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Consulting Engineers Limited

Medway Energy Recovery Limited

Environmental Risk Assessment

ENGINEERING CONSULTING

Document approval

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1 Introduction

Medway Energy Recovery Limited is applying to the Environment Agency (EA) under the Environmental Permitting Regulations (EPR's) for an Environmental Permit (EP) to operate the MedwayOne Energy Hub (the Facility). The Facility will comprise a twin line waste incineration plant and associated infrastructure (including battery storage), and will be located at MedwayOne, Kent.

The aim of this report is to assess the environmental risks associated with the activities proposed to be undertaken at the Facility and demonstrate that the necessary measures will be in place to protect the environment ensuring that the operation of the Facility, throughout its life, will not pose an unacceptable risk to the environment.

This report will:

a. identify potential risks that the activity may present to the environment;
b. screen out those that are insignificant and don't require detailed assessment;
c. identify potentially significant risks, where appropriate;
d. choose the right control measures, where appropriate; and
e. report the findings of the assessment.

This document has been developed to consider the requirements of Environment Agency (EA) Guidance Notes H1 Annexes A, C, H and F. While it is acknowledged that these guidance documents have been withdrawn, it is understood that the requirements of the guidance are still applicable under Environment Agency Guidance *'Risk assessments for specific activities: environmental permits',* which replaced H1 and H2 with alternate (albeit not as prescriptive) guidance in February 2016.

1.1 Risk Assessment Process

The EA Guidance promotes the following key steps:

1. identify and consider risks from your site/the activity and the sources of those risks;
2. identify the receptors at risk from your site;
3. identify the possible pathways from the sources of the risks to the receptors;
4. assess the risks relevant to your specific activity and check they are acceptable/can be screened out;
5. justify appropriate measures to control the risks if they are high; and
6. submit/present the assessment with the permit application.

1.2 Step 1 – Identify Risks

The following report will identify the activities that present different types of risk to the environment associated with the operation of the Facility, including:

1. odour;
2. noise;
3. fugitive emissions;
4. accidents; and
5. flooding.

1.3 Step 2 – Step 4: Assessment of receptors, pathways and risks

The report will include an assessment of risks associated with the operation of the Facility, and will identify the:

1. hazard;
2. receptor; and
3. pathway.

The risks relevant to the activities to be carried out at the Facility will be checked to see if they are acceptable/can be screened out.

1.4 Step 5 – justify appropriate measures

This report will demonstrate that the risks associated with the operation of the Facility have been considered and will identify the proposed control measures to demonstrate that the risks will be appropriately managed.

1.5 Step 6 – present the assessment

The report will conclude by presenting the following:

1. possibility of exposure;
2. consequence; and
3. the overall risk.

The report will present the overall risk applying the EA's previous H1 criteria, defined as:

1. insignificant;
2. not significant; and
3. significant.

2 Table A1 – Odour risk assessment and management

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence.**
Odorous emissions may occur during the delivery of waste, reception of waste and the storage and handling of waste prior to processing.	Immediate area. Immediate area and the nearest residential receptor is located approximately 700m to the west of the Installation Boundary.	Air – winds generally blow from a south-westerly direction.	All wastes received will be unloaded inside an enclosed tipping hall. The waste bunker area will be retained at negative pressure. Air from waste bunker area will be combusted within the Facility, as detailed in the Supporting Information. Potentially odorous air extracted from waste handling and storage areas (namely the tipping hall and waste bunker area), maintaining these areas at negative pressure and minimising potential fugitive emissions of odour.	Unlikely	Odour annoyance. This will have more impact in the summer, when temperatures are higher and people are outdoors.	Not significant if managed well.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence.**
Odorous emissions may occur as a result of waste present in the bunker during periods of shutdown of the Facility.	Immediate area. Immediate area and the nearest residential receptor is located approximately 700m to the west of the Installation Boundary.	Air – winds generally blow from a south-westerly direction.	Measures will be in place to minimise odorous emissions during periods of shutdown, as part of the Environmental Management System (EMS). Doors to the tipping hall will be kept shut. Regular olfactory checks will be undertaken during periods of shutdown. Prior to periods of planned shutdown, the quantities of waste stored will be run-down to minimise potential fugitive odour emissions. In the event of an extended unplanned shutdown requiring waste to be removed from the bunker, facilities will be provided to enable the waste to be back-loaded from the bunker and transferred off-site to a	Unlikely	Odour annoyance, which will have greater impact in the summer when temperatures are higher and people are outdoors and more likely to be exposed to odour.	Not significant due to management systems in place.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence.**
			suitably licensed waste management facility.			

