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 2007[4]. This has resulted in a Joint Municipal Waste Management Statement[5] (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 Strategies[6]

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 Ltd[7] 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

Criterion	Assessment Methodology
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 2000[9]. 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, which are consistent with the household waste recycling target in the Government Review of Waste Policy in England 2011.

Regional Strategy

5.2.15 The South West regional waste strategy was published in March 2004[10]. 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. Box 1 below provides a commentary by MVV on potential alternative technologies available. 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.

BOX 1 MVV Commentary on Alternative Technologies

Autoclaving, anaerobic digestion (AD) and Plasma Arc (PA) are known systems that have potential applications in certain waste streams but are not proven at a commercial scale in combination on household residual waste.

Alternative technologies are covered by the Planning Application Supporting Statement (especially referencing the evaluation of alternatives by SWDWP; see para 1.2.16) and in more detail in this chapter of the ES. AD was previously considered by both Plymouth City Council and Devon County Council in their independent options appraisals. MVV also covered alternatives and noted that autoclaving and AD still leave residues that have to be dealt with (see ES paragraphs 5.2.17 to 5.2.19). MVV comments on alternative technologies as follows..

Advanced Anaerobic Digestion

A system labelled “Advanced Anaerobic Digestion” (AAD) has been promoted at Lee Moor by a company called AAD South West, which is a joint venture of AreoThermal Group Ltd and 4Recycling Limited. It proposes a scheme which combines autoclaving and AD for the treatment of household residual waste.

Autoclaving

Autoclaving has been used on certain grades of clinical waste to reduce its hazardous nature (e.g. in Bristol) although it is not known if this practice continues. Autoclaving of household residual waste is being carried out on a commercial basis in Rotherham by a company called Sterecycle although the resultant residues are presently landfilled or sent to the Sheffield EfW facility. They are able to recover an element of recyclable materials. However, the efficiency of recovery of recyclable materials is not high, and there are large quantities of a residual "fibre" which comprises the organic materials and some non-organic material which cannot be recycled, e.g. plastics which have been melted by the autoclave process and glass that has been shattered into splinters. Sterecycle are investigating ways of improving the quality of the fibre for use as a compost but have so far not carried out any developments. They presently have a stockpile of approximately 800 tonnes held pending a decision by the Environment Agency for using the fibre as a low level soil improver, but this does not pass the PAS100 requirements for compost. Sterecycle have also been looking to have this "fibre" disposed of in an energy from waste facility, and have carried out trials at various energy from waste plants, but the fibre's energy content is too low and its moisture content is too high for it to burn easily. Last year Sterecycle suffered an accident at their facility when a pressure system exploded killing one person and seriously injuring another and this is hampering their ability to continue their development. Other autoclaving plants are being developed by Graphite Resources Ltd, who have built a 320,000 tonne capacity facility at the Derwenthaugh EcoParc in Tyne and Wear.

Autoclaving uses energy in the form of pressurised steam which is in almost all cases raised from fossil fuels. It also uses water. It therefore is a consumer of resources.

Anaerobic Digestion (AD)

AD is a well proven system for the biodegradation of organic waste producing a "biogas" which is a mixture of carbon dioxide and methane. Its best application is on the disposal of liquid farm waste (e.g. manure) although it also works on source separated household food waste (i.e. food waste properly separated out in the home and not contaminated with other waste).

AD of the organic element of household residual waste (which is claimed to be the output of an autoclave) is likely to be very difficult. In Spain there are a number of projects which initially tried to separate out the organic fraction of household residual waste by mechanical means, but the subsequent AD process did not work due to mechanical blockages and poor biogas generation, and the digesters were converted to source separated food waste. In the UK there are a number of AD plants working on farm or food waste but none on household residual waste.

Norfolk County Council did award preferred bidder status to a bidder proposing the AD of mechanically separated organics from household residual waste in 2006 but this project failed to achieve financial closure, as the technology was not financeable. Eventually Norfolk CC chose a conventional energy from waste solution (at King's Lynn) which also has combined heat and power potential.

In any event, the energy recovery efficiency of AD is less than combustion systems such as proposed by MVV achieve. AAD claim only 3MW of electricity from 70,000 tonnes per annum of household residual waste whereas conventional proven energy from waste systems would generate closer to 6MW from the same waste. Additionally, AD leaves a digestate which has a very high odour component. Normally this digestate has to be further composted to fully biodegrade away the organic elements and this requires further land and energy.

Autoclaves and AD in Combination

Autoclaves and AD have also been proposed in some PFI projects. For example a solution involving an autoclave (in combination with an AD plant) was selected as the preferred bid for the Wakefield PFI project in 2007. However, the original bidder then changed ownership and the new owner decided not to be involved. The bidding company was then sold to Shanks, a well established waste company, but to-date the contract has still not yet been signed. This is understood to be due to technical issues in the proposed system.

Whilst AAD's parent company, Aerothermal Group, no doubt have experience in steam systems, their track record in autoclaving of household residual waste is not known or proven. They do not operate any such household residual waste autoclaves. Their proposals for Lee Moor are stated only in their webs site and in a scoping study submitted to Devon County Council, for which the council issued a scoping opinion. However, the issuing of a scoping opinion does not confer any opinion on or approval of Devon County Council on the technical or commercial viability of such a system.

Plasma Arc (PA)

PA is known to work as a technique for melting metals and treating of certain waste streams (e.g. certain hazardous waste to vitrify them). However, PA is not at all proven at a commercial scale on household residual waste or the digestate from an AD plant. Indeed even at a pilot scale it has not been proven to work well. One company in Swindon has been promoting the technology for some years but has so far failed to demonstrate the technology at a commercial scale or for any significant period of time (only 1,000 hours since 2007 according to their website).

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 CO_2 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 overleaf.

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 NOx 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.

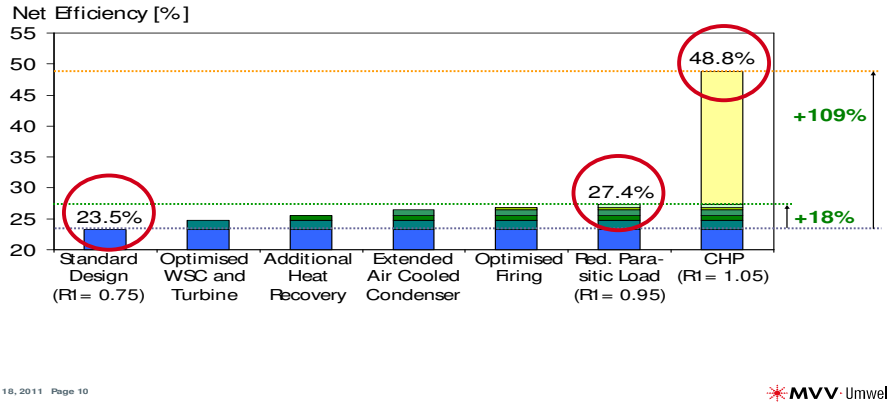
Therefore, taking the above into consideration, along with its proven performance at a commercial scale, moving grate technology has been selected as a cost effective option and is considered BAT for the Devonport facility."

