

5 Alternatives to the Proposed Development

5.1 Introduction

- 5.1.1 This Chapter describes the alternative technologies, locations, site layouts / designs and transport means that have been considered.
- 5.1.2 This Chapter has been prepared in fulfilment of Schedule 4, Part II (4) of the EIA Regulations 1999 which require that an ES should provide “an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects”.
- 5.1.3 The three Authorities of Plymouth City Council, Torbay Council and Devon County Council have formally joined together to create the South West Devon Waste Partnership (SWDWP) to procure a shared solution to their future residual waste disposal needs. In October 2008 the SWDWP was awarded Private Finance Initiative (PFI) funding worth £177 million by the Department of Environment, Food and Rural Affairs (Defra) to enable the procurement of a residual waste treatment facility. After an extensive procurement process commencing in late 2008 and closing in January 2011, taking into account technical, environmental, planning / site deliverability, and legal and financial aspects, MVV was awarded the contract to design, construct and operate its EfW CHP facility at North Yard, Devonport.

5.2 Alternative Technologies

Introduction

- 5.2.1 The purpose of this section of ES Chapter 5 is to describe the alternative waste management options and residual waste treatment technologies that were considered for the SWDWP contract.

Waste Collection and Disposal Responsibilities of SWDWP Authorities

- 5.2.2 Plymouth and Torbay are unitary authorities so each therefore act both as Waste Collection Authority (WCA) and Waste Disposal Authority (WDA). Devon County is a two-tier authority and therefore the County Council is the WDA, with eight District Councils acting as the WCAs, three of which – Teignbridge, South Hams and West Devon – will provide residual municipal solid waste for the SWDWP-procured EfW CHP facility.

Municipal Waste Management Strategies and their Relationships

Individual and Joint Municipal Waste Management Strategies

- 5.2.3 Between 2005 and 2008 each of the three Partnership Authorities developed its own Municipal Waste Management Strategy^{1,2,3}, the essence of which is to establish performance targets and to guide the Authorities to increase recycling and composting and reduce the amount of waste going to landfill in accordance with the principle of the Waste Hierarchy.
- 5.2.4 However, these Municipal Waste Management Strategies have not been developed in isolation. The SWDWP, in preparing its Outline Business Case (OBC) for the Defra PFI funding, has carefully reviewed and considered these strategies to determine individual and common waste

management objectives and has also compared and, where appropriate, updated these against the National Waste Strategy for England 2007⁴. This has resulted in a Joint Municipal Waste Management Statement⁵ (JMWMS) which has defined common objectives and targets. The JMWMS states that the sub-region faces some important key issues with respect to waste management, including diminishing landfill void capacity in the sub-region; no commercial landfill within 22 mile radius of Plymouth from April 2008; and a Landfill Allowance Trading Scheme (LATS) permit shortfall for each council from 2009/10 onwards.

- 5.2.5 Under the PFI contract, the EfW CHP facility will cater for residual waste and the amount of EfW capacity planned for allows for increased recycling rates across all partner councils. Forecast recycling rates show a steady rise, except in Torbay, where action is being taken to introduce new systems to achieve 50% recycling by 2012. Notwithstanding forecast improved recycling rates, other waste recovery measures are required to meet targets for the diversion of waste to landfill, to avoid landfill tax costs and LATS penalties and to meet the challenge of 'zero landfill' which is part of the government's agenda in the current review of national waste management policy.
- 5.2.6 In summary, the JMWMS proposes to achieve specified recycling / composting performance as well as procuring a sub-regional EfW facility to manage the residual waste.
- 5.2.7 According to the JMWMS, in developing the individual strategies a number of options were appraised at the regional and local level in order to narrow the options to suit the needs of the local community. With regard to the treatment of residual waste which it was not practical to recycle or compost, the individual strategies evaluated the following options shown in Table 5.1.

Table 5.1: Options Evaluated by each Authority as part of their Individual Municipal Waste Management Strategies⁶

Option Evaluated	Evaluating Authority	Preferred Option
Landfill-based strategy, LATS purchase or continue "as is"	Devon, Torbay, Plymouth	
Use of advanced thermal treatment such as pyrolysis, gasification and/or autoclaving	Devon, Torbay, Plymouth	Devon
Thermal treatment using EfW technology	Devon, Torbay, Plymouth	Plymouth
Mechanical biological treatment (MBT) with in-vessel composting (IVC) and refuse-derived fuel (RDF) / EfW	Torbay, Plymouth	
MBT with anaerobic digestion (AD)	Plymouth	
MBT with AD and RDF / EfW	Devon, Torbay	
MBT with IVC and landfill of residue	Devon, Torbay	
MBT with AD and landfill of residue	Torbay	
Sub-regional EfW treatment	Torbay	Torbay

- 5.2.8 The JMWMS records that each Authority produced a detailed analysis of at least six options covering a range of possible solutions. It states that although each identified a slightly different preferred option, all agreed that there was a need for thermal treatment of the residual waste.
- 5.2.9 Further options appraisal and modelling was commissioned by the SWDWP and carried out by Entec UK Ltd⁷ on the following six options with respect to formulating a sub-regional solution:

- 1) "Do-Minimum" – disposal of residual waste to landfill.
- 2) Individually procured EfWs (a facility for each authority).
- 3) A single joint EfW located in Plymouth.
- 4) A single joint EfW and a joint AD facility for food waste treatment.
- 5) Three strategically located MBT facilities (including AD for the organic fraction), producing an RDF which is combusted in a joint RDF burner (located in Plymouth).
- 6) Three strategically located MBT facilities (including AD for the organic fraction), producing an RDF which is combusted in a merchant RDF burner (located in Runcorn, Cheshire).

5.2.10 All six options underwent detailed modelling, undertaken by Entec, against various technical, planning, environmental, social, financial and economic criteria, all detailed in the Entec report. The environmental criteria and the methods by which they were assessed are shown below in Table 5.2.

Table 5.2: Environmental Criteria and Methods Applied to the Six Short-Listed Options by Entec for the SWDWP

Criterion	Assessment Methodology
Abiotic resource depletion	WRATE ⁸ model, approved by the Environment Agency
Freshwater aquatic ecotoxicology	WRATE model, approved by the Environment Agency
Acidification	WRATE model, approved by the Environment Agency
Eutrophication	WRATE model, approved by the Environment Agency
Global warming potential	WRATE model, approved by the Environment Agency
Human toxicity	WRATE model, approved by the Environment Agency
Local amenity (odour, visual impact, noise)	Report published by the Office of the Deputy Prime Minister
Localised vehicle movements / congestion	Likely number of collection vehicles

5.2.11 Entec's WRATE analysis demonstrates that each of the options 2, 3, 4, 5 and 6 performed significantly better than option 1 (landfill), especially in respect of global warming potential (measured in kilograms of carbon dioxide equivalent) (i.e. landfill has greatest global warming potential and is therefore worse environmentally). The Entec report states that EfW facilities with CHP have a significantly lower global warming potential than EfW facilities without CHP.

5.2.12 However, the impacts of abiotic resource depletion, freshwater aquatic ecotoxicology, acidification and eutrophication are slightly lower with option 1 (landfill) than the other five options. The analysis by Entec also states that the options which included AD (4, 5 and 6) performed better in terms of global warming potential and human toxicity, but this effect is limited compared to the total environmental impact. Entec's analysis also states that the MBT options (5 and 6) provide an improvement in terms of all environmental impacts (although this is reduced for the option that requires the RDF to be sent further distances for processing). These improvements, the report states, are due to the savings associated with the recyclate that is recovered from this process and the high thermal efficiency of the process used to combust the RDF.

- 5.2.13 Taking the technical, planning, environmental, social, financial and economic criteria into account, the JMWMS states that the results of the Entec and SWDWP options appraisal indicated that option 3, the sub-regional EfW facility in Plymouth, offered the preferred joint option.

National Strategy

- 5.2.14 Both Devon and Plymouth adopted their Municipal Waste Management Strategies on the provisions contained in the national Waste Strategy 2000⁹. Waste Strategy 2000 was subject to review by Government and a report was published in November 2002. Subsequently, Waste Strategy 2000 has been superseded by the Waste Strategy for England 2007, which sets both new and revised targets for England. The joint proposals set out in the JMWMS will meet or exceed the targets for recycling and composting set out in the Waste Strategy for England 2007.

Regional Strategy

- 5.2.15 The South West regional waste strategy was published in March 2004¹⁰. Devon, Torbay and Plymouth contributed to the development of the regional strategy and have been mindful of the policy objectives in developing the joint waste statement. One of the key elements of the regional strategy is to provide treatment facilities close to the larger urban centres. Although the regional strategy predates the Waste Strategy for England 2007, the targets for the region are generally in line with the Waste Strategy for England 2007 targets according to the JMWMS.

Conclusion on Municipal Waste Management Strategies and their Relationships

- 5.2.16 A range of options for the management of municipal waste – including residual waste – has been considered by Devon County Council, Plymouth City Council and Torbay Council individually and collaboratively (firstly as individual but contiguous authorities and latterly under the ambit of the SWDWP). This analysis and the strategies that resulted have had due regard to the appropriate national and regional waste strategies, as well as local conditions. Taking technical, planning, environmental, social, financial and economic criteria into account, the JMWMS produced by the SWDWP in 2008 concluded that a sub-regional EfW facility in Plymouth offers the preferred joint option.

MVV's Solution

- 5.2.17 The authorities which comprise the South West Devon Waste Partnership have each set out their strategies for increasing recycling and meeting targets to reduce the amount of waste which they collect from households in their areas in their Municipal Waste Management Strategies. In developing a solution to manage the waste which has not been collected separately at the kerbside and which would not conflict with the policies to improve recycling performance, MVV have selected a technology which can achieve a diversion from landfill performance of over 90% and which can manage all types of material.
- 5.2.18 The achievement of maximum efficiency, reliability, and proven performance together with reducing the carbon footprint were also very important objectives in both developing the technology and selecting the preferred site for the facility.
- 5.2.19 There are many technologies such as anaerobic digestion which can manage segregated waste streams but most of the alternative technologies for managing mixed residual waste following maximum segregation e.g. autoclaving, still leave a residue which has to be landfilled or thermally treated. MVV have considered other forms of thermal treatment including "Fluidised Bed"; "Rotary Kiln"; "Gasification"; and "Pyrolysis"; and established that the "Moving Grate"

system put forward in their solution offers the most efficient form of combustion in terms of energy efficiency; diversion from landfill; and economical viability. The site put forward by MVV enables the efficiency and carbon reduction performance to be optimised by supplying energy to Dockyard to substitute for fossil fuels.