3 Table A2 – Noise and vibration risk assessment and management plan

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Noise from vehicle movements at the Facility.	Immediate area. The nearest residential receptor is located approximately 700m to the west of the Installation Boundary.	Sound propagation through air and the ground.	Waste and other materials will typically be delivered to the Facility by road during daytime hours. This will minimise the impacts of noise associated with delivery vehicles at the Facility. Roads will be maintained in a good condition, minimising noise from the movement of lorries/HGVs/waste delivery vehicles within the Installation Boundary.	Unlikely (due to the industrial location of the site and distance to receptors).	Annoyance.	Not significant. Refer to Appendix C of the Supporting Information (Noise Assessment) for further information on the impact of noise from the operation of the Facility.
Noise from plant items such as the waste treatment processes, heat recovery boiler, exhaust air fans, stack exhaust, steam	Immediate area. The nearest residential receptor is located approximately 700m to the west of the Installation Boundary.	Sound propagation through air and the ground.	Noisy plant items, where practicable, will be installed within process buildings rather than outside and, where appropriate, they will be installed with appropriate noise attenuation measures.	Unlikely (due to the industrial location of the site and distance to receptors).	Annoyance.	Not significant. Refer to Appendix C of the Supporting Information (Noise Assessment) for further information on the impact of

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
turbine, cooling condensers and noise radiation from the building envelope itself, etc.			The Facility will be designed to reduce noise and tonal components. Regular maintenance of plant items will be undertaken in accordance with documented maintenance procedures.			noise from the operation of the Facility.