5.2.25 In June 2011 DECC published a report prepared by the independent consultants Arups which was titled "Review of the generation costs and deployment potential of renewable electricity technologies in the UK." [1]

5.2.26 The Arup Report at 14.4.4 states "*EfW plants are one of the most proven technologies for the thermal treatment of mixed waste biomass fuel. There is a range of technology providers and project developers established in the market, and they have demonstrated their ability to successfully deliver EfW plants. No particular innovation is expected regarding EfW technology given that it is a well established and researched technology. The main challenge will be to make better use of the heat generated to improve the overall energy efficiency of EfW plants resulting in better environmental performance (e.g. reduced greenhouse gas emissions). Efficient EfW plants can also be classified as energy recovery operations (R1 facilities) rather than waste disposal.*"

[1] Department of Energy and Climate Change / ARUP. Review of the generation costs and deployment potential of renewable electricity technologies in the UK. Study Report REP001. Final | June 2011.

5.2.27 The plant which is the subject of this application will be eligible to be classed as an Energy Recovery Operation with a normal electrical efficiency of over 27% compared with the 20% efficiency assumed in the Arup Report. Furthermore it will deliver Combined Heat and Power from Day 1 giving it an overall efficiency of 38% in summer and almost 49% in winter. It therefore achieves the objective of "making better use of heat generated" referred to by Arup.



5.2.28 The Arup report notes that only 5 plants in the UK operate in CHP mode and that (at 14.4.4) "*Developing heat transmission networks is challenging because there is a number of barriers to their deployment, for example, availability of heat customers (e.g. food and drink industry, homes, hospitals, universities etc) located in close proximity to the EfW plants, and affordability (e.g. capital costs of the heat network and connections).*" The location of the proposed plant in the North Yard where there is an existing steam pipe network makes this much easier to deliver than alternative sites within Plymouth and the SWDWP area but it will still be necessary to invest over £4m in upgrading the existing pipe network.

5.2.29 In contrast with Energy from Waste, which the Arup report describes as proven technology, Chapter 16 of the report opens at 16.1 by stating:

"*Gasification and pyrolysis are still considered to be emerging and unproven technologies for the treatment of waste biomass fuel. To our knowledge, there are very few commercial scale gasification and pyrolysis plants operating in Europe and world-wide. In particular, there are very few large-scale commercial plants (i.e. >150,000tonnes/annum) in operation. However, there has been some significant interest in the UK in developing ACT (*advanced conversion technologies*) plants.*

ACT plants face, or have faced, significant technical challenges in terms of treating heterogeneous waste streams, and there are several cases where plants failed to achieve their design throughput or air emission standards. The two UK gasification plants (i.e. Scotgen, Dumfries and Energos, Isle of Wight) have both encountered technical problems during plant commissioning resulting in significant programme delays.

Based on the two existing gasification and pyrolysis plants in the UK and other examples of gasification and pyrolysis plants world-wide, UK project developers are likely to encounter technical problems in commissioning and operating these types of plants. This has already adversely affected the bankability and deployment rate of these technologies. It is considered that there is a low potential of significantly increasing the current electricity generation from waste biomass fuel in the short-term (i.e. 5 to 10 years) using gasification and pyrolysis

technologies. The key innovation required is to develop enough technical knowledge and expertise to address some of the technical challenges and demonstrate successful commercial operation of these plants, which would help to establish these plants as proven technology and increase deployment rates to 2030.

There is relatively little information available on the actual overall energy conversion efficiency of gasification and pyrolysis plants. Based on our research and experience, the overall efficiency (i.e. net electrical efficiency) is often not higher than that achieved via a conventional Rankin steam cycle energy conversion system where steam is used to drive a turbine generator to produce electricity."

5.2.30 This independent technical report commissioned by government clearly casts doubt on the commercial case for investing in these technologies and why they are not being developed in preference to conventional mass burn Energy from Waste which the report describes as "one of the most proven technologies for the thermal treatment of mixed waste biomass fuel".

5.3 Alternative Locations

Introduction

5.3.1 This section of Chapter 5 describes an assessment 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 – "c*ommunities 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 and the time-line of the site choice process;
- 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 Regulations[11] 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 (PPS10[2]) 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

[2] Planning Policy Statement 10: Planning for Sustainable Waste Management. ODPM July 2005

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 policy[3] 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 RSS[4], 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:*

- *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 consideration of alternative sites described in this chapter.

5.3.18 One of the key elements of the South West Regional Waste Strategy[5] 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 Strategy[6] (JMWMS), the Partnership authorities considered alternative spatial / geographical options for locating a facility to deliver the contract[7]. 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

[3] Regional Planning Guidance for the South West (RPG10) DTLR September 2001
[4] The Draft Regional Spatial Strategy for the South West 2006 – 2026. South West Regional Assembly June 2006.
[5] From Rubbish to Resource. The Regional Waste Strategy for the South West 2004 – 2020. South West Regional Assembly.
[6] [6] 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)
[7] South West Devon Waste Partnership. SWDWP – Waste PFI – OBC. Options Appraisal and Technical Modelling Assumptions. Entec April 2008

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.

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.

Description of the time-line for the site choice

5.3.22 This section clarifies the time-line context for the site choice, including the South West Devon Waste Partnership (SWDWP) area development plan policy and SWDWP procurement processes.

5.3.23 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. There are adopted development plans for waste management development covering all of the Partnership authorities.

The Plymouth Waste Development Plan Document

5.3.24 In 2005, Entec produced a report for Plymouth City Council[8] (the 2005 Entec Report), which documents a site selection process undertaken to inform the allocation of sites in the Plymouth Waste Development Plan Document (2008) (the Waste DPD).

5.3.25 The 2005 Entec Report considered a large number of potential sites (a 'long list'), for a range of different types of waste management facility. The long list of sites was subjected to several stages of sieving against evaluation criteria, resulting in a short list of thirteen sites and three areas of search (see Table 5.6) as having "*some potential to accommodate either strategic and/or local waste management facilities*".