MVV WRATE Analysis

- 5.2.20 Companies bidding for the SWDWP residual waste treatment and disposal contract were provided with a 'baseline' WRATE model representative of the existing waste collection and disposal arrangements within the SWDWP area, which assumes landfill of residual waste. Each bidder then prepared a WRATE model of its proposed solution, enabling a comparison to be made between the baseline scenario and the solution proposed by that bidder; a separate comparison could also then be made by the SWDWP of the different solutions offered by bidders. MVV has therefore undertaken its own WRATE analysis as part of its bid for the contract. The full report can be found at Appendix 3 to the Planning Application Supporting Statement but a synopsis of the results is provided below.
- 5.2.21 MVV's solution would result in an offsetting of -34,625 tonnes CO₂ equivalent (tCO_{2eq}) emissions. This compares to a net burden of +38,879 tCO_{2eq} from the baseline landfill only solution. Overall therefore the WRATE model calculates that the MVV solution would deliver a reduction of 73,504 tCO_{2eq} per year, equating to 1.84 M tCO_{2eq} emissions over the course of the 25-year contract. The reported improvement in CO_{2eq} emissions is largely attributable (-20,387 tCO_{2eq}) to the recovery of 548,733 GJ of energy per annum (based on reference year tonnages) and offset emissions from landfill disposal (-38,717 tCO_{2eq}) with an additional significant contribution from additional ferrous and non-ferrous metals recycling (-5,749 tCO_{2eq}). Transportation and intermediate facilities represent net CO_{2eq} burdens but they are essential to realise the proposed solution and deliver the net benefit, including social, financial and economic criteria, (and would likely apply to any solution proposed by any bidder).
- 5.2.22 Normalised (Eur. Person Eq.) results showing indicative performance against all six WRATE indicators are shown in Table 5.3 below.

Table 5.3: All WRATE Indicators: Comparison Between MVV Solution and Baseline

WRATE impact categories	Baseline	MVV
Climate change: GWP 100a	3,008	-2,679
Acidification potential: average European	77	-826
Eutrophication potential: generic	1,629	46
Freshwater aquatic ecotoxicity: FAETP infinite	506	-4,287
Human toxicity: HTP infinite	-32	-2,963
Resources: depletion of abiotic resources	-3,256	-19,325
Total	1,931	-30,034

- 5.2.23 It can therefore be concluded that MVV's solution would have a significantly lower global warming potential than the SWDWP continuing to use the existing practice of landfilling residual waste.

Best Available Technique (BAT)

5.2.24 The BAT evaluation concluded that

“the assessment of the different thermal treatment options has shown that:

- Although there is some difference in pollutant levels in raw gas (e.g. lower NO_x but higher particulate with fluidised bed), each of the options can perform in accordance with WID emission limits with the use of appropriate secondary abatement technologies;
- The GWP signature for all technologies is broadly similar, however consideration of the relative energy generation efficiency of the process, the need for supplementary combustion fuel to support the thermal treatment process and parasitic load requirements to drive supporting plant and equipment shows that moving grate systems have similar or improved performance to the other technologies; and
- Moving-grate has a similar or improved level of performance to other technologies in respect of electrical efficiency, residue generation, raw materials and noise impact.

Therefore, taking the above into consideration, along with its proven performance at a commercial scale, moving grate technology has been selected as a cost effective option and is considered BAT for the Devonport facility.”

5.3 Alternative Locations

Introduction

5.3.1 This section of Chapter 5 describes an assessment undertaken by the applicant of the potential suitability of alternative sites and the reasons that the North Yard, Devonport site was selected as the proposed location for the EfW CHP facility. Chapter 3 of this Environmental Statement (ES) describes an assessment of need for the EfW CHP facility.

5.3.2 National planning policy includes a number of main principles which guide the consideration of suitable locations for waste management development; including:

- PPS1. “...development plans contribute to global sustainability by addressing the causes and potential impacts of climate change – through policies which promote the development of renewable energy resources and take climate change impacts into account in the location and design of development.”

- PPS1 Climate Change Supplement. *“...new development should be planned to make good use of opportunities for decentralised and renewable or low carbon energy”*
 - PPS10 – *“communities taking more responsibility for their own waste”*
 - PPS10 – *“enabling waste disposal in one of the nearest appropriate installations”*
 - PPS10 – *“recognition that the particular locational needs of some waste management facilities, together with the wider environmental and economic benefits of sustainable waste management, are material considerations that should be given significant weight in determining whether proposals should be given planning permission”*
 - PPS10 - *waste planning authorities should consider “a broad range of locations including industrial sites” and “give priority to the re-use of previously developed land....”*
- 5.3.3 The potential for EfW facilities to contribute to the management of climate change, particularly where combined heat and power can be delivered, and the importance of using previously developed land for waste uses, are central considerations in the identification of sites suitable for the treatment of residual waste.
- 5.3.4 The scope of this consideration of alternative sites includes:
- a consideration of the geographical area of search for potential sites for a EfW CHP facility to service the SWDWP contract;
 - the identification of a list of sites that were suitable in principle for locating an EfW CHP facility; and
 - the process employed to evaluate alternative potential sites.

Relevance of alternative sites to planning application determination

- 5.3.5 Statutory planning policy, including the development plan for the North Yard site, does not explicitly require applicants for planning permission for waste management development to consider alternative locations or to demonstrate that an application site is the best location for the proposed development when compared with alternative locations. The EIA Regulations¹¹ require only that an ES should provide *“an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects”*.
- 5.3.6 Case law, such as *Trusthouse Forte Hotel Ltd. V Secretary of State for the Environment and Another* (13 June 1986), is helpful in establishing in this case the relevance of the availability and suitability of an alternative location for the proposed development. The judgement on the *Trusthouse Forte Hotel* case summarises that:
- 5.3.7 *“Land may be developed in any way which is acceptable for planning purposes. The fact that other land exists upon which the development would be yet more acceptable for planning purposes would not justify the refusal of planning permission on the application site.” ;* and
- 5.3.8 *“Where, however, there are clear planning objections to development upon a particular site then it may well be relevant and indeed necessary to consider whether there is a more appropriate site elsewhere.”;*

5.3.9 The judgement goes on to note that:

5.3.10 *“Oliver L.J.’s judgment in Greater London Council v. Secretary of State for the Environment and London Docklands Development Corporation and Cablecross Projects Ltd. suggests a helpful although expressly *300 not exhaustive approach to the problem of determining whether consideration of the alternative sites is material 1 :*

5.3.11 *... comparability is appropriate generally to cases having the following characteristics: First of all, the presence of a clear public convenience, or advantage, in the proposal under consideration; secondly, the existence of inevitable adverse effects or disadvantages to the public or to some section of the public in the proposal; thirdly, the existence of an alternative site for the same project which would not have those effects, or would not have them to the same extent; and fourthly, a situation in which there can only be one permission granted for such development, or at least only a very limited number of permissions.”*

5.3.12 As such, the degree to which potential merits or demerits of alternative sites for an EfW to serve the SWDWP contract is a material consideration to the determination of this planning application is dependent on, broadly speaking, the need for the facility, the significance of any adverse effects and the likelihood of another site being available which would not have such adverse effects. Because elsewhere in this Environmental Statement it is acknowledged that the proposed EfW development at North Yard could result in some adverse effects, it is necessary to consider whether there is an available alternative site which would not have similar, other, or lesser, adverse effects.

The Geographical Area of Search

5.3.13 The SWDWP catchment is comprised of the South Hams, West Devon and (part of) Teignbridge districts of Devon and the Plymouth and Torbay administrative areas.

5.3.14 A key planning objective of national planning policy for waste management (PPS10¹) is that regional planning bodies and planning authorities should deliver planning strategies that *“provide a framework in which communities take more responsibility for their own waste”* and *“enable waste to be disposed of in one of the nearest appropriate installations”*. This policy framework suggests that a facility to manage waste generated in the SWDWP area should be located within the SWDWP administrative area.

5.3.15 Regional waste planning policy² requires in Policy RE5, that waste management delivery partners should co-operate to *“give priority to the provision of waste management facilities at or near the PUAs”* (Principal Urban Area) and that those facilities should *“take account of waste management requirements in the PUA(s) concerned and its neighbouring county areas”*.

5.3.16 The draft RSS³, in Policy W2, sets out a locational hierarchy, with management where waste arises at the top of the hierarchy and subsequently management in accordance with the proximity principle. Policy W2 goes on to state that (relating to Strategically Significant Towns and Cities, including Plymouth);

“For SSCTs the cost of landfill is increasing at £8 per tonne per annum as a consequence of the Landfill Tax Escalator the location of new waste management or disposal facilities should accord with the following sequential approach:

¹ Planning Policy Statement 10: Planning for Sustainable Waste Management. ODPM July 2005

² Regional Planning Guidance for the South West (RPG10) DTLR September 2001

³ The Draft Regional Spatial Strategy for the South West 2006 – 2026. South West Regional Assembly June 2006.

- *Within*
- *On the edge of, and/or*
- *In close proximity to (i.e. within 16 kilometres) of the urban area primarily served by the facility”*

5.3.17 Regional planning policy therefore suggests that the relationship between the location of waste management facilities and the main urban areas that they serve is an important consideration in identifying suitable locations. However, the government’s intention to abolish regional planning policy, and the relevance of that stated intention to this planning application, was taken into consideration as part of the applicant’s consideration of alternative sites.

5.3.18 One of the key elements of the South West Regional Waste Strategy⁴ is to provide treatment facilities close to the larger urban centres. Within the SWDWP area, the city of Plymouth has the greatest population and population density (Table 5.4) and therefore generates the greatest concentration of waste. It also provides the greatest opportunities to develop Combined Heat and Power opportunities thus enhancing the efficiency of the facility and reducing its environmental footprint. This principle is reflected in the JMWMS (see paragraph 5.2.13).

Table 5.4: SWDWP Area Population Density (Source: SWDWP Final Business Case Redacted Version Jan 2011. Table 2.1)

Year	Plymouth	Torbay	South Hams	Teignbridge	West Devon
Population	256,700	134,000	83,500	126,900	52,700
Population Density (people per hectare)	32.17	21.31	0.94	1.88	0.45

5.3.19 As part of the preparation of the Joint Municipal Waste Management Strategy⁵ (JMWMS), the Partnership authorities considered alternative spatial / geographical options for locating a facility to deliver the contract⁶. This process included detailed modelling of the planning, environmental, technical and economic criteria. As illustrated in Table 5.5, a far greater quantity of waste is currently landfilled in Plymouth than in any of the other Partnership authority areas. The Partnership concluded that a single facility, located within the administrative boundary of Plymouth, would offer the most sustainable solution.

Table 5.5: SWDWP Area MSW Landfilled 2009/10 (Source SWDWP Final Business Case Redacted Version Jan 2011. Tables 2.5 – 2.7)

Year	Plymouth	Torbay	Teignbridge, West Devon & South Hams
2009/10	84,599	43,694	62,888

5.3.20 Relevant waste management strategy therefore indicates, similarly to regional planning policy, that the relationship between the location of waste management facilities and the main urban areas that they serve is an important consideration in identifying suitable locations.

⁴ From Rubbish to Resource. The Regional Waste Strategy for the South West 2004 – 2020. South West Regional Assembly.