4 Table A3 – Fugitive emissions risk assessment and management plan

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Re-suspension of dust from road surface, when site vehicles arrive/leave.	Immediate area – air, land, water.	Air, surface runoff.	Control of vehicle speeds, on site roads maintained in good condition, and personnel taking due care. A good standard of 'housekeeping' will be maintained on site roads.	Not likely.	Nuisance, dust on cars and road.	Not significant due to mitigation measures in place.
'Unacceptable' material/waste being accepted at the site.	Immediate area – air, land, water.	Air, surface runoff, direct contact.	Robust waste pre acceptance and acceptance procedures will be in place to minimise the risk of 'unacceptable' wastes being accepted at the Facility. Dedicated quarantine areas will be available for the temporary storage of 'unacceptable' wastes after unloading, prior to transfer off-site.	Unlikely.	Contact with hazardous wastes, dust, fugitive emissions of contaminants.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Emission releases from the tipping hall when opening and closing doors.	Immediate area – air.	Air, surface runoff, direct contact.	All waste handling activities will be undertaken within enclosed buildings. The waste bunker area will be held under negative pressure. Fast-acting roller shutter doors (or equivalent) will be installed at the ingress/egress to the tipping hall.	Unlikely.	Nuisance, dust on clothing and cars.	Insignificant.
Dust/litter from waste deliveries being blown off-site.	Immediate area – air, land.	Air, surface runoff.	Waste will be delivered in enclosed vehicles. All waste unloading activities will be undertaken within the enclosed tipping hall. The waste bunker area will be held under negative pressure. Housekeeping procedures will be employed to minimise the build-up of dust or litter.	Unlikely.	Nuisance and dust.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Fugitive emissions during periods of shutdown.	Immediate area – air.	Air, direct contact.	Doors to the tipping hall will be kept shut. Prior to periods of planned shutdown, the quantities of waste store within the waste bunker will be run-down, with incoming waste deliveries halted. In the event of an extended unplanned shutdown requiring waste to be removed from the bunker, it will be backloaded from the bunker and transferred off-site to a suitably licensed waste management facility.	Unlikely.	Nuisance, annoyance.	Insignificant.
Spillage of waste and materials during delivery and offloading.	Immediate area – air, land, water.	Air, surface runoff.	Waste unloading activities will be undertaken within an enclosed building. The waste bunker area will be held under negative pressure.	Unlikely.	Nuisance and dust.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			Spillages would be cleaned up in accordance with documented management systems. Waste unloading areas will have contained drainage systems which discharge into the process drainage system to minimise the risk of emissions of contaminated water. Housekeeping procedures will be employed to reduce the build-up of litter at the site.			
Bottom ash discharge at the Facility.	Immediate area – air.	Air, surface runoff, direct contact.	Once removed from the combustion chamber by the bottom ash extractors, the bottom ash is then discharged to an ash quench system, prior to transfer to an ash storage area by enclosed conveyor and	Low.	Nuisance.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			relocation to off-site to an IBA processing facility. An ash quench will minimise the potential of fugitive dust emissions. Ash handling within will be undertaken in an area with contained drainage which discharges into the process water drainage system. Therefore, there is minimal risk of bottom ash leachate being discharged to surface water drainage systems.			
Discharge of Air Pollution Control residues (APCr) when emptying the APCr silo.	Immediate area – air, land.	Air, surface runoff, direct contact.	When unloading the APCr silo, the displaced air from the tanker will be recirculated into the silo to prevent releases into the atmosphere. A fabric filter will minimise the risk of fugitive emissions of dust.	Unlikely.	Nuisance, release of hazardous dust.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			APCr unloading activities will be undertaken by trained personnel and in accordance with documented management procedures. APCr unloading activities will be supervised by sufficiently trained personnel.			
Reagent and chemical discharges when filling silos.	Immediate area – air.	Air, surface runoff, direct contact.	Reagents will be delivered in sealed tankers and off-loaded via a standard hose connection. For solid reagents, air displaced from the silo will be discharged through fabric filters. Regular inspections and maintenance will be undertaken of abatement equipment. Unloading activities will only be undertaken in areas of hardstanding with contained	Unlikely.	Nuisance.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			drainage. Unloading activities will be supervised by suitably trained personnel.			
Lime leak during injection into APC system.	Immediate area – air.	Air, surface runoff, direct contact.	Lime handling systems will be enclosed, and regular inspections and preventative maintenance will be carried out. Lime will be injected via a completely enclosed dosing and conveying system. Process areas will have contained drainage. Automated control systems will be in place to detect leaks from lime handing and dosing systems.	Unlikely.	Nuisance.	Insignificant.
Spillage of air pollution control reagents when capping or changing filter bags.	Immediate area – air, land.	Air, surface runoff, direct contact.	Enclosed system located inside building. Kept under suction by the ID fan. The fabric filter will have a number of cells. When capping or changing bags,	Unlikely.	Nuisance, release of hazardous dust.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			the relevant cell will be shut down for a sufficient time to enable the dust to settle. This allows any faulty or damaged cells to be isolated easily. Process areas will have contained drainage.			
Spillage/leak of liquid chemicals when tanker off-loading.	Immediate area – air, land.	Air, direct contact.	Deliveries of liquid chemicals will be from sealed tankers and off-loaded via dedicated hoses. Spillages will be prevented by good operating procedures, high tank level alarm/trips etc. Tanks will be located within suitably designed secondary containment. Unloading of liquid chemicals will be undertaken on areas of contained drainage to prevent the release of contaminated effluent off-site through any spillages.	Unlikely.	Liquid or vapour release.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Spillage/leak when unloading from delivery vehicles and chemical containers (IBCs, FIBCs, drums etc).	Immediate area – air, land.	Air, direct contact.	Deliveries will be from road vehicles and off-loaded via mobile plant. Potential leaks/spills will be prevented by experienced mobile equipment operators undertaking unloading activities. Unloading activities will only be undertaken in areas of hard standing with contained drainage. Chemical containers will be stored within suitably designed secondary containment.	Unlikely.	Hazardous liquid or vapour release.	Insignificant.