[8] 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. Entec UK Ltd (2005).

Table 5.6. Short list of potential strategic and local waste management sites and areas of search identified in the 2005 Entec Report
E01 Chelson Meadow
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, Ernesettle
E60 Land at Agaton Farm, Ernesettle
E55 Southway Redevelopment Area
E57 Plymouth Airport Redevelopment Area
E58 Forder Valley

5.3.26 Following further assessment of this short list of thirteen sites, the 2005 Entec Report concludes that six sites were potentially suitable for strategic sites for waste recovery (see Table 5.7).

Table 5.7. Short list of potentially suitable strategic sites for waste recovery identified in the 2005 Entec Report
E01 Chelson Meadow
E02 Moorcroft Quarry, Billacombe
E47 Prince Rock Depot
E48 China Clay Works, Coypool
E53 Employment Land Allocation, Ernesettle
E54 University of Plymouth Playing Fields, Ernesettle

5.3.27 Between 2005 and 2007, further site assessments were made along with extensive public and statutory consultation to gain wider views on potential site allocations and Waste DPD policies. Subsequently the final draft Waste DPD was submitted for Planning Inspector approval in late 2007, with the planning enquiry taking place in February 2008.

5.3.28 The Waste DPD was adopted by Plymouth City Council in 2008 and the sites allocated for strategic waste management facilities including energy recovery were:

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

5.3.29 Proposal W2 was a refinement of the site identified in the 2005 Entec Report as E54 - University of Plymouth Playing Fields, Ernesettle.

The Devon Waste Local Plan

5.3.30 The SWDWP area includes the Plymouth City and parts of the Devon County administrative areas. Devon County Council adopted its Devon County Waste Local Plan[9] (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 listed in Table 5.8.

Table 5.8. Sites within SWDWP area allocated in the Devon Waste Local Plan for strategic waste management and treatment facilities
SH17 New England Quarry (South Hams)
TE13 Heathfield Landfill Site (Teignbridge)
TE 51 Heathfield Industrial Estate (Teignbridge)
WD 07 Crowndale Tavistock (West Devon)
SH52 Wrangaton (South Hams)

The SWDWP Reference Site

5.3.31 In 2005/06, Plymouth City Council's waste management service, in light of Chelson Meadow landfill's impending closure, identified the need to secure an alternative long-term waste treatment solution. To procure such a solution Plymouth City Council identified the need to acquire a new waste management site. During 2005-2007, Plymouth City Council's waste service, with asset management, considered various sites and actively pursued two sites identified in the 2005 Entec report, i.e. the Coypool and Ernesettle sites, both of which were considered suitable for the delivery of a range of waste treatment solutions and could accommodate a sub-regional solution if appropriate.

5.3.32 Between 2005 and 2008, Plymouth City Council actively sought to acquire an interest or ownership of the Coypool site. However, following its investigations and confidential commercial negotiations, Plymouth City Council concluded that the complicated ownership and business interests of the land-owners, alongside challenges in securing a suitable access to the site, were such that there would be on-going delay or complete failure to deliver the site and that this delay would not be consistent with the needs of Plymouth City Council in securing an urgently needed new waste treatment solution. Further, Plymouth City Council considered options to acquire the site by Compulsory Purchase Order, but concluded that such a course of action would be likely to be prohibitively expensive, difficult to justify legally given available alternative sites and would again fail to meet the timescales required to deliver a solution for SWDWP.

5.3.33 Given the difficulties encountered with securing Coypool, Plymouth City Council – in advance of the Waste DPD finalisation and adoption – speculatively purchased the identified site at Ernesettle in early 2007 as a potential site for the City's own long-term waste treatment solution. When the three partnership councils commenced working together in mid 2007, this site was appraised as being suitable for a sub-regional 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.

5.3.34 The SWDWP further considered the potential of the Coypool site but was unable to take this site forward into the PFI procurement, due to complicated freehold and lease arrangements of the Coypool site which was divided into 3 parcels of land owned between Imerys and a private owner, with the latter ownership being leased to Imerys until 2016 for their china clay operations. In addition it was highlighted that to access the area of the Coypool site identified for waste

[9] *Devon County Waste Local Plan*. Devon County Council (2006).

management purposes it was necessary secure access rights over the other two parcels of land and secure an improved off-site access route to the adopted highway.

5.3.35 At the commencement of the PFI procurement in late 2008, the SWDWP made all prospective bidders aware of the nearby waste sites allocated in the Plymouth Waste DPD and Devon Waste Local Plan. Furthermore SWDWP formally offered the Ernesettle strategic waste site to all bidders for their solutions and SWDWP also verbally communicated Plymouth City Council's background knowledge with respect to the Coypool strategic site to allow bidders to pursue this site if they felt it appropriate.

The MVV Site Search

5.3.36 MVV commenced its search for a suitable site to develop an EfW CHP facility in late 2008, in the early stages of the bidding process for the SWDWP waste management contract.

5.3.37 Initially, MVV focussed on the Coypool and Ernesettle sites allocated for waste infrastructure development including energy recovery in the Waste DPD, which had been adopted in 2008. Both were inspected in early 2009 following the inclusion of MVV in the SWDWP bidders list. The Chelson Meadow site belonging to PCC and the Viridor site at Lee Mill, Devon were also inspected but immediately eliminated for technical and commercial reasons respectively.

5.3.38 MVV confirmed the conclusions of the SWDWP on the availability and deliverability of Coypool in its consideration of potentially available sites. MVV made approaches to the agent for the Coypool land owner up to as late as 2011, which indicated that the landowner was unwilling to sell the land to MVV as a waste management site.

5.3.39 Viridor waste management was the other bidder in the latter stages of the SWDWP contract procurement process and in January 2010 Viridor submitted a planning application for an EfW facility at the Devon Waste Local Plan site at New England Quarry. In updated alternative site assessment document[10] (Table 4.1), submitted in support of that planning application, it is concluded of Coypool that "*Land owners decided not to proceed with waste development during discussions with Viridor. There is no evidence that this position has changed.*"

5.3.40 During its assessment of the suitability of the Ernesettle site for the development of an EfW CHP Facility, MVV had identified a number of potential difficulties in developing the site, including that it was:

- on sloping ground which would increase engineering costs and environmental impact during construction;
- accessed via a steep road running past several residential properties where lorries would be particularly slow and noisy coming up the hill from the site to the A38;
- not close to existing significant potential heat or steam users, and that there were engineering, environmental and cost implications of connecting the site to existing developments that could use heat or steam; and
- a significant part of the available land is with the blast zone from Ernesettle Armaments Storage Depot.