⁵ South West Devon Waste Partnership, Plymouth, Devon and Torbay Joint Municipal Waste Management Strategy Statement (Appendix 3D of SWDWP Procurement of Waste Treatment Services Outline Business Case)

⁶ South West Devon Waste Partnership. SWDWP – Waste PFI – OBC. Options Appraisal and Technical Modelling Assumptions. Entec April 2008

5.3.21 Consequently, to be consistent with planning and waste management policy, the consideration of alternative site options for the delivery of the SWDWP contract focused on locations within the Partnership area. Additionally, in accordance with relevant policy and with the findings of the SWDWP analysis of spatial options, the consideration of alternative locations by the applicant took account of the spatial relationship between sites and the main concentrations of waste arisings in the main urban areas, particularly in terms of the existence of heat loads and the potential for deliverable CHP.

Potential Alternative Sites

5.3.22 In their capacities as Waste Planning Authorities (WPA), Plymouth City Council, Devon County Council and Torbay Council are responsible for planning for all future waste management development (not just household waste) within their jurisdictions. All of the Partnership authorities have adopted development plans and MVV considered sites allocated for appropriate types of waste management uses as being alternative sites suitable in principle for the proposed EfW CHP facility.

5.3.23 Plymouth City Council adopted its Waste Development Plan Document¹² (DPD) in 2008. This DPD addresses *inter alia* Plymouth City Council's Local Development Framework (LDF) Core Strategy Strategic Objective 13 (3):

"Allocating sufficient and appropriate land within the city that is capable of accommodating a range of strategic waste management and treatment facilities. Providing sufficient capacity to meet Plymouth's needs and, if possible, additional capacity to manage and treat waste from adjoining areas."

5.3.24 The Waste DPD allocates a total of four sites as having the potential to accommodate a strategic waste management and treatment facility. Of those four, two are listed as being potentially suitable for an EfW facility, namely:

- Proposal W1 – Coypool China Clay Works.
- Proposal W2 – Land West of Ernesettle Lane.

5.3.25 Devon County Council adopted its Devon County Waste Local Plan¹³ (WLP) in 2006. The WLP allocates a total of nine sites in the county having the potential to accommodate a strategic waste management and treatment facility. Of those nine, five are within the SWDWP area and are listed in the WLP as being potentially suitable for an EfW facility, as follows:

- SH17 – New England Quarry (South Hams).
- SH52 – Wrangaton (South Hams).
- TE13 – Heathfield Landfill Site (Teignbridge).
- TE51 – Heathfield Industrial Estate (Teignbridge).
- WD07 – Crowndale, Tavistock (West Devon).

5.3.26 Torbay Council adopted its Local Plan¹⁴ in 2004, within which is a Waste and Minerals chapter. It does not allocate any specific sites for strategic waste management use such as EfW.

- 5.3.27 In addition, MVV also considered alternative sites that had been identified on a ‘Short List’ in Table B2 of a preparatory evidence base study carried out by Entec for Plymouth City Council⁷ (the 2005 Entec Report).
- 5.3.28 Further, as this Entec study was carried out a number of years ago, MVV also considered whether the criteria used by Entec to identify potentially suitable sites were still current. MVV concluded that the importance of deliverable CHP had not been considered at the time of the study as a positive locational criterion by Entec, and, in consultation with Plymouth City Council, identified a number of additional sites with potential for CHP connection, for consideration.
- 5.3.29 Sites within Devonport Dockyard were limited to those offered by the MoD and land availability was limited by a number of factors. To the south of Weston Mill Lake, there was a lack of available sites/land of sufficient size (area) and a number of listed and residential buildings in the Dockyard, especially in the southern yard. There was also a MoD statutory explosive safeguarding zone in this part of the Dockyard. To the north of Weston Mill Lake, there was limited land availability of a suitable scale, due to operational requirements of the MoD, and there was a need to establish a segregated, secure site, with a dedicated access route.
- 5.3.30 Consequently, only one site in South Yard and one site in North Yard (the application site) were considered.
- 5.3.31 In summary, MVV established a list of potential alternative sites for the proposed EfW CHP facility, drawn from:
- sites allocated in the SWDWP area development plans;
 - the list of potential strategic and local waste management sites identified in the Entec Report, Table B2; and
 - a list of alternative sites with potential for CHP connection, prepared in consultation with Plymouth City Council.
- 5.3.32 The list of alternative sites considered for the EfW CHP facility is presented overleaf.

Table 5.6: List of Alternative Sites Considered for the EfW CHP Facility

List of Alternative Sites Considered for the EfW CHP Facility
A. Sites allocated in the SWDWP area development plans
Proposal W1 - China Clay Works, Coypool
Proposal W2 - Land West of Ernesettle (formerly considered in 2005 Entec Report under site E54, University of Plymouth Playing Fields)
SH17 New England Quarry
TE13 Heathfield Landfill Site
TE 51 Heathfield Industrial Estate
WD 07 Crowndale Tavistock
SH52 Wrangaton
B. Potential strategic and local waste management sites identified in the Entec Report
E01, Chelson Meadow

⁷ Plymouth Waste Development Plan Document: Search for Potential Waste Management Sites. Entec 11 July 2005

List of Alternative Sites Considered for the EfW CHP Facility
E02, Moorcroft Quarry, Billacombe
E07 Land off St.Budeaux By Pass, St Budeaux
E14 Plymbridge Industrial Estate
E19 British Gas Site, Breakwater Road
E21, Water Treatment Works, Glacis Park, Tavistock Road
E47, Prince Rock Depot
E50, Land at Estover Gate
E52, Land at Burrington Industrial Estate
E53, Employment Land Commitment, Ernesettle
E55, Southway Redevelopment Area
E57, Plymouth Airport Redevelopment Area
E58, Forder Valley
C. Alternative sites with potential for CHP connection
North Yard, Devonport
South Yard, Devonport
Langage, Devon

Evaluation Methodology

The site evaluation methodology took account of three sets of evaluation criteria

- A. The Plymouth Waste DPD site evaluation criteria (from the 2005 Entec Report)
- B. Combined heat and power deliverability criteria
- C. Waste travel-time analysis

A. Plymouth Waste DPD Site Evaluation Criteria

- 5.3.33 Plymouth City Council and Devon County Council undertook detailed site identification exercises and subjected their potential sites to various suitability tests in order to justify the allocation of sites for waste management uses in their respective development plan documents. These site allocations have been tested at a public examination by an independent planning inspector.
- 5.3.34 The sites in North Yard and South Yard had not been made available by MoD at the time of the site identification exercises and public examination and therefore did not form part of the Independent Inspectors evaluation.
- 5.3.35 As the MVV EfW CHP facility site is in Plymouth and the planning application will be determined in accordance with the Plymouth Waste DPD, it was considered appropriate to base the evaluation of potential alternative locations and the proposed North Yard site on the criteria that were applied to the list of sites considered for allocation by Plymouth City Council, but also to take into account changes in planning policy that would define evaluation criteria in 2011.
- 5.3.36 Entec UK Ltd. undertook the original work¹⁵ (the 2005 Entec Report) for Plymouth City Council in support of the Waste DPD. The site evaluation criteria used by the applicant were updated from those used in the 2005 Entec Report, to include up-to-date sustainability, energy use and deliverability criteria and these updated criteria were established in consultation with PCC.

URS/Scott Wilson then undertook an evaluation of the list of potential alternative sites and the report of this process can be found at Appendix 5.1.

- 5.3.37 The criteria used to evaluate the list of potential alternative sites are listed in Table 2 of Appendix 5.1 and covered criteria relating to land use, physical size, economics, traffic and transportation, amenity nature conservation and landscape and visual impact. Additionally, an assessment of CHP potential, including deliverability matters, was undertaken. The CHP assessment criteria are described below.

Review of Entec Report Criteria

- 5.3.38 Section 3 of the 2005 Entec Report describes the policy basis for the site evaluation criteria. It should be noted that this policy basis pre-dated Planning Policy Statement 10 and that there are a number of important differences between PPG10 and PPS10. It is particularly relevant to note, when re-evaluating the sites allocated in the Waste DPD, that paragraphs 20 and 21 of PPS10 require waste planning authorities to give priority to the re-use of previously developed land when allocating sites for waste management uses in their development plans.
- 5.3.39 Part of the Entec study involved the application of a further criterion to establish the most suitable sites, which considered the proximity of housing within 250m of identified sites. The 250m distance from sensitive receptors was not applied as an exclusionary threshold in the Entec study, i.e. it was not a criterion that automatically excluded a site from consideration.
- 5.3.40 On page 10 of the 2005 Entec Report, the Environment Agency Technical Guidance on Composting Operations (Version 3.0), is described as the source of the 250m threshold, based on a statement in the Environment Agency Technical Guidance that the Agency will object to composting operations within 250m of a sensitive receptors, subject to risk assessment. The 2005 Entec Report notes that this guidance has clear implications for the siting of any proposal that includes a composting facility, but also notes that even then, the 250m threshold is not exclusionary. The proposed EfW CHP does not include a composting operation and the Environment Agency Technical Guidance offers no basis in planning policy for the application of a 250m stand-off threshold in the evaluation of the suitability of sites for EfW development.
- 5.3.41 The 250m stand-off threshold also appears in a research study on planning for waste management facilities¹⁶ that was prepared by consultants on behalf of the Office of the Deputy Prime Minister in 2004. It should be noted that Section 3 of the 2005 Entec Report does not refer to this study as being an important part of the policy basis for site evaluation criteria.
- 5.3.42 As the title of the ODPM report suggests, the report is merely a research study and is in part a conjectural report setting out the research team's views on the planning considerations raised by a broad range of waste management facilities and has no real status in the planning system. The report does not provide robust justification as to why it is suggested that large scale thermal treatment facilities should, where possible, be located a distance of at least 250m from sensitive receptors, nor does it justify why this specific distance is applied (in an apparent arbitrary manner) to a range of waste management facility types. The basis for the suggested 250m stand-off appears to be related to the above Environment Agency guidance relating to the avoidance of impacts of bioaerosol release from biological treatment processes. For example, it is stated on page 109 of the ODPM report paragraph states: "*Concerns over health risks from bio-aerosols generated by biological treatment processes may require plants to be located at least 250m from sensitive receptors.*"

5.3.43 Further, on page 139 of the ODPM report it is stated, in relation to small scale thermal treatment facilities:

“Sites closer than 250m of housing etc should generally be avoided where possible. However, scale and improved environmental performance standards should enable a reasonable case to be made for such plants to be located closer to houses etc, particularly when part of a CHP/district heating scheme.”

5.3.44 Clearly this advice is contradictory in itself and there is no direct relationship between the scale of a thermal treatment facility and the level of potential odour/noise/bio aerosol impacts on the amenity of residential properties. It might be concluded from a consideration of the ODPM report that thermal treatment facilities, especially those incorporating CHP, can be acceptably located within 250m of residential properties.

5.3.45 The status of the research study is limited to a reference in the Companion Guide¹⁷ to Planning Policy Statement 10, which notes that the research study may provide potentially helpful information and case study examples to planning authorities and developers. The PPS10 Companion Guide itself is not a statutory planning policy document. Neither PPS10, nor the Companion Guide, make any requirement for the establishment of ‘buffer zones’ between waste management development and other land uses, nor do they specifically refer to the 250m distance that is suggested in the research study. Given the conjectural nature of the research study’s conclusions on buffer zone distances and lack of status of the research study report, it is clear that its contents should be given no weight in the determination of planning applications.

