

# Energy from Waste, Combined Heat and Power Facility North Yard, Devonport Environmental Permit Application (Application EPR/WP3833FT/A001)

Non-Technical Summary June 2011



Prepared for





#### **Revision Schedule**

# Non-Technical Summary

June 2011

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# 1 Report Context

Scott Wilson Ltd has been commissioned by MVV Environment Devonport Ltd (MVV hereafter) to prepare an application for an environmental permit for an Energy from Waste, Combined Heat and Power Facility located at Devonport Dockyard, Plymouth (Devonport EfW/CHP hereafter).

Within the Site, as defined in planning terms, and the Installation, as defined in permitting terms, the proposed facility will principally comprise:

- Tipping Hall;
- Waste Bunker Hall with Waste Handling Cranes;
- Bale Store/Baling System;
- Turbine Hall with Steam Turbine Generator;
- Boiler House with Grate, Boiler and Ancillary Systems;
- Flue Gas Cleaning System and Chimney;
- Air Cooled Condensers;
- Water Treatment Plant;
- Bottom Ash Handling System.
- Administration Block; and
- Workshop and Stores

This document is the Non-Technical Summary that accompanies the application for an environmental permit for the proposed Energy from Waste Combined Heat and Power Facility. The report should be read in conjunction with the other supporting application reports and risk assessments.



# 2 Application Summary

# 2.1 Background to the Application

Councils in the UK are responsible for managing the waste that they collect from households within their jurisdiction, and for ensuring that waste diversion from landfill is optimised in line with national targets. To ensure that the necessary landfill diversions are achieved, there are a number of fiscal measures in place:

- Landfill allowance and trading scheme (known as LATS), which imposes a fine on an authority for every tonne of biodegradable waste that it sends to landfill above its predetermined target; and
- Landfill tax, which imposes a tax on every tonne of waste that is disposed off in landfill; for non-inert waste, this is currently at £56 per tonne, and is increasing by £8 per year.

In South West Devon, several Waste Disposal Authorities are working together as the South West Devon Waste Partnership (SWDWP) to develop a Joint Municipal Waste Management Strategy to provide a framework for management of municipal solid waste over the next 20 years, to ensure that Government targets are met.

Through a competitive tendering process, MVV Environment Devonport Limited (MVV) has been awarded the South West Devon Waste Partnership's (SWDWP) residual waste treatment and disposal contract. The SWDWP is a collaboration that has been established between Plymouth City Council, Torbay Council and Devon County Council to provide a long term solution to deal with waste from the southwest Devon area which is left over after re-use, recycling and composting.

MVV's proposal is to construct and operate an Energy from Waste (EfW) facility, incorporating Combined Heat and Power (CHP) technology, on land situated in the north-east of Her Majesty's Naval Base (HMNB) Devonport, Plymouth. This EfW CHP facility will, depending on the composition of the waste (and therefore its energy content), have the capacity to process up to 265,000 tonnes per year of waste, although it is expected that 245,000 tonnes per year will be processed. The waste will be combusted and the heat will be used to generate steam. The steam will drive a steam turbine and generate renewable electricity for use at the facility, to supply Devonport Dockyard and HMNB, and for export to the National Grid. Steam will also be fed into the Devonport Dockyard and HMNB steam network to be used for heating.

# 2.2 The Proposed Facility

The proposed EfW/CHP facility is designed to treat residual municipal waste streams, and commercial and industrial waste streams of a similar nature which currently go to landfill. The new facility, which will create 33 full time equivalent operational posts, will use:

- A mass burn combustion process which enables blending of the incoming wastes to produce a consistent waste fuel feed to the furnace;
- The flue gases from the combustion processes will be used to produce steam to generate electricity via a steam turbine generator and to provide heat. The electricity will be used to operate the process with the excess being exported together with the heat in the form of steam, to the adjacent dockyard ; and
- Recycling by means of off-site processing, to recover value and materials from the bottom ash, in the form of metals and secondary aggregate.



The facility has a maximum operating capacity of 265,000 tonnes of waste per annum, and is designed to provide the South West Devon Waste Partnership with a 97% diversion of residual wastes from landfill.

The schematic of the process is shown in Figure 1 below.