5 Table A4 – Accidents risk assessment and management plan

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Making the wrong connections to drains.	Local environment – water.	Direct contact, leaching.	Detailed site drainage plan, which will be available to all staff. Drains will be labelled accordingly.	Unlikely.	Pollution of surface water.	Insignificant.
Incompatible substances coming into contact.	Immediate area.	Surface runoff, wind, direct contact.	Due care and attention. Retention of Material Safety Data Sheets (MSDS) to identify hazards of substances to be used on site.	Unlikely.	Pollution of surface water, human health impacts.	Insignificant.
Unwanted reactions.	Immediate area.	Surface runoff, wind, direct contact.	Due care and attention. Retention of MSDS to identify hazards of substances to be used on site.	Unlikely.	Low.	Insignificant.
Fires in waste reception storage and handling areas.	Immediate area – air.	Direct contact.	Fire detection and suppression systems. Refer to the Fire Prevention Plan, refer to Appendix H of the Supporting Information.	Unlikely.	Visual impact, pollution of air, harm to staff, damage to infrastructure.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Contaminated fire water.	Immediate area – water, land.	Surface runoff, leaching.	Site drainage for external areas will be fitted with an isolation valve which is interfaced with the fire protection systems. The primary source of firewater containment in the event that there is a fire within the waste bunker itself, which is designed as a water-retaining structure. Additional firewater storage will be available from the attenuation pond, process water tank/pit, site kerbing and roadways.	Unlikely.	Pollution of surface water.	Insignificant.
Failure to contain firewater.	Land.	Land, water, groundwater.	Maintenance of the shut-off valve and/or pumping system within the drainage system.	Unlikely.	Release of chemicals/ contamination to water/land.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			Inspection and maintenance of roadways and areas of hardstanding.			
Vandalism	Immediate area.	Land, air, water.	Security fences, controlled entrance to the site, security personnel, CCTV.	Unlikely.	Release of substances to any environment.	Insignificant.
Spill during unloading of chemicals.	Immediate area – air, land, water.	Direct contact.	Training in unloading practices. Under manual control, and continual observation. Impervious surfaces outdoors. Containment of drainage from chemical handling areas (links to the process drainage system and/or bunds). Documented procedures will be developed identifying actions in the event of spills. Spill kits will be readily available.	Unlikely.	Release of hazardous substances to the environment.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Overfilling of vessels.	Local environment air, land, water.	Surface runoff, wind.	Training in unloading practices. Under manual control, and continual observation. Impervious surfaces outdoors. High level alarms. Secondary containment for storage vessels. Documented procedures will be developed identifying actions in the event of spills. Spill kits will be readily available.	Unlikely.	Release of hazardous substances to the environment.	Insignificant.
Leak of water from treatment plant, and leak of boiler water treatment chemicals.	Immediate area – water.	Surface runoff.	Secondary containment for storage of water treatment chemicals such as bunding. Routine inspection and maintenance. Impervious surface indoors, separate drains for process water. Regular preventative maintenance of storage vessels to confirm the	Unlikely.	Pollution of surface water.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			integrity of the storage vessel.			
Flue gas leak.	Local environment – air.	Air.	Design standards. Inspection and maintenance programme. Controls and alarms for over pressure conditions. Combustion systems will be retained at negative pressure. Emissions monitoring systems will detect exceedances of ELVs. Robust design of control systems.	Very unlikely.	Pollution of atmosphere, health impacts.	Insignificant.
Fuel storage failure.	Immediate area – litter.	Direct contact.	Storage of waste in a dedicated waste storage bunker. The bunker will be constructed of reinforced concrete. Construction quality assurance checks will be undertaken during construction to ensure the	Unlikely.	Litter.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			integrity of the infrastructure. Regular preventative maintenance and visual inspections will be undertaken on the bunker throughout its lifetime.			
Control failure leading to combustion control upset.	Local environment – air.	Air - Winds generally blow from a south westerly direction.	Good/robust design of control system including system redundancy. Monitoring of combustion conditions. Maintenance of combustion air systems.	Unlikely,	Pollution of atmosphere (short term), human health impacts.	Insignificant.