5.3.46 It is clear therefore that there is no basis in planning policy for the application of a 250m threshold for a stand-off distance from residential property in evaluating the suitability of potential sites for EfW development.

5.3.47 The 2005 Entec Report describes the application of a “general amenity exclusion zone” as an opportunity in the evaluation of potential amenity impacts, as part of the on-site evaluation process. The on-site assessment criteria included a 250m stand-off threshold for the evaluation of amenity impacts. Table D1 of the Entec Report lists short-listed sites that were excluded from further consideration following the on-site evaluation, listing ‘amenity’ as the single reasons for exclusion for seven sites. It is not clear whether these sites were excluded solely because the sites were located within 250m of residential properties. Site E54, University of Plymouth Playing Fields, is located within 250m of residential properties. This fact is not recorded in Table D1 and the site was not excluded from further consideration.

5.3.48 For the purposes of this alternative sites assessment, the amenity impact categorisation awarded by in the Entec Report was taken at face value, but the 250m stand-off threshold was not an exclusionary criteria and sites within 250m of sensitive receptors were evaluated against CHP deliverability criteria, as well as the Entec Report criteria.

5.3.49 It is important to note that the evaluation of potential alternative sites by Entec was carried out at a broad level of detail, when compared to the full and fine-detail environmental impact assessment that is required for this planning application for the EfW CHP at North Yard. It is therefore difficult to directly compare the benefits and dis-benefits of the North Yard site with those of potential alternative sites, at the level of detail that is revealed by the environmental impact assessment process.

5.3.50 Entec concluded in section 7.1.2 of its report (without having undertaken an environmental impact assessment) that five sites had potential to accommodate a strategic site for recovery.

Subsequently two of these sites (University of Plymouth Playing Fields and China Clay Works, Coypool), were allocated in the Plymouth Waste DPD.

- 5.3.51 In the 2005 Entec Report (on page C4), there is no description of the assessment criteria relating to landscape and visual impacts. However, Plymouth City Council/Entec has subsequently confirmed that the assessment of landscape and visual impact was based on the impact the siting of such a facility would have on the amenity of the area the site is located in, rather than impacts on individual viewpoints per se.

B. Combined Heat and Power Deliverability Criteria

- 5.3.52 Since the Entec report was prepared, Planning and Climate Change Supplement to Planning Policy Statement 1 (the PPS1 Supplement) (2007) has been published. Under the section 'Selecting Land for Development', paragraph 24 of the PPS1 Supplement sets out a number of criteria that local authorities should take into account when selecting land for development. One of the criteria given is:

"the extent to which existing or planned opportunities for decentralised and renewable or low-carbon energy could contribute to the energy supply of development"

- 5.3.53 The ability of sites to contribute to decentralised and renewable low-carbon energy was not considered as part of the site identification and assessment criteria used in the Entec Report. However, given updated national policy, this should be a consideration of all future work on the allocation of sites for residual waste treatment.
- 5.3.54 In order to address this, potential sites were assessed with regard to potential to contribute to the provision of decentralised and low-carbon energy. In the case of sites for waste management development, this would most likely relate to the use of heat and power produced from waste material and the potential for the use of combined heat and power (CHP).
- 5.3.55 Criteria that impact on a site's ability to provide CHP were identified by Scott Wilson and an evaluation grading system established, in consultation with Plymouth City Council. The CHP suitability criteria and evaluation gradings are described below and the results of the evaluation are described in Appendix 5.1.

Criterion 1: Distance between heat source and heat user(s) (as a measure of economic feasibility)

- E – Greater than 5km from significant heat user(s)
- D – Greater than 2km to 5km from significant heat user(s)
- C – Greater than 1km to 2km from significant heat user(s)
- B – Greater than 500m to 1km from significant heat user(s)
- A – Within 500m of significant heat user(s)

'Significant' heat users

A District Energy Study of the City of Plymouth was produced by ICE (UK) Ltd. in January 2010⁸ to assess the energy needs and suitability for district CHP schemes of Devonport, Plymouth City Centre and Derriford. In 2008, Entec UK Ltd. produced a report reviewing the potential for EFW-CHP development in Plymouth⁹ on behalf of Plymouth City Council. Information from these

⁸ ICE (UK) Ltd. (2010) *City of Plymouth District Energy Study, Feasibility Study for an Energy Services Company in Plymouth*, Plymouth City Council.

⁹ Entec UK Ltd. (2008) *Review of EFW-CHP Potential*, Plymouth City Council.

reports enabled Scott Wilson to identify what are defined for the purposes of this exercise as potential 'significant' users of heat:

- HMNB Devonport Dockyard (identified by ICE and Entec);
- Devonport housing and other uses (identified by ICE);
- Derriford area (Derriford Hospital identified by Entec, wider Derriford area including other industrial and commercial uses identified by ICE);
- City centre, specifically Civic Centre and University of Plymouth (identified by ICE);
- Sherford – planned settlement of 5500 homes plus associated infrastructure with resolution to grant planning permission;
- Plymstock – new settlement of 1600 homes plus associated infrastructure with planning permission to southeast of city (identified by Entec).

Significant heat users have been discussed with Plymouth City Council officers and the above list has been agreed as being accurate and suitable for the purposes of this CHP appraisal.

Criterion 2: Steam or hot water distribution network at heat user(s)

E – No steam or hot water distribution network/infrastructure in place and retrofitting considered technically and/or economically prohibitive

D – New steam or hot water distribution network/infrastructure could be designed into new heat user(s) but space is limited (e.g. urban area)

C – New steam or hot water distribution network/infrastructure could be retrofitted to existing heat user(s) and space is available to do this (e.g. industrial area/business park)

B – New steam or hot water distribution network/infrastructure could be designed into new heat user(s) that are planned but not yet constructed

A – Existing steam or hot water distribution network/infrastructure in place at existing user's Sites

Criterion 3: Route between heat source and heat user(s)

E – Significant and insurmountable land ownership, engineering and/or environmental constraints

D – A number of severe land ownership, engineering and/or environmental constraints

C – Some moderate land ownership, engineering and/or environmental constraints but not insurmountable

B – Some minor land ownership, engineering and/or environmental constraints

A – Free from significant land ownership, engineering and environmental constraints

Criterion 4: Progress towards contract for purchase of heat

E – No progress

D – Potential heat user(s) identified by supplier

C – Discussions commenced with heat user(s)

B – Detailed negotiations underway with heat user(s)

A – Heads of Terms agreed for purchase of heat between supplier and heat user(s)

C. Waste Travel-Time Analysis

5.3.56 As part of the Transport Assessment, an assessment was made of the number of hours per week involved in the transportation of waste from waste transfer stations / bulking points, to alternative potential EfW locations. The analysis considered EfW locations at North Yard,

Devonport, Ernesettle and Coypool in Plymouth and New England Quarry in Devon. A full account of this analysis is provided in Annex G to the Transport Assessment.

- 5.3.57 Travel time was selected in preference to travel distance as a better indicator of the climate change impact of waste transport and this 'waste travel-time' analysis focussed only on the sites allocated in the Plymouth Waste DPD for EfW facilities and the proposed EfW facility at New England Quarry.

Evaluation Results

Results Summary

- 5.3.58 The report at Appendix 5.1 provides a detailed account of the results of the evaluation of the list of potential alternative sites against the evaluation criteria. Tables 5.7(a) - (c) below provide a summary of the evaluation results.
- 5.3.59 The evaluation of potential sites against CHP deliverability criteria (see Table 5.7 (a)) reveals that the application site at North Yard, Devonport, scored 'A' against each of the CHP deliverability criteria. The site is within 500m of HMNB Devonport, where there is an existing steam distribution network. The route of the connecting infrastructure is controlled by the MoD and an Energy Supply Agreement has been signed by MVV and HMNB Devonport. Of the potential sites considered, no other site matches the CHP deliverability criteria as closely as North Yard, Devonport.
- 5.3.60 The consideration of waste travel-time (see Table 5.7(b)) revealed that locating an EfW CHP facility in Plymouth involves shorter travel time than the site evaluated outside Plymouth and that of the available sites in Plymouth, at North Yard, Devonport would result in the shortest travel-time.
- 5.3.61 The evaluation of potential alternative sites against the Entec Report criteria (see Table 5.7(c)) shows that North Yard qualifies as an area/site to consider, as it is a vacant, brownfield site and the site of the EfW CHP facility is not affected by any exclusionary criteria. In common with most of the other sites assessed, North Yard is affected by local environmental designations, namely Greenscape and a Biodiversity Network Feature.
- 5.3.62 On evaluation against on-site assessment criteria, the North Yard site scores generally well in comparison to the other sites evaluated. The lowest grading was 'C' (mitigation possible), in relation to amenity and visual/landscape impacts.

Table 5.7(a): Summary of Evaluation Results (CHP Criteria)

Site No.	Site Name	Criterion 1: Distance between heat source and user(s)	Criterion 2: Steam or hot water distribution network at heat user(s)	Criterion 3: Route between heat source and heat user(s)	Criterion 4: Progress towards purchase of heat
		Grade	Grade	Grade	Grade
-	North Yard, Devonport	A	A	A	A
E01	Chelson Meadow, Waste Management	B	B	C	E
E02	Moorcroft Quarry, Billacombe	B	B	B	E
E07	Land off St. Budeaux By Pass, St. Budeaux	C	A	C	E
E14	Plymbridge Industrial Estate	D	B	D	E
E19	British Gas Site Breakwater Road	D	B	C	E
E21	Water Treatment Works, Glacis Park, Tavistock Road	B	C	B	E
E47	Prince Rock Depot	C	C	D	E
E48	China Clay Works, Coypool	D	C	D	E
E50	Land at Estover Gate	B	C	B	E
E52	Land at Burrington Industrial Estate	C	A	C	E
E53	Employment Land Commitment, Ernesettle	D	A	D	E
E54	University of Plymouth Playing Fields, Ernesettle	D	A	D	E
E55	Southway Redevelopment Area	C	C	B	E
E57	Plymouth Airport Redevelopment Area	B	C	B	E
E58	Forder Valley	D	C	C	E
E60	Agaton Farm, Ernesettle	D	A	D	E
-	South Yard	A	A	A	E
-	New England Quarry	D	B	C	C
-	Heathfield Landfill Site	E / C	C	D	E

Site No.	Site Name	Criterion 1: Distance between heat source and user(s)	Criterion 2: Steam or hot water distribution network at heat user(s)	Criterion 3: Route between heat source and heat user(s)	Criterion 4: Progress towards purchase of heat
		Grade	Grade	Grade	Grade
-	Heathfield Industrial Estate	E / A	C	B	E
-	Crowndale, Tavistock	E / B	-	-	-
-	Langage	C	B	C	E
-	Wrangaton	E / D	-	-	-

Table 5.7(b): Summary of Evaluation Results (Waste Travel-Time)