5.3.41 During January 2009, MVV looked for an alternative site to Ernesettle. At this time, the site at North Yard, HMNB Devonport (North Yard), was suggested by the MOD. This site had not been

[10] New England Resource Recovery Centre, Nr. Lee Mill, Devon. Appendix R19.2: Updated Alternative Site Assessment. SLR (Dec 2010)

available at the time that Plymouth City Council was assessing potential alternative sites for allocation in the Waste DPD, which occurred from approximately 2005 - 2008. During the bidding process MOD had undertaken the Defence Review and government had on a wider basis developed its policy on sustainability more explicitly. As a consequence Sita (the third bidder) was able to develop a proposal for a site in South Yard but the potential of this site was limited and there were problems with managing the access for laden waste delivery vehicles to this site and Sita subsequently withdrew from the bidding process. MVV held negotiations with the MOD for an Agreement to Lease the North Yard site during 2009/10.

5.3.42 Throughout the bidding process in 2009 and 2010, MVV developed its proposals for the SWDWP waste management contract, which initially included alternative proposals to develop an EfW CHP Facility at the Ernesettle site, or at North Yard.

5.3.43 In February 2010 MVV initiated its public consultation (when it was still one of two bidders for the SWDWP contract) and held public exhibitions at Ernesettle and at Weston Mill, close to North Yard. These exhibitions included plans for its outline proposals for development of an EfW Facility at the Ernesettle site, as well as its proposals for North Yard, Devonport.

5.3.44 Around 135 people attended the exhibitions over two days (122 at Ernesettle and 23 at Weston Mill Community Primary School). Of those who attended, some 80 per cent opposed the choice of Ernesettle, while 6 per cent expressed support, or qualified support. The main reasons given for opposing the choice of Ernesettle were concern about traffic, adverse effect on the Area of Outstanding Natural Beauty or damage to visual amenity, worry about locating an EfW facility in close proximity to an existing 'armaments depot' and health impacts.

5.3.45 Following the public consultation, MVV reviewed its proposals for both sites, and in March 2010 announced that it would henceforward be concentrating its proposals solely on the North Yard, HM Naval Base Devonport site. MVV's choice of site was made on the basis of the positive attributes of the site for the development of the specific type of EfW CHP Facility that MVV was proposing to build and on the basis of a consideration of reasonable alternative options. MVV concluded that the main advantage of the North Yard site was its location in the Dockyard which meant that heat and steam could be supplied direct to the Naval Base as soon as the plant became operational, thus significantly improving the plant's energy efficiency and cost-effectiveness for SWDWP and improving the sustainability of the Dockyard whilst remaining a suitable site when considering other environmental criteria.

5.3.46 Amongst the key concerns expressed by the public at the February 2010 exhibitions about development of an EFW CHP Facility at North Yard were noise, dust, visual impact and proximity to housing. In response to these concerns MVV reviewed its plans for the development at the North Yard. As a result of this review MVV redesigned the plant both re-orientating the building so that the lowest point was closest to the nearby housing and moving the building further northward on the site so that it was further from the nearest houses. The location of the proposed building was moved from on top of Table Top Mountain, where it would have been directly in front of the flats on Talbot Gardens, to a location where the MoD and their contractors Ashcrofts had been recycling construction material from the Dockyard.

5.3.47 MVV's proposals for North Yard were also part of consultation events by the SWDWP in June 2010. MVV also prepared a scoping report and issued a scoping opinion request to Plymouth City Council, as part of the process of identifying the potential environmental effects of developing the site and to assist in the evaluation of the impact of the proposed development and help in confirming its choice of site as it had not been part of the Entec evaluation.

5.3.48 In October 2010, MVV submitted its final proposals for the SWDWP waste management contract. These proposals centred on the development of an EFW CHP Facility at the North Yard site.

5.3.49 In order to validate the robustness of its choice of site, MVV commissioned URS Scott Wilson to undertake an alternative sites assessment study. A report of that study is presented as Appendix 5.1 to this ES Chapter. The next section of this Chapter provides further clarification of the alternative sites assessment methodology applied independently by URS Scott Wilson.

Evaluation Methodology

Overview of the Alternative Sites Assessment Methodology

5.3.50 Reasonable alternative sites were assessed against a range of relevant planning evaluation criteria. The purpose of the assessment was to test and validate MVV's choice of site (to ensure that there was no reasonably preferable site in terms of environmental, economic, social and availability/deliverability criteria), not necessarily to apply a sieving process and reject alternative sites until the 'best' site was selected.

5.3.51 The national planning policy does not require the 'best' site to be identified and the definition of 'best' site would be subjective and variable, based on different weightings applied to relevant assessment criteria. Policy W7 in the Waste DPD makes provision for sites not identified in the Development Plan to be brought forward and sets out the criteria against which they should be assessed.

5.3.52 The assessment methodology was based on the same environmental, economic and availability evaluation criteria that were adopted in the 2005 Entec Report, but updated to take into account relevant new planning policies (such as PPS10), including criteria to assess the suitability of sites for deliverable CHP. Additionally, a waste travel time analysis was carried out on selected short list of sites (those allocated in the Waste DPD and the New England Quarry application site), as a broad comparative test of the environmental implications of waste transportation at sites within and outside Plymouth. The assessment process involved comparative analysis in the round of the results of applying the evaluation criteria, using professional judgement to draw conclusions about the suitability of sites for EfW CHP development.

5.3.53 In developing the alternative sites assessment methodology, it was considered that because the 2005 Entec Report assessment criteria did not take account of CHP deliverability, it would be appropriate to re-consider all of the sites that had been short-listed in the 2005 Entec Report, rather than just sites that had eventually been allocated in the Waste DPD.

5.3.54 The reasonable alternative sites considered included those short-listed in the 2005 Entec Report, sites allocated in the Waste DPD and the Devon Waste Local Plan for waste management uses consistent with EfW CHP development and other sites identified by MVV and URS Scott Wilson, in consultation with the Local Planning Authority, that were considered to have some potential for combined heat and power (CHP) connection.

5.3.55 When considering and concluding on the results of the application of evaluation criteria, URS Scott Wilson applied professional judgement to an assessment of the suitability of alternative sites. This process involved comparative analysis in the round and sites were not necessarily discounted due to the presence of exclusionary or discretionary criteria, or because of apparent difficulties with CHP deliverability.

Combined Heat and Power Deliverability Criteria

5.3.56 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"

5.3.57 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.

5.3.58 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).

5.3.59 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 2010[11] 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 Plymouth[12] on behalf of Plymouth City Council. Information from these 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.