Failure of emission abatement equipment.	Local environment – air.	Air - Winds generally blow from a south westerly direction.	Regular maintenance, inspections. Redundancy of critical equipment or spares on stock.	Unlikely.	Pollution of atmosphere, human health impacts.	Insignificant.
Failure of emission monitoring systems.	Immediate area – air.	Air - Winds generally blow from a south westerly direction.	Regular maintenance, inspections. A back-up CEMS system will be available in the event of a failure of the duty CEMS.	Unlikely.	Lack of data, public concern.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Failure of containment (e.g. bund).	Immediate area – water, land.	Surface runoff, wind, leaching.	Regular inspections of bunds. Preventative maintenance will be employed through a documented management system.	Unlikely.	Pollution of surface water.	Insignificant.
Leaks from process water tank/pit.	Immediate area – water, land.	Leaching/infiltration	Underground structures will be designed in accordance with the relevant standards and will be impermeable to prevent the release of liquid pollutants into the ground/groundwater. Quality assurance checks will be undertaken during construction to test/inspect the integrity of structures. Structures will be subject to regular inspection and preventative maintenance. In the event of the integrity of the structure being compromised, remedial	Unlikely.	Pollution of ground/ groundwater.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			maintenance will be undertaken in a timely manner and investigations of any potential contamination will be undertaken (such as water testing). Remediation will be undertaken if required.			
Loss of power.	None.	N/A	A back-up generation system to provide safe shutdown of the Facility in the event of loss of power.	Not likely.	None.	Not significant.
Loss of compressed air.	None.	N/A	Multiple compressors.	Unlikely.	None.	Insignificant.
Loss of boiler water.	None.	N/A	Automatic shutdown of the Facility.	Unlikely.	None.	Insignificant.
Steam leak to plant building/atmosphere.	Noise, visual impact.	Air	Statutory design, fabrication and inspection standards for steam systems. Controls and alarms for pressure. Routine operator checks.	Unlikely.	Nuisance from noise and visual impact.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Residues handling failure.	Immediate area – air, land, water.	Direct contact.	Training in residue handling practices. Contained transfer systems. Impervious surfaces in residue handling areas with designated drainage systems in areas where residues are stored.	Unlikely.	Pollution of surface waters.	Insignificant.
Fires in FGT bag filter.	Local environment.	Air - Winds generally blow from a south westerly direction.	Temperature measurement and level control in filter hopper, fire-fighting systems.	Unlikely.	Dust, pollution of air.	Insignificant.
Fire in furnace feed system.	Immediate area – air.	Air.	Furnace charging procedures / training. Level indicator in chute. Fire-fighting system.	Unlikely.	Pollution of air.	Insignificant.
Over pressurisation of the steam boiler.	Immediate area – air.	Direct contact.	In case of over pressure, the pressure will be released through the pressure relief valve, preventing the risk of an explosion within the steam boiler.	Unlikely.	Pollution of air.	Insignificant.
Fire from ignition of lube oil leak.	Immediate area – air.	Wind, direct contact.	Fire detection and protection systems. Refer to the Fire	Unlikely.	Visual.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			Prevention Plan, refer to Appendix H of the Supporting Information.			
Significant fugitive release of APCr.	Immediate area – air, land, water.	Air, land, surface runoff, groundwater infiltration.	Impervious surfaces in residue handling areas with designated drainage systems in areas where residues are stored. Storage of APCr inside an enclosed silo which will be subject to regular inspections/preventative maintenance. Spillages would be cleaned up in accordance with documented management systems for the Facility.	Unlikely.	Release of hazardous substances within APCr to the environment.	Insignificant due to mitigation and containment measures in place.
Significant fugitive release of fuel oil due to fire at the site.	Immediate area – air, land, water.	Air, land, surface runoff, groundwater infiltration.	Fire detection and suppression systems. Provisions for containment of contaminated firewater. Refer to the Fire Prevention	Unlikely.	Release of hazardous substances within fuel oil to the environment.	Insignificant due to mitigation and containment measures in place.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			Plan, refer to Appendix H of the Supporting Information. Local fuel oil supply isolation valve will be automatically closed in the case of a fire. Impervious surfaces in fuel oil areas with designated drainage systems in areas where fuel oil is stored. Spillages would be cleaned up in accordance with documented management systems.			