Waste Travel Time / Miles Comparison – Summary (Refuse Transfer Station Location Option 1)

EfW location	Two-Way distance travelled (miles per week)	Two-Way distance travelled (km per week)	Two-way time (hours per week)
Devonport	8729	14049	199
New England Quarry	10012	16112	258
Ernesettle	8865	14267	204
Coypool	7713	12413	180

Waste Travel Time / Miles Comparison – Summary (Refuse Transfer Station Option 2)

EfW location	Two-Way distance travelled (miles per week)	Two-Way distance travelled (km per week)	Two-way time (hours per week)
Devonport	7694	12383	219
New England Quarry	8910	14339	265
Ernesettle	7822	12588	223
Coypool	6686	10761	197

Table 5.7(c): Summary of Evaluation Results (Entec Report Criteria)

Stage 1 conflict Inclusionary Objective	Subject Area
Unallocated site with existing industrial use / vacant and undeveloped site larger than 1.0 hectare	North Yard, Devonport
Existing Waste Facility	E01, Chelson Meadow, Waste management
Existing Waste Facility / Operational Quarry	E02, Moorcroft Quarry, Billacombe
Greenfield Employment Zone	E07 Land off St.Budeaux By Pass, St Budeaux
Employment Allocation	E14, Plymbridge Industrial Estate
Employment Allocation	E19, British Gas Site, Breakwater Road
Employment Commitment	E21, Water Treatment Works, Glacis Park, Tavistock Road
Existing Waste Facility	E47, Prince Rock Depot
Unallocated Site in Existing Employment Use	E48, China Clay Works, Coypool
Unallocated Site in Existing Employment Use	E50, Land at Estover Gate
Unallocated Site in Existing Employment Use	E52, Land at Burrington Industrial Estate
Greenfield Employment Commitment	E53, Employment Land Commitment, Ernesettle
Greenfield Vacant Playing Fields	E54, University of Plymouth Playing Fields
Planned Redevelopment of Employment Use	E55, Southway Redevelopment Area
Unallocated Site in Existing Employment Use	E57, Plymouth Airport Redevelopment Area
Greenfield Planned Employment Allocation	E58, Forder Valley
Greenfield Vacant Playing Fields	E60, Agaton Farm, Ernesettle
Not allocated. Site proposed by SITA at ISOS stage of SWDWP procurement but bid withdrawn	South Yard
Allocated for strategic waste management in Devon County Waste Local Plan	New England Quarry
Allocated for strategic waste management in Devon County Waste Local Plan	Heathfield Landfill Site
Allocated for strategic waste management in Devon County Waste Local Plan	Heathfield Industrial Estate
Allocated for strategic waste management in Devon County Waste Local Plan	Crowndale Tavistock
General industrial estate / science park area suggested for allocation but not allocated ¹⁰	Langage
Allocated for strategic waste management in Devon County Waste Local Plan	Wrangaton

Stage 2 Exclusionary Objectives (severity)	Subject Area
Access route partially within Flood Zone 2 (<5%)	North Yard, Devonport
Mixed use allocation. (partial) (<2%)	E01, Chelson Meadow, Waste management
Major Aquifer (100%)	E02, Moorcroft Quarry, Billacombe
-	E07 Land off St.Budeaux By Pass, St Budeaux
-	E14, Plymbridge Industrial Estate
Major Aquifer (100%)	E19, British Gas Site, Breakwater Road
-	E21, Water Treatment Works, Glacis Park, Tavistock Road
Major Aquifer (100%)	E47, Prince Rock Depot
-	E48, China Clay Works, Coypool
-	E50, Land at Estover Gate
-	E52, Land at Burrington Industrial Estate
-	E53, Employment Land Commitment, Ernesettle
RNAD Explosive Arc (yellow zone) (20%)	E54, University of Plymouth Playing Fields
CAA Airport Protection Zone (<5%)	E55, Southway Redevelopment Area
-	E57, Plymouth Airport Redevelopment Area
-	E58, Forder Valley
-	E60, Agaton Farm, Ernsettle
Site located within Devonport AAP area but not specifically allocated. Potential conflict with AAP objectives	South Yard
Periphery within Flood Zone 3 (10%) Site not committed for mineral extraction, but within mineral consultation area (100%) although not in itself a reason for exclusion	New England Quarry
Corner within Flood Zone 2 (5%) Site not committed for mineral extraction, but within mineral consultation area (100%) although not in itself a reason for exclusion	Heathfield Landfill Site
Periphery within Flood Zones 2 and 3 (10%) Entirely within ACNB (100%) – based on this the Enttec criteria require that this site no longer be considered	Heathfield Industrial Estate
-	Crowndale Tavistock
-	Langage
-	Wrangaton

Subject Area	
Stage 3 Discretionary Objectives (severity)	
North Yard, Devonport	Biodiversity Network Feature (20%) Local Greenscape Area (20%)
E01, Chelson Meadow, Waste management	Floodplain Zone 1 (partial) (<2%) Greenscape (partial) (<5%) BAA Birdstrike Consultation Zone (100%)
E02, Moorcroft Quarry, Billacombe	Greenscape (partial) (<20%) BAA Birdstrike Consultation Zone (100%)
E07 Land off St.Budeaux By Pass, St Budeaux	Greenscape (partial) (<10%) BAA Birdstrike Consultation Zone (100%)
E14, Plymbridge Industrial Estate	Floodplain Zone 1 (partial) (5%) CAA Consultation Zone (100%) BAA Birdstrike Consultation Zone (100%)
E19, British Gas Site, Breakwater Road	Floodplain Zone 1 (partial) (40%) BAA Birdstrike Consultation Zone (100%)
E21, Water Treatment Works, Glacis Park, Tavistock Road	Floodplain Zone 1 (35%) BAA Birdstrike Consultation Zone (100%)
E47, Prince Rock Depot	Greenscape (partial) (<2%) BAA Birdstrike Consultation Zone (100%)
E48, China Clay Works, Coypool	CAA Consultation Zone (100%) BAA Birdstrike Consultation Zone (100%)
E50, Land at Estover Gate	CAA Consultation Zone (100%) BAA Birdstrike Consultation Zone (100%)
E52, Land at Burrington Industrial Estate	BAA Birdstrike Consultation Zone (100%)
E53, Employment Land Commitment, Ernesettle	RNAD Explosive Arc (purple zone) (100%) BAA Birdstrike Consultation Zone (100%)
E54, University of Plymouth Playing Fields	Greenscape (Sports Pitches) (100%) RNAD Explosive Arc (purple zone) (100%) BAA Birdstrike Consultation Zone (100%)
E55, Southway Redevelopment Area	CAA Consultation Zone (100%) BAA Birdstrike Consultation Zone (100%)
E57, Plymouth Airport Redevelopment Area	RNAD Explosive Arc (purple zone) (100%) BAA Birdstrike Consultation Zone (100%)
E58, Forder Valley	Greenscape (100%) CAA Consultation Zone (100%) BAA Birdstrike Consultation Zone (100%)
E60, Agaton Farm, Ernsettle	Affected by Greenscape (100%) BAA Birdstrike Consultation Zone (100%)
South Yard	Route to A38 approximately 5km, depending on route taken
New England Quarry	Partly within County Wildlife Site (30%)
Heathfield Landfill Site	Partly within County Wildlife Site (15%) Area containing archaeological features (5%) Public right of way (5%)
Heathfield Industrial Estate	Adjacent to railway Adjoins Haz Installation Consultation Zone Records of Features of Archaeological Value Mineral Consultation Area
Crowndale Tavistock	N/A
Langage	-
Wrangaton	-

Table 5.7(b): Summary of Evaluation Results (Entec Report Criteria)

Subject Area	Objectives	North Yard, Devonport	E01, Chelson Meadow, Waste management	E02, Moorcroft Quarry, Billacombe	E07 Land off St Budeaux By Pass, St Budeaux	E14, Plymbridge Industrial Estate	E19, British Gas Site, Breakwater Road	E21, Water Treatment Works, Glacis Park, Tavistock Road	E47, Prince Rock Depot	E48, China Clay Works, Coypool	E50, Land at Estover Gate	E52, Land at Burrington Industrial Estate	E53, Employment Land Commitment, Ernesettle	E54, University of Plymouth Playing Fields	E55, Southway Redevelopment Area	E57, Plymouth Airport Redevelopment Area	E58, Forder Valley	E60, Agaton Farm, Ernesettle	South Yard	New England Quarry	Heathfield Landfill Site	Heathfield Industrial Estate	Crowndale Tavistock	Langage	Wrangaton	
Land Use	1. To avoid the loss or damage to protected trees and groups of trees.	A	A	A?	D	A	A	A	A	C	A	A	C	A	A	A	A	A	A	C	C	C	-	B	C	
	2. To avoid impact upon public footpaths and public rights of way.	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	A	-	B	A	
	3. To protect the best and most versatile agricultural land.	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	A	A	A	A	-	C A	A	
Physical Size	1. To ensure site is physically large enough to accommodate facilities.	A	A	A	A	A	A	A	A	A	E A	E A	A	A(D*)	A A	A A	A A	A	A	A	A	A	A	-	A	A
Economic	1. To avoid detrimental impact on employment uses.	A	A	A	B	C	C	C	A	A	C	C	A?	B	C	C	C	D	B	A	A	C	-	A	B	

MVV Environment Devonport Ltd

Energy from Waste Combined Heat and Power Facility
North Yard, Devonport



Subject Area	Objectives	North Yard, Devonport	E01, Chelson Meadow, Waste management	E02, Moorcroft Quarry, Billacombe	E07 Land off St.Budeaux By Pass, St Budeaux	E14, Plymbridge Industrial Estate	E19, British Gas Site, Breakwater Road	E21, Water Treatment Works, Glacis Park, Tavistock Road	E47, Prince Rock Depot	E48, China Clay Works, Coypool	E50, Land at Estover Gate	E52, Land at Burrington Industrial Estate	E53, Employment Land Commitment, Ernesettle	E54, University of Plymouth Playing Fields	E55, Southway Redevelopment Area	E57, Plymouth Airport Redevelopment Area	E58, Forder Valley	E60, Agaton Farm, Ernesettle	South Yard	New England Quarry	Heathfield Landfill Site	Heathfield Industrial Estate	Crowndale Tavistock	Langage	Wrangaton
Traffic and Transportation	1. To ensure site is physically accessible to a standard acceptable to the highway authority.	A	A	C	C	A	D	A	A	D/E*	A	A	A	A	A	B	D	A	B	C/D	A	B	-	A	B
	2. To promote sites in locations that avoid access through residential areas and sensitive land-uses.	A	B	B	D	B	B	C	B	C	B	E	B	B	C	B	D	B	E	E/E	E	C	-	B	D
Amenity	1. To minimise potential detrimental impacts of noise/vibration.	C*	A?	B	C	B	B	C	C	A	C	C	D	C*	B	C	C	D	C	C	C	C	-	C	B
	2. To minimise potential detrimental impacts of odour.	C*	A?	B	C	B	B	C	C	A	C	C	D	C*	B	C	C	D	B	C	C	C	-	C	B
	3. To minimise potential detrimental impacts of nuisance (vermin, pests, litter, lighting pollution).	C*	A?	B	C	D	B	C	C	C	D	C	D	C*	D	D	C	D	B	C	C	C	-	C	B