[11] ICE (UK) Ltd. (2010) *City of Plymouth District Energy Study, Feasibility Study for an Energy Services Company in Plymouth*, Plymouth City Council.
[12] Entec UK Ltd. (2008) *Review of EFW-CHP Potential*, Plymouth City Council.

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)

The Benefits of Deliverable CHP at North Yard

5.3.60 The potential offered by the North Yard site for a deliverable CHP scheme at HMNB Devonport and the Dockyard influenced MVV's choice of site.

5.3.61 The specific location of the EfW CHP facility offers a unique opportunity to provide renewable energy from day one of operation to the Dockyard and allows the existing gas and oil-fuelled generators to be switched off permanently, other than in the short periods when the EfW CHP facility is undergoing routine annual maintenance. In doing so, the facility at North Yard will improve the economic viability of the Dockyard and will in turn make an important contribution to sustaining the local communities that rely on the jobs and business generated by the dockyard. A full evaluation of the social and economic effects of the proposed EfW CHP facility is provided in Chapter 17 of the Environmental Statement. A full description of the production and use of CHP and the economic and employment benefits of the EfW CHP scheme is provided in Appendix 4 to the Planning Application Supporting Statement, the Energy, Economy, Employment and Education Benefits Statement. A list of the benefits that the EfW CHP Facility will bring, due to its location at North Yard, is set out below.

5.3.62 List of benefits associated with locating the EFW CHP Facility at North Yard.

- Steam provided to HMNB Devonport will displace steam currently generated by the North Yard natural gas boilers. The EfW CHP will save 82,200,00 kWh per annum natural gas energy and 15,194,671 tonnes of CO_2 per annum, equating to a reduction of 90% of current emissions associated with the boilers.

- The EFW CHP Facility will have a net overall efficiency of 39% on average (up to 49% in the winter) due to the deliverable CHP, compared to about 23% efficiency in a typical non-CHP UK EfW facility.

- Delivery of CHP allows the facility to achieve R1 (recovery) status and 'Good Quality CHP' status under the Government Department of Energy and Climate Change Scheme.

- The site is close to the South Yard part of Devonport Dockyard and to the Devonport area of the City and is therefore well located to allow an extension of the heat supply network into these areas and integration with other energy production plants to support future economic development and/or housing development.

- Currently planned MOD developments in the North Yard area, such as the Devonport Landing Craft Co-location Project and the Help for Heroes projects, will be able to connect to the existing steam supply network, bringing savings on infrastructure capital, maintenance and utility costs.

- The North Yard EFW CHP Facility will deliver an estimated £388.8M savings to SWDWP authorities, compared to a standard EfW only facility reference project.

5.3.63 MVV has an agreement with the MOD to supply heat and electricity for 25 years and to lease the site for up to 45 years. There will be a range of benefits to HMNB and the Dockyard from this long term commitment, which will help to support the viability of the site, reduce costs to the MOD and to protect jobs. HMNB and the Dockyard together generate 13% of Plymouth Gross Value Added income. Such benefits include improved security of energy supply for Dockyard nuclear implicated supplies, reduced waste management costs, reduced energy costs and as such constitute a vital component of the MOD's plans maintain a sustainable business in the long term and to rationalise its activities and regenerate the Dockyard.

Summary of the Alternative Sites Assessment Results – Availability and CHP Deliverability Criteria

5.3.64 The alternative sites assessment methodology included consideration of the availability of sites for development (Entec methodology indicator - "land available for development") and CHP deliverability. The results of the assessment of reasonable alternative sites against these criteria demonstrate that many alternative sites considered were not available and/or had much lower deliverable CHP potential than North Yard.

5.3.65 National planning policy places significant emphasis on availability and deliverability when Local Planning Authorities identify land for development.

5.3.66 PPS10, paragraph 18 states that "*waste planning authority should….avoid unrealistic assumptions on the prospects, for the development of waste management facilities, or of particular sites or areas, having regard in particular to any ownership constraint which cannot be readily freed….*"

5.3.67 More recent national policy, published since the alternative sites assessment was undertaken, reinforces this policy position. National Policy Statement EN-1 (July 2011), paragraph 4.4.3, states that an important factor in considering alternatives to energy development proposals is the need to be proportionate and to take account of whether there is a realistic prospect of the alternative site delivering the same infrastructure in the same time scale as the proposed development.

5.3.68 Table 5.9 sets out a summary of an assessment of sites by URS Scott Wilson against CHP deliverability criteria and Table 5.11 provides a summary of the assessment against availability and deliverability criteria.

Table 5.9: Summary of Evaluation Results (CHP Criteria)

Site No.	Site Name	Criterion 1: Distance between heat source and user(s) Grade	Criterion 2: Steam or hot water distribution network at heat user(s) Grade	Criterion 3: Route between heat source and heat user(s) Grade	Criterion 4: Progress towards purchase of heat 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. Budaux	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 Redevelop-ment Area	C	C	B	E
E57	Plymouth Airport Redevelop-ment Area	B	C	B	E
E58	Forder Valley	D	C	C	E
E60	Agaton Farm, Ernsettle	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) Grade	Criterion 2: Steam or hot water distribution network at heat user(s) Grade	Criterion 3: Route between heat source and heat user(s) Grade	Criterion 4: Progress towards purchase of heat Grade
-	Heathfield Industrial Estate	E / A	C	B	E
-	Crowndale, Tavistock	E / B	-	-	-
-	Langage	C	B	C	E
-	Wrangaton	E / D	-	-	-

5.3.69 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.

5.3.70 A separate report by consultants Entec[12], 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"*

5.3.71 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.

5.3.72 Further assessment of the benefits of the scheme is presented in detail in several sections of the information submitted with the planning application. Table 5.10 signposts this supporting information.

Table 5.10: 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 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 Planning Application Supporting Statement Appendix 3 (Energy, Economy and Employment Statement) Section 106 Agreement Heads of Terms (Planning Application Supporting Statement)

5.3.73 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.

5.3.74 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.

5.3.75 Entec produced a further report for PCC in 2009[13], which considered the feasibility of CHP in Plymouth, including options for the supply of heat to HMNB Devonport.

5.3.76 The report concludes that for a CHP scheme based on an EfW plant at Ernesettle, the route of a steam pipeline would face significant challenges, the distance is at the limit of what would be technically feasible and that it would not be feasible to supply the Naval Base with steam from Ernesettle. Two alternative routes were considered, the first following the major highways into the Camel's Head Gate entrance to the Naval Base and the second following the coast, which involves crossing the A38 and two rail lines and the report notes that obtaining the necessary consents to cross rail lines can be a difficult and time consuming process.