6 Table A5 – Flood risk assessment and management

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
Emissions to surface waters due to damage of raw material, waste and residue storage facilities as a result of flooding.	Immediate and wider area – water.	Surface runoff.	Monitoring of flood warnings. Site shutdown in the event of severe flood warnings. The Facility is located within an area which is identified as being in an area which benefits from flood defences. Therefore, there is a low risk of the Facility being subject to flooding. The Facility has been designed with a SUDS system to mitigate the risk of off-site flooding and to manage the discharge of surface water. The SUDS system is designed to provide sufficient surface water storage for storm / flood events including an	Unlikely.	Pollution of surface water with a wide range of contaminants.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			allowance for climate change.			
Emissions to groundwater due to damage of raw material, waste and residue storage facilities as a result of flooding.	Immediate and wider area – groundwater.	Infiltration.	Monitoring of flood warnings. Site shutdown in the event of severe flood warnings. The Facility is located within an area which is identified as being in an area which benefits from flood defences. Therefore, there is a low risk of the Facility being subject to flooding. The Facility has been designed with a SUDS system to mitigate the risk of off-site flooding and to manage the discharge of surface water from the installation. The SUDS system is designed to provide sufficient surface water storage for storm /	Unlikely.	Pollution of groundwater with a wide range of contaminants.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			flood events including an allowance for climate change.			
Emissions to land due to damage of raw material, waste and residue storage facilities as a result of flooding.	Immediate and wider area – land.	Surface runoff and infiltration.	Monitoring of flood warnings. Site shutdown in the event of severe flood warnings. The Facility is located within an area which is identified as being in an area which benefits from flood defences. Therefore, there is a low risk of the Facility being subject to flooding. The Facility has been designed with a SUDS system to mitigate the risk of off-site flooding and to manage the discharge of surface water from the installation. The SUDS system is designed to provide sufficient surface	Unlikely.	Pollution of land with a wide range of contaminants.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			water storage for storm / flood events including an allowance for climate change.			
Electrical faults and damage to equipment due to flooding.	Immediate area – equipment.	Surface runoff.	Monitoring of flood warnings. Site shutdown in the event of severe flood warnings. The Facility is located within an area which is identified as being in an area which benefits from flood defences. Therefore, there is a low risk of the Facility being subject to flooding. The Facility has been designed with a SUDS system to mitigate the risk of off-site flooding and to manage the discharge of surface water from the installation.	Unlikely.	Harm to equipment.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			The SUDS system is designed to provide sufficient surface water storage for storm / flood events including an allowance for climate change.			
Risk of harm to staff due to flooding.	Health and safety of staff.	Surface runoff.	Monitoring of flood warnings. Site shutdown in the event of severe flood warnings. The Facility is located within an area which is identified as being in an area which benefits from flood defences. Therefore, there is a low risk of the Facility being subject to flooding. The Facility has been designed with a SUDS system to mitigate the risk of off-site flooding and to manage the	Unlikely.	Harm to staff.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			discharge of surface water from the installation. The SUDS system is designed to provide sufficient surface water storage for storm / flood events including an allowance for climate change.			
Damage to structure of buildings.	Immediate area – buildings.	Surface runoff.	The Facility is located within an area which is identified as being in an area which benefits from flood defences. Therefore, there is a low risk of the Facility being subject to flooding. Monitoring of flood warnings. Site shutdown in the event of severe flood warnings. The Facility has been designed with a SUDS system to mitigate the risk of off-site	Unlikely.	Harm to buildings.	Insignificant.

What do you do that can harm and what could be harmed?			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Possibility of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that remains? The balance and probability and consequence**
			flooding and to manage the discharge of surface water from the installation. The SUDS system is designed to provide sufficient surface water storage for storm / flood events including an allowance for climate change.			

7 Detailed Assessment

The environmental impact of the Facility has been evaluated using the H1 software tool as described in Part 2 of Technical Guidance Note EPR-H1, presented in Appendix **Error! Reference source not found.** of this report. This assessment has been expanded by a more comprehensive Air Quality Assessment (refer to Appendix E of the Application Pack) and a full Noise Assessment (refer to Appendix C of the Application Pack).

7.1 Emissions to Air

A detailed Air Quality Assessment is presented in Appendix E of the Application Pack.