MVV Environment Devonport Ltd

Energy from Waste Combined Heat and Power Facility
North Yard, Devonport



Subject Area	Objectives	North Yard, Devonport	E01, Chelson Meadow, Waste management	E02, Moorcroft Quarry, Billacombe	E07 Land off St.Budeaux By Pass, St Budeaux	E14, Plymbridge Industrial Estate	E19, British Gas Site, Breakwater Road	E21, Water Treatment Works, Glacis Park, Tavistock Road	E47, Prince Rock Depot	E48, China Clay Works, Coypool	E50, Land at Estover Gate	E52, Land at Burrington Industrial Estate	E53, Employment Land Commitment, Ernesettle	E54, University of Plymouth Playing Fields	E55, Southway Redevelopment Area	E57, Plymouth Airport Redevelopment Area	E58, Forder Valley	E60, Agaton Farm, Ernesettle	South Yard	New England Quarry	Heathfield Landfill Site	Heathfield Industrial Estate	Crowndale Tavistock	Langage	Wrangaton
	4. To minimise any potential detrimental effects to air quality.	C*	A?	B	C	B	B	C	C	A?	C	C	D	C*	B	D	C	D	C	C	C	C	-	C	B
	5. To minimise any potential detrimental effects from bioaerosols.	C*	A?	D	E	E	E	E	E	A	E	E	E	C*	E	E	E	E	C	C	C	C	-	C	B
Nature Conservation	1a). To minimise the impact on wildlife interests. (presence of protected species)	B	-	-	C	A	A	A	A	-	A	A	-	-	A	C	C	C?	A	C	C	D	-	B	B
	1b). To minimise the impact on wildlife interests. (location of wildlife corridor)	B	A	A	C	C	C	A	A	A	A	A	A	B	A	C	B	B	A	C	C	D	-	C	B
Land- scape and Visual	1. To prevent the creation of unacceptable visual impacts.	C*	D	A	C	B	B	C	C	B	A	B	D	D	A	C	D	D	C	C	C	C	-	C	D

* Notes on evaluation rationale – Entec Report criteria

E54, University of Plymouth Playing Fields

Land Use - Score = Potentially D if site capacity restrictions due to slope and existing RNAD access road and Greenscape status are taken into account.

Amenity – Score = C due to sensitive uses being present within 250m of the site, in accordance with Entec Evaluation Criteria.

North Yard, Devonport

Amenity – Score = C due to sensitive uses being close to rather than adjacent to the site and due to mitigation of amenity impacts being possible for all indicators, as evidenced by the Environmental Statement.

Visual/landscape impact – Score = C, due to evidence in Environmental Statement Chapter 8 that, whilst there are some adverse effects on views from individual properties, the impact of the facility on the visual amenity of the area (as a whole) would be limited to “significant but manageable”, due to the high quality design of the proposed facility and the site layout design and landscaping strategy taking advantage of the particular topography and vegetation of the area.

E48, China Clay Works, Coypool

Traffic and Transportation – Score = D/E as site access is via retail park, park and ride facility and past housing.

Evaluation Results - Combined Heat and Power Deliverability Criteria

- 5.3.63 The CHP deliverability criteria were applied to all of the sites short-listed in the 2005 Entec Report (Table D1), including those sites that were identified in Table D1 as being unsuitable on amenity and other grounds.
- 5.3.64 The appraisal of potential sites against CHP deliverability criteria demonstrates that the North Yard Site has by far the greatest potential for effective use of CHP. The North Yard fully meets all of the deliverability criteria; it is currently part of HMNB Devonport, a major heat user, and there is an existing steam distribution network which can be connected to the EfW CHP Facility. The route of the connecting pipe-work is under the control of the MoD and MVV has signed an Energy Supply Agreement to provide combined heat and power to HMNB Devonport.
- 5.3.65 A separate report by consultants Entec¹⁸, published in April 2008 prior to the commencement of the SWDWP contract bidding process, stated that:
- “...the most likely site to match heat output from the EFW is the Devonport Dockyards. No other single site would appear to be exactly matched to the heat supply output from either EFW facility”*
- 5.3.66 Importantly, CHP at the North Yard site is deliverable, with the applicant having secured a lease from the MOD. The Site offers a deliverable opportunity to incorporate CHP provision into the facility from the outset. The spatial relationship between the North Yard site and Devonport Dockyard affords the EfW CHP facility a net efficiency of between 39 % and 49%, compared to a normal “electricity only net efficiency” of about 27%. The EfW CHP facility also achieved an R1 Coefficient (EU measure of energy efficiency) of between 0.95 and 1.01, compared to the standard set for qualification as energy recovery of 0.65. The EfW CHP also qualifies for the ‘Good Quality CHP Scheme’ (run by Defra), with a Quality Index of 105, compared to the minimum standard of 100.
- 5.3.67 Additionally, the facility allows connectivity to district heating schemes and opportunities to provide heat to neighbouring communities are being actively investigated in conjunction with Plymouth City Council.
- 5.3.68 Deliverable CHP at North Yard, Devonport will bring major social and economic benefits to the Dockyard, the community and Plymouth and consequently play a major role in helping the City of Plymouth to meet its strategy planning objectives. The Energy, Economy and Employment Statement, which can be found at Appendix 3 to the Planning Application Supporting Statement, provides a fuller consideration of the CHP benefits of the EfW CHP facility and of the associated economic and employment benefits.
- 5.3.69 Further assessment of the benefits of the scheme is presented in detail in several sections of the information submitted with the planning application. Table 5.8 signposts this supporting information.

Table 5.8: Signpost to Supporting Information on the Benefits of the North Yard EfW CHP Scheme

Main Benefit	Location of Assessment / Evidence Documents
Energy: Carbon Balance & Climate Change	Planning Application Supporting Statement Appendix 3 (Energy, Economy and Employment Statement)
Energy: Economy and Jobs	Planning Application Supporting Statement Appendix 3 (Energy, Economy and Employment Statement) Environmental Statement Chapter 17
Community Benefits: access, landscape, recreation and biodiversity	Planning Application Supporting Statement Design and Access Statement
Community Benefits: other	Planning Application Supporting Statement Appendix 3 (Energy, Economy and Employment Statement) Section 106 Agreement Heads of Terms (Planning Application Supporting Statement)

- 5.3.70 None of the other sites evaluated fully meet the CHP deliverability criteria. Of the two sites allocated in the Plymouth Waste DPD, Coypool is not close to a potential significant user of heat and the nearest user would require retrofitting with heat distribution infrastructure. There are likely to be land ownership constraints on a pipework route and there are no known proposals to develop a CHP scheme.
- 5.3.71 The Ernesettle site is 2.5km from a potential significant heat user (HMNB Devonport) where there is existing heat distribution infrastructure. Land ownership between the sites is unknown and likely to present a significant constraint and there are no known proposals to develop a CHP scheme linking the sites.
- 5.3.72 The New England Quarry site is the subject of a planning application for a EfW facility. The application documents suggest that, although the scheme would not provide CHP at the outset, the facility would be capable of delivering CHP, should a suitable heat user be identified and subject to a number of identified constraints. One heat user option considered in the application documents is the proposed Sherford development. The Sherford proposals have not yet received planning approval (pending agreement of a Section 106 legal agreement), therefore there is no existing heat load or infrastructure. Land ownership between the sites is unknown and could present a constraint, but the developer has expressed some interest in the principle of the use of heat from the proposed EfW facility.

Evaluation Results - Waste Travel-time Analysis

- 5.3.73 The waste travel-time analysis (Transport Assessment Annex G) demonstrates that although Coypool gave the lowest waste travel time of the sites considered, locating an EfW at the North Yard site would save at least 46 hours waste travel time per week compared to New England Quarry and at least 4 hours per week compared to Ernesettle.
- 5.3.74 The North Yard site is therefore in accordance with relevant development plan and national planning policy on the location of waste management facilities in relation to waste arisings,

including the key planning objective of PPS10 to enable waste to be disposed of in one of the nearest appropriate installations.

Evaluation Results - Plymouth Waste DPD Site Evaluation Criteria

North Yard

- 5.3.75 The application of the 2005 Entec Report site evaluation methodology to North Yard demonstrates that, had the site been available, it would have been likely to have been included on the short list of sites considered for allocation for an EfW facility and the evaluation of the site would have been favourable compared to other short-listed sites.
- 5.3.76 The part of the site to be developed is brownfield, previously developed land which is in accordance with this national policy. The site is graded 'A' against land use and physical size criteria.
- 5.3.77 The economic benefits of deliverable CHP lead to an 'A' grade against economic criteria and the adequate existing access from the public highway results in an 'A' grade for traffic and transportation.
- 5.3.78 An adjacent area of woodland offers an opportunity to develop a comprehensive landscape strategy, based on careful consideration of building orientation in relation to surrounding topography and land uses and major improvements to biodiversity in this area, which also offers an educational resource for visitors to the EfW CHP facility. The Site is graded B against nature conservation criteria.
- 5.3.79 When evaluating the North Yard site against the 2005 Entec Report amenity impact criteria, the North Yard site is evaluated as a 'C' category (poor, but mitigation possible). This categorisation is awarded because, although the site is close to residential properties, it is separated from them by an area of woodland and it is possible, by employing good design and engineering solutions, to meet all of the amenity objectives of the 2005 Entec Report methodology (i.e. to minimise impacts from noise, odour, nuisance, air quality and bioaerosols to an acceptable degree).
- 5.3.80 The evaluation of the landscape and visual impacts of the North Yard site, in terms of the impact on the visual amenity of the area, in accordance with the 2005 Entec Report evaluation criteria, also results in a 'C' categorisation (i.e. a significant but manageable impact on the visual amenity in the area). This evaluation includes recognition of the landscape and design-led approach to positioning a building of high quality design within the site in such a way as to minimise the number of viewpoints that experience a major adverse affect on views, resulting in an overall acceptable level of impact for the area as a whole. The Design and Access Statement submitted with the planning application for the EfW CHP facility provides more evidence to support this assessment of visual effects.

Alternative Sites

- 5.3.81 The 2005 Entec Report concluded (in Section 7.1.2) that five sites could have been suitable for a waste recovery facility. Subsequently, two sites (Land West of Ernesettle Lane and Coypool China Clay Works) were allocated in the Plymouth City Council Waste Development Plan Document. The Waste DPD acknowledges (at Sections on Proposal W1 and Proposal W2) that both these allocations are not without their dis-benefits.
- 5.3.82 The allocated strategic waste site 'Land West of Ernesettle Lane' was purchased in early 2007 by Plymouth City Council as a potential site for the City's own long-term waste treatment solution.

When the three partnership councils commenced working together, this site was appraised as being suitable for a waste treatment solution and was therefore used as the Reference Project site and offered by the City Council to the SWDWP for use within the PFI procurement.