5.3.77 The report also concludes that if hot water were to be supplied from Ernesettle, the existing Naval Base steam network would need to be replaced, at a cost of approximately £15.6M.

5.3.78 The report discounts an option of producing refuse derived fuel at Ernesettle to be used in an EfW plant at HMNB.

5.3.79 The report concludes that there are a number of benefits in locating an EfW facility at HMNB, including the direct provision on heat and steam to the existing Naval Base heat network without significant change to the existing system and that this would constitute an integrated, single site solution, without the need for a pipeline from Ernesettle, which would be costly (£6-9M), logistically difficult and would require relevant permits.

5.3.80 The New England Quarry site is the subject of a planning application for an 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.

5.3.81 A summary of the assessment against availability and deliverability criteria is provided in Table 5.11.

Table 5.11. Summary of an assessment of sites against availability and deliverability criteria.

List of Sites Considered By MVV	Availability / Deliverability Criteria Assessment Results	Reasonably Available / Deliverable ?
A. Sites Allocated in the SWDWP area Development Plans		
Proposal W1 - China Clay Works, Coypool	Site not available within SWDWP waste contract time-frame. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
Proposal W2 - Land West of Ernesettle (formerly considered in 2005 Entec Report under site E54, University of Plymouth Playing Fields)	Owned by Plymouth City Council and offered as reference site by SWDWP. Uncertain CHP connection route. Deliverable CHP potential much lower than North Yard.	Yes
SH17 New England Quarry	Site in ownership of second bidder for SWDWP contract and	No

[13] Entec UK Ltd (2009). South West Devon Waste Partnership. Plymouth Combined Heat and Power (CHP) Potential Scoping Study. Final Report

	not available to MVV. Site of proposed EfW development. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	(But consider further due to site being the subject of current planning application for EfW development)
TE13 Heathfield Landfill Site	Availability constraint – site in ownership of competitor waste company Viridor and not available to MVV. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
TE 51 Heathfield Industrial Estate	Availability unknown. Uncertain CHP heat demand and network. Deliverable CHP potential much lower than North Yard.	Yes
WD 07 Crowndale Tavistock	Availability unknown, but the Devon Waste Local Plan allocation describes potential sites uses as "Continued use as a Recycling Centre and waste transfer station. There may be potential for the introduction of a MRF, and small energy from waste plant or MBT/BMT facility, together with in-vessel mixed/greenwaste composting." The Devon Waste Local Plan states that "Vehicular access is not very good." Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No (Site also within an AONB, adjacent to Ancient Woodland and an Unconfirmed Wildlife Site and the line of the railway is a Conservation Area and the nearby disused canal is part of a candidate World Heritage Site. The site is on the floodplain of the River Tavy. These constraints support deliverability criteria assessment conclusions)
SH52 Wrangaton	Size / availability constraint – majority of site comprises series of buildings occupied by small businesses. Unoccupied areas are too small for EfW CHP Facility development. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
B. Potential strategic and local waste management sites identified in the 2005 Entec Report		
E01, Chelson Meadow	Availability constraint. Waste DPD states "*The area of land available for new uses is limited…and larger areas of land could only be released at the expense of existing waste management facilities".* The existing waste management use is planned to continue for the foreseeable future as part of the PCC waste management services. EfW CHP development would require re-location of existing facilities. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
E02, Moorcroft Quarry, Billacombe	Waste DPD allocation for the sustainable management of construction and demolition waste and not for other waste streams of waste management facilities. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No

E07 Land off St.Budeaux By Pass, St Budeaux	2005 Entec Report recommends consideration for civic amenity site or small materials recycling facility only. Access junction (A3064/A38) capacity constraint, significant and costly works required. Uncertain CHP connection route. Deliverable CHP potential much lower than North Yard.	No
E14 Plymbridge Industrial Estate	Developed since 2005 and has planning consent for other development (known as Sisna Park) Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
E19 British Gas Site, Breakwater Road	2005 Entec Report suggests allocation for marine employment uses and traffic and highway constraints limit potential to materials recycling facility. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
E21, Water Treatment Works, Glacis Park, Tavistock Road	Site is part of Glacis Park neighbourhood proposals in the Plymouth City Council Pre-Submission Derriford and Seaton Area Action Plan (February 2011), which form a key part of the delivery of the Plymouth City Council Core Strategy DPD vision. The Glacis Park proposal (DS12) is for a residential-led mixed use development, including 700 new homes, office space and strategic greenspace. 2005 Entec Report recommends assessment for materials recycling facility only, due to traffic and highway constraints. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
E47, Prince Rock Depot	Site is specifically excluded from the allocated sites in the Waste DPD, due to issues including uncertainty about land availability, Renewal Area status and proximity to a COMAH site. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
E50, Land at Estover Gate	Existing building and unsuitable site size (1.85ha). 2005 Entec Report recommends assessment for materials recycling facility handling commercial and industrial waste only. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
E52, Land at Burrington Industrial Estate	Existing building and unsuitable site size (1.12ha). Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
E53, Employment Land Commitment, Ernesettle	Employment allocation could affect availability. 2005 Entec Report recommends amalgamation with E54. Site E54 subsequently preferred and allocated in Waste DPD. Uncertain CHP connection route. Deliverable CHP potential much lower than North Yard.	No
E60 – Land at Agaton Farm, Ernesettle	Availability unknown Uncertain CHP connection route. Deliverable CHP potential much lower than North Yard.	Yes

E55, Southway Redevelopment Area	Alternative development with planning permission and under construction. 2005 Entec Report recommends assessment for materials recycling facility only. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
E57, Plymouth Airport Redevelopment Area	Site has outline planning permission for residential development. 2005 Entec Report recommends assessment for materials recycling facility handling commercial and industrial waste only. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
E58, Forder Valley	Land associated with Plymouth International Medical and Technology Park and Seaton Neighbourhood, Derriford and Seaton Area Action Plan. 2005 Entec Report recommends assessment for civic amenity / materials recycling facility uses only. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	No
C. Other sites considered to have some potential for combined heat and power (CHP) connection		
North Yard, Devonport	Site available and meets CHP deliverability criteria.	Yes
South Yard, Devonport	Site available and partially meets CHP deliverability criteria.	Yes
Langage Energy Park, Devon	Site availability unknown. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard.	Yes

Evaluation Methodology - Plymouth Waste DPD Site Evaluation Criteria

5.3.82 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.

5.3.83 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 evaluation by independent inspector.

5.3.84 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.