#### Figure 1: Plant Schematic

The waste treatment process will take place within the Main Building, and no waste will be stored or processed outside the building. The main elements of the treatment area include:

#### 1. Tipping Hall

The Tipping Hall will be situated within the Main Building, which is fully enclosed. The Tipping Hall provides an enclosed reception area for incoming vehicles delivering waste to the facility. Within the Tipping Hall delivery vehicles will transfer waste directly into the Waste Bunker. To minimise odours and dust, air-flow in this area will be carefully controlled and will be used in the combustion process.

#### 2. Waste Bunker

The Waste Bunker will be situated in the Main Building. Prior to being burnt, waste will be stored and mixed within the Waste Bunker. Due to the continuous movement of waste it will be an environment to which vermin, such as rats, would not be attracted.



Photograph 1: Crane operator and hydraulic grab crane in action	Photograph 2: Typical bunker view with crane control cabin (background), tipping chutes (right), stored waste (centre) and feed hopper (left, flap gate closed)

#### 3. Bale Store

The Bale Store, situated within the Main Building, enables the continued receiving, storing, transferring and diversion of waste when the facility is not available for any reason, for example during planned maintenance. Storing waste in this way avoids the need for waste to be diverted to landfill. If the Bale Store is needed, the waste will be compressed into bales, measuring approximately 1.5 square metres, to remove all of the air from within it. The bales will then be wrapped in strong plastic film. The film provides a full seal against air and pests, and is highly resistant to cuts and tears. The waste in the bale does not degrade due to the lack of oxygen and moisture. The bales will in due course be split and fed into the normal waste bunker at times when deliveries were not able to meet the capacity of the plant. Such baling is routinely used in Germany.

#### 4. Turbine/Boiler House

The Turbine / Boiler House will be the largest part of the Main Building, and is where the main incineration process will take place, on a grate. The Turbine/Boiler House will contain the furnace and boiler, and a steam turbine, which will generate electricity from the superheated steam produced in the boiler. The size of this part of the building is dictated by the need to retain gases within the combustion chamber for more than 2 seconds, at a temperature in excess of 850° C.





#### 5. Air Pollution Control System

An Air Pollution Control System will be provided. The gases resulting from the combustion of waste will be cleaned prior to being released into the atmosphere, via the 95m chimney. Emissions released through the stack will be continuously monitored to ensure they meet strict requirements enforced by the Environment Agency, and do not pose an unacceptable risk to the health of the local population.

#### 6. Air Cooled Condensers

Air Cooled Condensers will be used to condense the steam from the steam turbine which is more efficient and produces no visible vapour plumes in contrast to the tall cooling towers normally associated with power plants.

#### 7. Control Room

A continuously manned Control Room will be provided in the Waste Bunker hall, from which the facility will be operated and monitored.

#### 8. By-Products

By-products will be produced in the form of incinerator bottom ash (IBA), which will be transported off-site in covered vehicles and recycled for use in the construction industry, and fly-ash from the air pollution control (APC) system, which will be transported off-site in sealed tankers for disposal at a licensed hazardous waste landfill.





# 2.3 Acceptance of Waste

The main purpose of the EfW CHP facility is to treat waste from the southwest Devon area which cannot be recycled, reused or composted. The facility will therefore primarily handle municipal waste collected by the SWDWP Authorities. The remaining processing capacity will be used to process similar commercial and industrial waste from local businesses in the surrounding area.

Wastes to be accepted at the facility include:

- Household Residual Waste;
- Household Bulky Items;
- Commercial Waste collected under Section 45(2) Environmental Protection Act 1990;
- HWRC Waste;
- Litter and Refuse from public Highway;
- Road Channel debris;
- Fly tipped waste;
- Tyres;
- Waste collected by Authority from charities, schools etc;
- Waste from household clearances;
- Animal carcass from road or marine kills;
- Faeces and sex litter;
- Waste contaminants and residues from bio composting;
- Other wastes that may be collected by the WDA; and
- Other similar waste from commercial and industrial sources.

## 2.4 Operating Hours

The EfW CHP facility will be operational 24 hours a day, 7 days a week burning the waste and generating steam and electricity.

The hours when lorries can deliver waste to the site and take away the ash and other residues and therefore when there will be greater amounts of activity outside the building will be restricted to the following times:

•	Monday to Friday	08.00 - 19.00
•	Saturday	08.00 - 18.00
•	Sunday	08.00 - 16.00
•	Bank Holidays (except Christmas Day and Boxing Day)	08.00 - 18.00
•	Christmas Day	Closed
•	Boxing Day	08.00 – 16.00

MVV recognises that there may be some occasions when the SWDWP may request that the facility accepts Contract Waste deliveries outside the normal opening hours, for example in the case of an emergency or to accommodate the delivery of Contract Waste where Authorised Vehicles have been unavoidably delayed; or in other similar circumstances. It is therefore



proposed that the facility be able to accept waste outside the operating hours stated above with agreement with the Local Planning Authority.