- 5.3.83 Despite this planning and ownership status, neither site was proposed by the SWDWP contract bidders at the latter stages of the bid process. The Coypool and Ernesettle sites did not offer MVV as good an opportunity to deliver an integrated CHP scheme as the North Yard site.

Land West of Ernesettle Lane

- 5.3.84 A large part of the site allocated in the Waste DPD was considered in the 2005 Entec Report as site 54, University of Plymouth Playing Fields. In this assessment against the Waste DPD site evaluation criteria, where comparison was possible, Site 54 was graded the same as North Yard against all criteria, except economy, where it was graded 'B' compared to 'A' for North Yard; traffic (avoidance of access through sensitive uses) where it was graded 'B' compared to 'A' for North yard, and landscape and visual, where it was graded 'D' compared to 'C' for North Yard.
- 5.3.85 In the 2005 Entec Report, giving priority to the use of previously developed land is not one of the main objectives, but it is used as an indicator under the 'physical size' subject area. The score of 'A' attributed to site E54 (Ernesettle Playing Fields) appears inconsistent with this indicator, as the site is described as 'Greenfield vacant playing fields'. Paragraph 7.7.1 of the 2005 Entec Report confirms that Ernesettle is a green-field site and that "*development would need to be justified in the context of a lack of alternative sites further up the sequential test.*" And this point is repeated at paragraph 7.1.2 in relation to the Ernesettle sites that were identified as having some potential for a strategic waste management facility.
- 5.3.86 Further, paragraph 2.2.5 of the 2005 Entec Report identifies designated Greenspace as a reason to potentially rule out sites from consideration. This constraint is recorded as affecting site E54 in the Waste Site Assessment proforma, but does not appear to have been taken into account in the grading of site E54 against objectives and indicators, which include giving preference to the use of previously developed land.
- 5.3.87 In the preferred options version of the Plymouth Waste development plan document (2005), Preferred Option 15, Land at Ernesettle Lane, which included parts of the now allocated 'Land West of Ernesettle Lane' site, was proposed as a reserve site. The preferred options document notes at paragraph 10.14, that the site was green-field should only be brought forward for development if other identified sites cannot be developed.
- 5.3.88 In 2006, Entec produced a report for Plymouth City Council entitled "Waste Management Site Feasibility Study" (the 2006 Entec Report). This report contains an assessment of a "re-defined" Ernesettle site, which includes the following statement at paragraph 3.2.1:

"In reality, the site is a substitute for Coypool.....Put simply, the Council needs Ernesettle should Coypool be unavailable. This is an important statement in justifying why the site is required given the level of previously development it has undergone and its proximity to environmentally sensitive designations."

- 5.3.89 The 2006 Entec Report goes on to identify a number of potential constraints on the development of the site. These included:
- the (at the time) current sports pitch use;

- the location of the site at least 350m from the Plymouth Sound and Estuaries SAC and the Tamar Estuaries Complex SPA and the presence of “a number of residential receptors located at least 140m to the east and 150m to the south of the site boundaries and further workplace receptors are located within 50m of the sites northern boundary”;
 - the capacity of the site being constrained by the RNAD access road and the slope gradient of the site; and
 - visual impact (the 2006 Entec Report notes that “*The Ernesettle area currently accommodates compatible, but relatively unobtrusive, land uses and the impact of a major scheme upon the Tamar and views of the city from the north and west is likely to be viewed as a significant issue. In this context, the lack of suitable alternative sites will be important.*”).
- 5.3.90 The Inspector’s Report into the examination of the Waste DPD was published in 20 March 2008. In his consideration of the suitability of the Land West of Ernesettle allocation the inspector concluded:

“In terms of the potential visual impact of an EfW incinerator, clearly such a facility would be a very large structure occupying a site of between 2 and 5 hectares. The mass and height of such buildings, based on my observation of the facility at Marchwood, Southampton, would make such a building at Ernesettle highly visible from the Ernesettle neighbourhood, from the River, from the Saltash waterfront and from rural settlements further north in the Tamar valley. It would be unrealistic to expect that the prominence of such a building could be masked by landscaping.”

Coypool China Clay Works

- 5.3.91 The evaluation of the Coypool site in the 2005 Entec Report reveals that although access to the A38 via the B3104 was considered to be acceptable, significant highway improvements would be required and the access to the site was via a private road. A Technical Note on Coypool, prepared by Entec in 2007, also notes that access was via a private road and that there was potential for HGV traffic to conflict with retail-park and park and ride traffic.
- 5.3.92 Plymouth City Council Waste Disposal Authority considered the potential of the Coypool site but was unable to take this site forward, due to multiple and complicated land ownership/lease issues and access difficulties to the site which prevented it being secured as a viable site for the Council’s long-term solution.
- 5.3.93 These constraints were clearly emerging in the lead up to the Waste DPD examination, as reported in the 2008 Entec Technical Note on Ernesettle, which states; “*The City needs to overcome the risk (potential land ownership constraints) associated with achieving delivery through a single site (Coypool).*”. A re-evaluation of the Coypool site today against the 2005 Entec Report discretionary criteria of ‘availability’ and ‘suitability’ would lead to the conclusion that the site was not available or suitable for allocation in a Waste DPD.

Conclusions on Alternative Locations

- 5.3.94 The results of the application of the site assessment methodology to the North Yard Site reveal that the Site has a number of significant benefits and the applicant’s assessment of the potential alternative sites concluded that no site outside of HMNB Devonport offered the same potential for deliverable CHP as North Yard.

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- 5.3.95 The waste travel-time analysis demonstrates that the North Yard site is in accordance with development plan and national planning policy on the location of waste management facilities in relation to areas of waste arisings.
- 5.3.96 The potential to supply CHP to the dockyard and the opportunity, because of the specific North Yard location, to deliver major social and economic benefits to the dockyard, its community and Plymouth as a whole, combined with a broadly favourable evaluation against other environmental, amenity and sustainability criteria, led the applicant to select North Yard as its preferred location for the EfW CHP facility. In coming to this conclusion, the weight that should be applied to the requirements of national and local planning policy to address the causes of climate change and to promote economic regeneration, when identifying sites for new development, was an important consideration.
- 5.3.97 The significance of potential impacts of developing a EfW CHP Facility at North Yard, including amenity and visual impact, has been considered in detail in this Environmental Statement. The findings of the environmental impact assessment are presented in the various topic chapters and a value judgement on the balance between the benefits and dis-benefits of the North Yard site is presented in the Planning Application Supporting Statement (PASS). This judgement concludes that, on balance, the major local, sub-regional and regional-level benefits of the EfW CHP scheme outweigh any dis-benefits of the scheme and that the North Yard site is an appropriate location for the EfW CHP facility.
- 5.3.98 Further, the analysis presented in Section 5.3 of this chapter confirms that there is no available alternative site which would not have similar, other, or lesser, adverse environmental effects to the proposed EfW CHP development at North Yard, Devonport.
- 5.3.99 An assessment of the proposed development against the relevant policies of the development plan, including policy W7 of the Plymouth Waste DPD (which specifically addresses planning applications for waste management facilities that are not on allocated sites) is included as Appendix 5 to the PASS and further commentary is included within the main PASS document.

5.4 Alternative Site Layouts / Designs

Design Evolution Process

5.4.1 The design of the EfW CHP facility for which planning permission is sought, as described in detail in Chapter 6 of this ES, has evolved over a period of approximately two years since the start of MVV's bid for the SWDWP contract. This design evolution has been undertaken collaboratively, involving inputs in various forms from *inter alia*:

- Developers, MVV.
- Process engineers, MVV O&M GmbH.
- Architects, Savage and Chadwick.
- Environmental and planning consultants and landscape architects, Scott Wilson.
- Civil engineers, Kier and GHA Livigunn.
- Landowners, Ministry of Defence.
- Plymouth City Council
- South West Design Review Panel of the Commission on Architecture and the Built Environment (CABE)
- Other stakeholders, including communities local to the site.

5.4.2 The purpose of this section of ES Chapter 5 is to describe the design evolution and the alternative site layouts and designs considered with a focus on their environmental effects, in order to accord with the EIA Regulations. The Design and Access Statement provides a fuller description of the design evolution in architectural terms. The Design and Access Statement is separate from this ES but submitted along with the planning application.

Architecture and Landscape

5.4.3 The site is located on previously used industrial land at the edge of the Devonport Dockyard, close to a residential area which is situated on land at a higher elevation to the site. The planning application boundary includes a wooded valley. This context required careful consideration of alternative layouts of the EfW CHP facility process equipment and buildings, of traffic circulation and of architectural design, in order to minimise the environmental effects of the facility.

5.4.4 In the early stages of evolution, the layout and design evolved from collaboration between landscape architects and architects, who were informed by the site and surroundings and by advice of the project engineers on the fundamental engineering limitations of the EfW process. Later in the design evolution process, views were sought of relevant professional organisations, such as South West Design Review Panel of the Commission on Architecture and the Built Environment (CABE) and Plymouth City Council and public exhibitions were held, which included illustrations and photomontages of the proposed facility layout and design.

5.4.5 Broadly a series of five alternative design options were explored through the design evolution process, before a final design (Option 5) was established, following the public exhibitions and consultation with Plymouth City Council officers and the SWDWP prior to the submission of the planning application. Each option was developed by the landscaped architect and architect working together to formulate the proposals. The alternative designs considered and the reasons for the rejection of options 0-4 are described below.

Provisional Design Option

5.4.6 The initial design was proposed very early in the SWDWP contract bidding process and was essentially a replication of the design solution for an alternative site (the Land West of Ernesettle Lane site), prepared for illustrative purposes to show how a EfW CHP facility might appear at the North Yard site.

5.4.7 The main facility was situated on Table Top Mountain, with ash processing on-site in an area to the north-east (where the main facility is now proposed).

5.4.8 The initial positioning of the different elements in the processing of the waste on the site was a standard compact and integrated process solution. This lent itself to a unified building envelope and the initial design option was a simple curved form rising from its lowest point to the North East to its highest point in the South West.

5.4.9 A Preliminary assessment led to the relocation of the facility on to the current main development site and the development of further design options.

Design Option 1

5.4.10 Design Option 1 was similar to the Provisional Design Option but the main building was moved to the land to the north-east. Again the design option was a simple curved form rising from its lowest point to the North East to its highest point in the South West. Ash processing was proposed on-site on Table Top Mountain. Figure 5.1 shows the site layout and a photomontage for Initial Design Option 1.

5.4.11 Design Option 2

5.4.12 Alternative Design Option 2 re-orientated the building so that the lowest point of it was closest to the nearby housing. Again, ash processing was proposed on-site on Table Top Mountain. Figure 5.2 shows the site layout and a massing model for Alternative Design Option 2.

Design Option 3

5.4.13 This option adopted an explicitly composite approach via a series of buildings of different heights and shapes, in order to reduce the overall mass of the building. The building form was angular and hard edged and the materials proposed were simple and designed to blend in with the green backdrop that forms the backdrop to the site from the West and North. Ash processing was no longer proposed on-site and the building was moved further northeast on the site. Figure 5.3 shows a layout and two elevations for Alternative Design Option 3.

