
R9	Retail Units
R10	Industrial Units
R11	HMS Cumbria
R12	Cadoxton River
R13	Railway line
R14	Entrance Channel
R15	Waterfront Medical Centre (GP)
R16	Barry Dock
R17	Barry Island Primary School
R18	Maslin Park
R19	Barry Island Train Station
R20	Barry Yacht Club
R21	Barry Dock lifeboat station
R22	Associated British Ports Barry
R23	Barry Docks lighthouse
R24	Barry Island Pleasure Park
R25	SSSI (Hayes point to Bendrick Rock)
R26	Solar PV Farm
R27	Unoccupied Land
R28	A4055 Road

1. Do not scale off this drawing
 2. All dimensions to be confirmed on site
 3. This drawing is copyright of Sol Environment Ltd
 4. This drawing is to be read in conjunction with relevant consultant drawings and specifications

Rev:	Date:	Desc:
0	OCT 17	Original

Client:	BIOMASS UK NO.2 LTD
Project:	BARRY ENERGY RECOVERY FACILITY
Drawing Title:	SENSITIVE RECEPTOR PLAN

Job No:	SOL1605BUK201
Date:	OCT 17
Drawn By:	SOPHIE PERRIN

Drawing No:	BUK205
Revision:	0
Scale:	NTS

Appendix B Dust Complaint Form

Customer Details	
Customer Name	
Address	
Postcode	
Customer Contact Details	
Tel	
Email	
Date	
Complaint Reference Number	
Complaint Details	
Investigation Details	
Investigation carried out by	
Position	
Date and time of investigation	
Weather conditions	
Wind direction and speed	
Investigation Findings	
Feedback given to NRW and / or LA	
Date feedback given	
Review and Improve	
Improvements needed to prevent reoccurrence	
Proposed date for completion of improvement works	
Actual date of completion	
If different, reason for delay	
Does the dust management plan need updating	
Date of D&PEMP update	
Closure	
Site Manager review date	
Site manager signature	