The Workshop building has limited doors and openings, none of which face the nearby housing, and it will normally only be used during the day.

## 2.5 Site Location

The site is located in the northern section of Her Majesty's Naval Base (HMNB), Devonport dockyard, Plymouth, and extends to approximately 7 hectares in area. The land is the ownership of the Ministry of Defence (MoD), and will be leased by the MoD to MVV.

The general location of the site is shown in Figure 2 below with the site boundary shown in red:

#### Figure 2: Site Location



The central part of the site, on which the EfW CHP facility building will be constructed, was until recently used by a firm called Ashcroft to process demolition rubble created from different construction projects throughout the naval base and dockyard. Some piles of rubble and skips remain on-site, and the MoD is in the process of disposing of these appropriately prior to making the site available to MVV.

The site also includes a large portion of Blackies Wood. This will not be the subject of any built development, but will be subject to landscape and ecological management.

At the south-western end of the site is a raised area of land which is known colloquially by the MoD as 'Table Top Mountain'. It is used by the MoD for the storage of equipment, but will be used by MVV as its construction compound. There is a general shortage of external storage space within HMNB Devonport, and this area is required long term by the MoD for storage purposes, and so at the end of the construction period it will be returned to MoD.

Access to the site is from the Camel's Head junction of Weston Mill Drive and Wolseley Road, through parts of HMNB Devonport. Weston Mill Drive is a Principal Road and provides the highway link between HMNB Devonport/Devonport dockyard and the trunk road network



(A38). The A38 is situated approximately 1.5km to the north-east of the site. The first part of the access road will be around the edge of an existing car park to the north of the main Camel's Head access road. A tarmac access road crosses Weston Mill Stream at two points to access the central part of the site, and a new bridge will be built to replace the existing bridges.

The site is outside the MoD's dockyard explosive safeguarding zone, and so no additional measures are required for building design. A Warships in Harbour Risk Assessment, Nuclear Safety Case Risk Assessment and Helicopter Flight Path Risk Assessment have all been carried out by the MoD, and no restrictions on the proposed EfW CHP facility have been identified.

The site is situated in an area that comprises a mix of residential, commercial and industrial properties. Receptors adjacent to the site boundaries include:

- To the north and north-west of the site lies the residential area of Barne Barton, which already has a generally industrial outlook;
- There are further residential properties to the east, north-east and south-east of the site, at Weston Mill, St. Budeaux, King's Tamerton, Camel's Head, North Prospect and Keyham, as well as further a field in Saltash to the north-west, Wilcove to the west and Torpoint to the south-west;
- The Weston Mill Viaduct is close to the eastern boundary of the site, and this forms a bridge carrying the railway line over the nearby entrance to HMNB Devonport and provides some screening from residential areas to the east; and
- To the west of the site is a car park, and to the south lies Weston Mill Lake, beyond which the majority of the dockyard facilities are located; to the south-east is the existing Devonport Distribution Facility (DDF) which stands approximately 8m high and is bordered to the north and south by large areas of tarmac used as loading bays and service yards.

## 2.6 Management Control

The facility will be operated by MVV Environment (Devonport) Ltd, and an environmental management system (EMS) will be implemented. The EMS will be externally assessed and verified as meeting the requirements of ISO14001. The system will define operational and maintenance procedures, coupled with requirements to be met in the event of an accident or incident.

Proposed site management techniques are detailed in the Site Management Report (Application Volume 1, part 4).

# 2.7 Operational Control

Operations at the facility will be controlled through an automatic process control system, which monitors process conditions continuously. The process control system will be programmed with operating criteria based on:

- · Achieving optimum process conditions; and
- Meeting all statutory requirements and emission levels.

The system will be programmed with alarms and interlocks to ensure these conditions are met.

The system also incorporates an independent emergency shutdown system (ESD), which takes control during emergency situations, and secures the plant into a safe state to avoid risk to humans, environment and equipment.



Site operational techniques are detailed in the Technical Arrangements Report (Application Volume 1, part 5).