In relation to impacts on human health, it is concluded that:

1. Emissions from the operation of the Facility will not cause a breach of any AQAL.
2. The overall impact of long-term and short-term process emissions associated with the operation of the Facility can be screened out as 'insignificant' or 'not significant' in accordance with the EA's screening criteria at the point of maximum impact and at all identified human sensitive receptors.
3. When considered cumulatively with potential emissions from the permitted but not yet constructed Damhead Creek II power station, there is no risk of exceedance of any AQAL, and no significant in-combination impacts are predicted.

7.2 Habitats Assessment

The Air Quality Assessment presented in Appendix E of the Application Pack, includes an assessment of impacts on designated ecological features, and concludes that:

> *all of the impacts at ecological features can be screened out as 'insignificant' or 'not significant' except for airborne ammonia and nitrogen deposition impacts at the Medway Estuary SPA/Ramsar site/SSSI, and nitrogen deposition impacts on saltmarsh habitats at the Medway Estuary SPA/Ramsar site/SSSI and the Thames Estuary SPA/Ramsar site/SSSI.*

In addition to this, a Shadow Appropriate undertaken by the project ecologist has concluded no significant effects are likely, either alone or cumulatively with emissions from the Damhead Creek II Power Station, refer to Appendix J of the Application Pack.

7.3 Emissions to water and sewer

There are no emissions of process effluents during normal operation of the Facility.

Process effluents will be stored within an intermediate vessel prior to reuse in the process. In the event that excess process effluents are generated, for example during periods of boiler emptying, it is intended to collect these effluents for transfer off-site, in a tanker, for treatment in a suitably licenced waste treatment facility. In the event that a sewer connection is installed at the MedwayOne development, these effluents will be discharged to sewer.

Uncontaminated surface water will be discharged, via the site surface water drainage system, to the on-site Attenuation pond. The pond will have a subsequent discharge to the existing site surface water drainage system and ultimately Damhead Creek.

It is expected that foul water systems (domestic effluent from welfare facilities) will be treated in site within an on-site package treatment plant prior to discharge off-site.

7.4 Noise

A Noise Assessment is presented in Appendix E of the Application Pack. The noise assessment concluded as follows:

1. During the daytime, the predicted rating levels are equal to or below the measured background noise levels at all receptors.
2. During the evening period, the predicted rating levels are equal to or below the measured background noise level at receptors 1 – 4.
3. During the night-time, the predicted rating levels are 1 dB above the background noise level or below at receptors 1 – 4.
    a. Although at 2 locations, predicted rating levels are exceeded by 1 dB, this is seen to be an insignificant difference and is considered to have a low impact on the surrounding area.
4. At receptor 5 the predicted rating levels during the evening and the night-time are 4dB and 5dB above the measured background noise level respectively.
    a. Although, rating levels exceed the measured background noise level, it is likely that background noise levels at receptor 5 are higher than at the monitoring position due to the proximity of the road and the railway line.
5. BS 4142: 1997 states that 'For the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low'. Please note this is an older version of the British Standard.

Therefore, the predicted noise levels at nearest noise sensitive receptors, are considered to be very low and as such, have a low impact on the surrounding area.

7.5 Visual Impact

The visual impact of the Facility has not been considered in the EP application, since this is primarily a matter for the planning authorities.

7.6 Odour

The mitigation measures for odour are presented in section 2.4.4 of the Supporting Information.

If these measures are not effective and there are complaints of odour which can be attributed to the Facility, Low Carbon will develop and implement an Odour Management Plan in consultation with the Environment Agency.

7.7 Global Warming

The assessment of the contribution of the Facility to global warming is complex. On the one hand, the Facility releases carbon dioxide to the atmosphere by the combustion of waste and auxiliary fuel. On the other hand, the Facility generates electricity, which displaces other electricity generation, which would release carbon dioxide from the combustion of fossil fuels.

In accordance with EA requirements, a Greenhouse Gas Assessment has been produced, which considers the direct and indirect emissions from the incineration of waste within the Facility and compares this with the emissions produced if the electricity were produced by conventional fossil fuel power station. This is presented in Appendix E of the Application Pack.

7.8 Disposal of Waste

Methods for reducing the impact from waste disposal are considered in section 2.9 of the Supporting Information.

8 Conclusions

As presented in this report, the Facility is considered to contain appropriate control measures and management systems to ensure that the Facility does not have any significant impacts upon the local environment.

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