5.3.85 Entec UK Ltd. undertook the original study (as reported in the 2005 Entec Report) for Plymouth City Council in support of the Waste DPD. The site evaluation criteria used by URS Scott Wilson 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 Plymouth City Council. 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.

5.3.86 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

5.3.87 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.

5.3.88 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.

5.3.89 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.

5.3.90 The 250m stand-off threshold also appears in a research study on planning for waste management facilities[13] 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.

5.3.91 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.*"

5.3.92 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."

5.3.93 Clearly this advice is contradictory in itself and there is not necessarily a 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 ODMP report that thermal treatment facilities, especially those incorporating CHP, can be acceptably located within 250m of residential properties.

5.3.94 The status of the research study is limited to a reference in the Companion Guide[14] 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.

5.3.95 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.

5.3.96 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.

5.3.97 For the purposes of the 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 availability and CHP deliverability criteria, as well as the Entec Report criteria.

5.3.98 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. When considering and concluding on the merits of alternative sites, URS Scott Wilson took account of the grading results of the application of the Entec evaluation criteria, but the assessment process involved comparative analysis in the round, and the application of professional judgement based on the available evidence. Alternative sites were not necessarily discounted due to the presence of exclusionary or discretionary criteria, or on the basis of certain grading results.

5.3.99 Entec concluded in section 7.1.2 of its 2005 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.

Waste Travel-Time Analysis

5.3.100 As part of the Transport Assessment, a broad assessment was made of the number of the likely 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.

5.3.101 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 – Travel Time and Entec Criteria

Results Summary

5.3.102 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 5.13-15 below provide a summary of the evaluation results.

Table 5.13: Summary of Evaluation Results (Waste Travel-Time)

Wste 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	**10034**	**16149**	**259**
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	**8932**	**14375**	**266**
Ernesettle	**7822**	**12588**	**223**
Coypool	**6686**	**10761**	**197**

Table 5.14: Summary of Evaluation Results (Entec Report Criteria)

Subject Area	North Yard, Devonport	E54, University of Plymouth Playing Fields	E60, Agaton Farm, Ernsettle	South Yard	New England Quarry	Heathfield Industrial Estate	Langage
Stage 1 conflict Inclusionary Objective	Unallocated site with existing industrial use / vacant and undeveloped site larger than 1.0 hectare	Greenfield Vacant Playing Fields	Greenfield Vacant Playing Fields	Not allocated. Site proposed by SITA at ISOS stage of SWDWP procurement but bid withdrawn	Allocated for strategic waste management in Devon County Waste Local Plan	Industrial land, including former mineral workings.	Area identified in Plymouth Urban Fringe Site Specific Allocations DPD
Stage 2 Exclusionary Objectives **(severity)**	Access route partially within Flood Zone 2 (<5%)	RNAD Explosive Arc (yellow zone) (20%)	-	Site located within Devonport AAP area but not specifically allocated. Potential conflict with AAP objectives	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	Listed Building, Historic Park and Garden and SSSI close to, but not within, site. Part of site within Flood Zone 2.	-
Stage 3 Discretionary Objectives **(severity)**	Biodiversity Network Feature (20%) Local Greenscape Area (20%)	RNAD Explosive Arc (purple zone) (100%) BAA Birdstrike Consultation Zone (100%)	BAA Birdstrike Consultation Zone (100%)	Route to A38 approximately 5km, depending on route taken	Partly within County Wildlife Site (30%)	Partly within County Wildlife Site (45%) Large part of site recorded as having features of archaeological value. Adjoins Hazardous Installation Consultation Zone. Mineral Consultation Area.	-

Subject Area	Objectives	North Yard, Devonport	E54, University of Plymouth Playing Fields*	E60, Agaton Farm, Ernsettle*	South Yard	New England Quarry	Heathfield Industrial Estate	Langage
Land Use	1. To avoid the loss or damage to protected trees and groups of trees.	A	A	A	A	C	C	B
	2. To avoid impact upon public footpaths and public rights of way.	A	A	A	A	A	A	B
	3. To protect the best and most versatile agricultural land.	A	A	C	A	A	A	C A

Physical Size	1. To ensure site is physically large enough to accommodate facilities.	A	A	A	A	A	A	A
Economic	1. To avoid detrimental impact on employment uses.	A	A	D	B	A	C	A
Traffic and Transportation	1. To ensure site is physically accessible to a standard acceptable to the highway authority.	A	A	A	B	C/D	B	A
	2. To promote sites in locations that avoid access through residential areas and sensitive land-uses.	A	B	B	E	E/E	C	B
Amenity	1. To minimise potential detrimental impacts of noise/ vibration.	C	A	D	C	C	C	C
	2. To minimise potential detrimental impacts of odour.	C	A	D	B	C	C	C
	3. To minimise potential detrimental impacts of nuisance (vermin, pests, litter, lighting pollution).	C	A	D	B	C	C	C
	4. To minimise any potential detrimental effects to air quality.	C	A	D	C	C	C	C
	5. To minimise any potential detrimental effects from bioaerosols.	C	A?	E	C	C	C	C
Nature Conservation	1a). To minimise the impact on wildlife interests. (presence of protected species)	B	-	C?	A	C	D	B
	1b). To minimise the impact on wildlife interests. (location of wildlife corridor)	B	B	B	A	C	D	C
Landscape and Visual	1. To prevent the creation of unacceptable visual impacts.	C	D	D	C	C	C	C

* Note to Table 5.14 – The grades applied to sites considered by Entec in the 2005 Entec Report (University of Plymouth Playing Fields and Agaton Farm) are the same grades as recorded in the 2005 Entec report.

Evaluation Rationale and Results - Waste Travel-time Analysis and Entec Site Evaluation Criteria

5.3.103 The rationale for the scoring applied by URS Scott Wilson to sites which were not included in the 2005 Entec Report is provided in Appendix 5.1 (Appendix 1). Further information on the scoring of the North Yard and the other sites evaluated by URS Scott Wilson is provided below.

5.3.104 The grades applied to sites considered by Entec in the 2005 Entec Report, including Ernesettle, are the same grades as recorded in the 2005 Entec report. However, it would be rational to question some of the Entec gradings applied to Ernesettle, if these were to be re-evaluated. For example, Entec awarded an A-grade ("Sensitive uses >250m from site. No mitigation required") against the amenity criteria, which is not strictly consistent with the presence of residential property within 250m.

5.3.105 The balanced assessment of sites, (recorded in Table 5.15) took account of the relative number of sensitive receptors close to the sites assessed and the potential for the mitigation of adverse amenity effects and was not based solely on the Entec evaluation criteria gradings.