# 2.8 Emissions Management

Emissions management at the facility is achieved by:

- Combustion control;
- Use of sodium bicarbonate and activated carbon as scrubbing agents;
- Use of a bag filter when the EfW/CHP is operational; and a
- Dust and carbon filter when the furnace is stopped. .

The emissions performance from a typical MVV EfW facility is well within the requirements given in the Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste, as demonstrated in Table 2.7 below.

The data in Table 2.7 contains emission measurements carried out at the MVV Leuna EfW in Germany. All measurements are at 11% Oxygen, and limits are  $mg/Nm^3$ , except Dioxin / Furans which are in  $ng/Nm^3$ .

Figure 2.1: Emission Performance (mg/Nm<sup>3</sup>)

	EU Limits	MVV Performance
Dust	10	1.5
Hydrogen Chloride	10	8
Sulphur Dioxide	50	40
Oxides of Nitrogen	200	160
Cadmium and Thallium	0.05	0.015
Mercury	0.05	0.0025
Dioxins and Furans	0.1	<0.005
Carbon Monoxide	50	15

Facility emissions management techniques are detailed in the Emissions Management Report (Application Volume 1, part 6).

### 2.9 Impact Assessment

The impact assessment for the facility was undertaken using a number of techniques including:

- H1 assessments;
- Baseline monitoring of air quality and background noise;
- Detailed air dispersion modelling for emissions to air and for odour;
- Detailed health impact assessment; and
- Detailed noise impact assessment.

The impact assessment identified that the following had the potential to have a significant impact on nearby receptors:

- Releases to air associated with releases from the combustion process;
- Releases of odour from the facility when the combustion process is not operational; and
- Noise emissions associated with various items of plant.



However, consideration of the plant design, engineering and operational controls and mitigation that will be implemented confirmed that:

- A chimney height of 95m above local ground level is sufficient to deliver the required air quality mitigation benefit without giving rise to other undesirable effects.
- Predicted operational concentrations of the modelled pollutants from the EfW process would be within their respective EAL criteria for the protection of human health and no significant impact is predicted on designated ecological sites.
- Potential exposure to the facility emissions will not pose unacceptable risk to the residential or farmer receptors identified in the vicinity of the proposed facility
- Impact from odour, noise and fugitive releases were not significant provided all controls and mitigation measures are implemented.

Details of the impact assessment are provided in Part 2, Application Volume 2.

# 2.10 Assessment of Best Available Techniques

An assessment of the proposed activities as Best Available Technique has been completed against the requirements of:

• S5.01 "Guidance for the Incineration of Waste and Fuel Manufactured From or Including Waste

It was concluded that the relevant sections of the guidance standards have been met, and that the proposed technology to be used in the Devonport EfW/CHP facility could be considered best available technique.

The individual assessment against BAT criteria, and an overall statement of BAT for the chosen technologies, has been prepared (Application Volume 1, part 10).

# 2.11 EP-OPRA

The EP-OPRA spreadsheet for installations has been completed in line with EA guidance (April 2011) on the basis:

- The installation meets the criteria for Section 5.1, Part A (1) (c) under the Environmental Permitting Regulations 2010 for "Incineration of non-hazardous waste in an incineration plant with a capacity of 1 tonne or more per hour".
- Releases to air were calculated on the basis of 8760 operational hours at WID limits;
- There are no releases to water, sewer or land;
- Locational criteria were confirmed as:
  - a. Human occupation <50m;
  - b. Habitats assessment was selected given proximity to Tamar SSSI;
  - c. On minor aquifer but not in a groundwater protection zone;
  - d. Potential receiving waters river grade 2/1 or estuarial;
  - e. Direct run-off from surface water will pass through interceptors;



- f. It is not located within an air quality management area (AQMA) or releases pollutants relevant to AQMA's within 2km of the site; and
- g. Under current site conditions a small part of the access road only is located within the tidal floodplain but the proposed mitigation will raise the access road above the tidal floodplain. The onsite access road is located outside the fluvial floodplain under both proposed and existing conditions.
- The operator will implement an ISO14001 environmental management system that will be certified within 18 months of the plant becoming operational.

The EP-OPRA spreadsheet is provided in Application Volume 1, Part 3 and an electronic version of the spreadsheet is provided on CD.



# 3 Application Type

This application is for a new Environmental Permit for an Energy from Waste, Combined Heat and Power (EfW/CHP) facility under the Environmental Permitting (England and Wales) Regulations 2010.

The application has been prepared as a bespoke application