5.4.14 Whilst this approach produced a building perhaps more suited to a semi industrial landscape the forms it adopted did not appear compatible with the form of the surrounding Dockyard and its development. The design also failed to respond satisfactorily to the landscape concept.

Design Option 4

- 5.4.15 This option which formed the basis for detailed pre-application consultation with Plymouth City Council Planning Authority, CABE and with the local community through a series of public exhibitions. The basis for the Option 4 design was building forms which were simple box shapes reflecting the process internally and were in-keeping with the various buildings nearby in the North Yard. These shapes were generally expressed in a neutral colour but occasionally 'punched through' within strong colours, again reflecting the process within them. Part of the scheme – toward the Air Pollution Control areas – was exposed and the process was visible. Figure 5.4 shows two elevations and a site layout for Alternative Design Option 4.
- 5.4.16 Option 4 constituted the architect's base design that was subsequently developed and refined into the final proposal (Option 5). This concept of 'object and wrapper' was welcomed when presented to the South West Design Review Panel of the Commission on Architecture and the Built Environment (CABE). Plymouth City Council made a number of comments on the Option 4 design, which were taken into account, along with feedback from the public exhibitions (as recorded in the Statement of Community Involvement) in the final design review stages.

Preferred Option (Option 5)

- 5.4.17 Following the process of consultation with the local community and with Plymouth City Council, the site context study was revisited and design option 4 evolved with a nautical theme. The form of the ship hull has been expressed externally by exposed steel columns which carry the outer cladding and roof trusses. These columns provide a striking architectural feature and they are laterally braced and visually unified.
- 5.4.18 Particular reference was drawn from the warships anchored in the dockyard. The angular bow and stern are reflected in the ends of the building and the more horizontal form of the superstructure is reflected in the central areas – Boiler House and Tipping Hall.
- 5.4.19 The building has retained its angular rather than curved form taking every opportunity to express the building component areas separately. This design philosophy continued to be informed by the need to respond to neighbouring residential areas by minimising the bulk and visual impact of the building.
- 5.4.20 In terms of a colour palette the dockyard references were entirely used. The predominant colour is grey and this is broken down into shades to match the various different shades of buildings and ships. In addition a strong colour palette is used sparingly in contrast, reflecting the limited bursts of colour that appear in the dockyard itself.

Facility for Processing Incinerator Bottom Ash

- 5.4.21 The initial intention of MVV was to locate an Incinerator Bottom Ash (IBA) processing facility at the south-western end of the site on land known colloquially by the Ministry of Defence as 'Table Top Mountain'. This can be seen in the bottom left hand corners of both Figure 5.1 and Figure 5.2.
- 5.4.22 However, pre-application meetings held with Plymouth City Council, the Environment Agency and Natural England highlighted concerns that the site is elevated and visual prominent and there were perceived risks of dust impacts from this facility on the nearby sensitive marine habitat; there were also concerns about noise and visual impact.

- 5.4.23 MVV therefore took the decision to seek an alternative site for the IBA processing and has identified a site at Whitecleave Quarry, Buckfastleigh, for this purpose, which is to be the subject of a separate planning application.

Chimney Height

- 5.4.24 During the design of the facility and the EIA, detailed air quality dispersion modelling has been undertaken to ensure that the combined impact/effect on the local community of existing emissions in the area and the new emissions from the EfW development is minimised and to inform *inter alia* the height of the chimney. The selection of an appropriate chimney height requires a number of factors to be taken into account, the most important of which is the need to balance a chimney height sufficient to achieve adequate dispersion of pollutants against site specific constraints such as visual impacts.
- 5.4.25 During the Invitation to Submit Detailed Solutions (ISDS) stage of the bidding process for the SWDWP Residual Waste Treatment and Disposal Contract, Scott Wilson undertook an initial air quality modelling assessment. This identified that an 85m tall chimney would be a suitable option to progress to detailed design. Following MVV's award of the SWDWP contract, Scott Wilson undertook a considerable amount of additional assessment work. This work, which is reported in full in Section 5 of Appendix 13.1, has considered a range of possible chimney heights from 45 m to 120 m. The magnitude of impacts at all receptors within 10 km of the proposed EfW CHP facility with an 85 m chimney would meet the assessment criteria for the protection of human health.
- 5.4.26 In addition to the main assessment criteria, an additional measure that is widely used as a screening check is to compare the magnitude of the contribution from the facility against a value of 1% of the criteria value. By increasing the height of the chimney to 95 m, the number of receptors that would experience an impact in annual mean concentrations of nitrogen dioxide for example, of less than 1% of the assessment criteria can be improved. Above 95m, the incremental benefit of further increases in the chimney height become less effective in reducing the contribution of the facility to ground-level pollutant concentrations. It is therefore considered that 95m represents a height at which the visual impacts of an increase in chimney height begin to outweigh the benefits to air quality, in terms of human health.
- 5.4.27 The air quality dispersion modelling work has established that a chimney in the range of 85 m to 95 m in height would deliver the required air quality mitigation benefit, without giving rise to other undesirable effects. Through the public consultation process, including road show events and meetings of the Local Liaison Committee, MVV were made aware of local residents preference for air pollutants to be released from as tall a chimney as possible. The decision was taken by MVV to progress the design and the planning application based on a chimney height of 95 m above local ground level. This ES has therefore used a 95 m chimney as the basis for an assessment of the significance of effects.

5.5 Alternative Transport Means

- 5.5.1 Scott Wilson transport consultants have undertaken an investigation into alternative forms of transport potentially available for accessing the EfW CHP facility at North Yard. A number of factors have been considered.

Location of Facilities

- 5.5.2 The location of the proposed facilities in relation to transport links is an important factor in deciding the method by which to transfer waste and / or residues.
- 5.5.3 The site of the proposed EfW CHP facility is close to water and to a number of wharves / quays within the Dockyard. Subject to MOD approval and non-conflict with military uses (which it is considered unlikely to be forthcoming), it is possible in theory that some of these could be used, although this would require transport of waste and / or residues through the secure area of the Dockyard.
- 5.5.4 The origins of waste are located across South West Devon at Waste Transfer Stations (WTS). None of these are close to water transfer links and there are no current water-to-road operations within Plymouth.
- 5.5.5 The destination for IBA at Whitecleaves Quarry is not close to any water transport facilities. It is clear then that any transportation by water would include a large amount of transfer between modes. Waste from the WTS sites would have to be bulked up and taken by road to existing water transport facilities. There are no such facilities in South West Devon; Teignmouth has a port but no specific waste handling facilities. When waste reaches the Dockyard it would then have to be transported through the yard to the EfW CHP facility, again using HGVs. The same logic would apply to the transportation of IBA and APC residues away from the EfW CHP facility.
- 5.5.6 Rail transport is similar in that although the site of the EfW CHP facility contains a former railway line – the remnant earthworks being located within Blackies Wood – none of the origins of the waste nor the destinations of the IBA are close to the railway. This would again mean a great deal of mode transfer. Further, the former railway line is located in an area of biodiversity value, close to residential property and these interests would be likely to be adversely affected by the introduction of a road to rail transfer point.

The Type and Quantity of Material to be Moved

- 5.5.7 It may not be appropriate to move certain types of material other than in sealed road-going tankers, due to their hazardous nature. APC residues need to be moved in sealed containers and should be handled as little as possible.
- 5.5.8 Furthermore, APC residues will not be generated in large enough quantities needed to make transportation by sea or rail viable.

Environmental Considerations

- 5.5.9 Emissions of rail and sea transport are generally less than for road providing each movement contains a sufficient load; however building infrastructure to facilitate these movements can have environmental impacts.
- 5.5.10 The site of the EfW CHP facility contains a former railway line, the remnant earthworks being located within Blackies Wood. The bed of the track remains in place but the permanent way and the associated turnout were removed many years ago. This infrastructure would have to be rebuilt in an area of ecological, landscape and amenity value, which would have adverse environmental effects. There are also residential properties in the vicinity to the north and east, which would be subject to increased noise from waste / residue handling – in particular the diesel

powered engines would have to pull full loads up the gradient out of the site past the residential properties.

Cost of New Infrastructure

- 5.5.11 The cost of the infrastructure needed to enable transport of waste and/or residues by sea and rail is very expensive, especially if it includes building new track or new docking facilities.

Timetable Restrictions

- 5.5.12 Movements on the rail network would be controlled by the rail operator and this could affect reliability and flexibility of movements. This might mean transporting waste and/or residues at night or in the early morning period when noise would be more perceptible and activities much more disruptive to nearby residents.
- 5.5.13 Movements by sea would be restricted during periods of extreme weather and when military activities had to take precedence.

Conclusion

- 5.5.14 Given the factors described above it is considered that access to and from the site for the inward transport of waste and the outward transport of residues is best achieved by road.

5.6 References

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- ¹ Devon County Council (2005) *Municipal Waste Management Strategy for Devon: March 2005*.
- ² Torbay Council (2008) *Municipal Waste Management Strategy for Torbay 2008 – 2025: Headline Strategy Adopted February 2008*.
- ³ Plymouth City Council (2007) *Plymouth City Council Municipal Waste Management Strategy 2007 – 2030: PCC MWMS Headline Strategy: Final Report April 2007*.
- ⁴ Department of Environment, Food and Rural Affairs (2007) *National Waste Strategy for England*.
- ⁵ South West Devon Waste Partnership (2008) *Plymouth, Devon and Torbay Joint Municipal Waste Management Strategy Statement*. Appendix 3D to SWDWP OBC.
- ⁶ Source: JMWMS page 12.
- ⁷ Entec UK Ltd (2008) *SWDWP – Waste PFI – OBC: Options Appraisal and Technical Modelling Assumptions*.
- ⁸ Waste and Resources Assessment Tool for the Environment.
- ⁹ Department of the Environment, Transport and the Regions (2000) *Waste Strategy 2000*. Cmd 4693.
- ¹⁰ South West Regional Assembly (2004) *From Rubbish to Resource: The Regional Waste Strategy for the South West 2004 – 2020*.

¹¹ Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999

¹² Plymouth City Council (2008) *Waste Development Plan Document 2006 – 2021*.

¹³ Devon County Council (2006) *Devon County Waste Local Plan*.

¹⁴ Torbay Council (2006) *Adopted Torbay Local Plan 1995 – 2011*.

¹⁵ Entec UK Ltd (2005). *Plymouth Waste Local Development Document: Search for Potential Waste Management Sites. Supporting Document for the Waste Core Strategy and Waste Local Development Preferred Options Report*.

¹⁶ Office of the Deputy Prime Minister (2004) *Planning for Waste Management Facilities: A Research Study*.

¹⁷ Department for Communities and Local Government (2006) *Planning for Sustainable Waste Management: A Companion Guide*.

¹⁸ Entec UK Ltd (2008) *Plymouth City Council: Waste Management Services PFI Contract: Review of EFW-CHP Potential*. Section 4.1.