5.3.106 When considering and concluding on the merits of alternative sites, URS Scott Wilson took account of the grading results of the application of the Entec evaluation criteria, but the assessment process involved comparative analysis in the round, and the application of professional judgement based on the available evidence. Alternative sites were not necessarily discounted due to the presence of exclusionary or discretionary criteria, or on the basis of certain grading results.

North Yard

5.3.107 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 47 hours waste travel time per week compared to New England Quarry and at least 4 hours per week compared to Ernesettle.

5.3.108 The main focus of the waste travel-time analysis was to examine the spatial relationship between the site and the sources of waste. Consequently the analysis focussed primarily on the transport of waste inputs to alternative EfW locations, rather than on the destination of residues from the EfW process. Assumptions about the destination of residues produced at alternative sites lack certainty and the methodology sought to minimise spurious accuracy. It is also unclear whether the Incinerator Bottom Ash from the New England site would be used as a secondary aggregate or used as a restoration material and although the location of the IBA processing site for the North Yard facility is some distance from the development site and therefore involves more "waste miles travelled" there is a firm commitment to use this material as a secondary aggregate and it is anticipated that the main markets for this material will be along the A38 to the east, where the treatment facility is located and therefore there is not a large number of additional miles when one adds together the miles travelled as processed and unprocessed material.

5.3.109 This broad analysis helps to demonstrate that the North Yard site is 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.

5.3.110 The 2005 Entec Report site evaluation criteria were applied to the North Yard site with the benefit of the scientific information contained in the ES. 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.

5.3.111 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.

5.3.112 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.

5.3.113 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).

5.3.114 The evaluation criteria described in the 2005 Entec Report state 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. It was assumed that this evaluation criteria refers to the area the site is located in as a whole, rather than impacts on individual viewpoints per se. North Yard was evaluated as grade C against visual/landscape impact criteria, due to evidence in Environmental Statement Chapter 8 that concludes that the proposed Facility is compatible with its surroundings in terms of visual impact, local context and views. 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.

South Yard

5.3.115 Amenity evaluation criteria grades are B-C. A school and residential property is within 300m of site. However, the point of access from the public highway would be close to residential properties and there are workplaces close to the site (within 250m). There are fewer residential properties close to the site when compared with the North Yard site. The balanced assessment of sites, recorded in Table 5.15, takes account of the relative number of sensitive receptors close to the site and the potential for the mitigation of adverse amenity effects and is not based solely on the Entec evaluation criteria scores.

New England Quarry

5.3.116 Amenity evaluation criteria scores are C, due to the presence of residential property within 250m. However, there are fewer residential properties close to the site when compared with the North Yard site.

Heathfield Industrial Estate

5.3.117 Amenity evaluation criteria scores are C, due to the presence of residential property within 250m. The site access passes through a mixed use industrial/business/retail and residential area

and there is a terrace of residential properties separated from the southern part of the site by a railway line.

Langage

5.3.118 Amenity evaluation criteria scores are C. There was no specific site identified within the area allocated for employment uses. However, there are a small number of residential properties within and close to the allocated area, which would be likely to be within 250m of an EfW CHP Facility site, thus attracting a score of 'C'. However, there would be fewer residential properties close to the site when compared with the North Yard site.

Balanced Assessment - Results

5.3.119 The alternative sites considered reasonably available and deliverable for an EFW CHP Facility development were tested against a range of environmental, economic and deliverability criteria. Table 5.15 provides details of the results of that assessment. Table 5.15 also includes a balanced comparative analysis conclusion, based on professional judgement of the assessment results and available evidence.

Table 5.15 Results of environmental, economic and deliverability criteria assessment and balanced comparative analysis

Site Name	Environmental / Economic / Deliverability / Travel Time Assessment Results	Comparative Analysis
Waste DPD Proposal W2 - Land West of Ernesettle Lane	Owned by Plymouth City Council and offered as reference site by SWDWP. Residential areas lie around 150m to the east and 200m to the south of the site, but the 2005 Entec Report acknowledges that there is "plenty of opportunity" to avoid amenity impacts. Site is of sufficient size but RNAD access road and topography potentially limit development engineering options. Sloping site would adversely affect engineering costs and construction impacts. Site is in a prominent location, within the setting of the Tamar Valley AONB and is approximately 100m from the Scheduled Ancient Monument at Ernesettle Battery. The Waste DPD examination Inspector's Report[14] indicates that an EfW development at the site would be highly visible, but that such a development would need to be considered in the edge-of-city site context, and that there was potential for a high quality design. Greenfield site (former playing fields use). Plymouth Sound and Estuaries SAC and Tamar Estuaries Complex SPA located around 450m to the west of the site. County Wildlife Site adjacent. Access to A38 (via Ernesettle Lane and B3413) is on a steep	The site has some potential advantages compared to North Yard, for example because it is not as close to residential areas. However, Ernesettle is also affected by a number of development constraints, including that much of the site has not been previously developed, the proximity of a licensed explosive site, the access road is on a steep gradient and passes residential properties, there are engineering difficulties in developing the site and it has restricted potential to develop a deliverable CHP scheme. The balance of advantages and disadvantages supports MVV's choice of North Yard over Ernesettle.

[14] Report to Plymouth City Council by Douglas Machin BSc DipTP MRTPI. The Planning Inspectorate. (20 March 2008).
[15] South West Devon Waste Partnership. Plymouth Combined Heat and Power (CHP) Potential Scoping Study. Final Report. Entec UK Plc. (February 2009)

	gradient and passes residential properties. RNAD Explosive Arc Yellow and Purple Zones and BAA Birdstrike Consultation Zone Waste travel time analysis results predict 204-223 hours per week. Entec produced a report for PCC in 2009[15] (the 2009 Entec Report), which considered the feasibility of CHP in Plymouth, including options for the supply of heat to HMNB Devonport. The report concludes that for a CHP scheme based on an EfW plant at Ernesettle, the route of a steam pipeline would face significant challenges, the distance is at the limit of what would be technically feasible and that it would not be feasible to supply the Naval Base with steam from Ernesettle. Two alternative routes were considered, the first following the major highways into the Camel's Head Gate entrance to the Naval Base and the second following the coast, which involves crossing the A38 and two rail lines and the report notes that obtaining the necessary consents to cross rail lines can be a difficult and time consuming process. The report also concludes that if hot water were to be supplied from Ernesettle, the existing Naval Base steam network would need to be replaced, at a cost of approximately £15.6M. The report discounts an option of producing refuse derived fuel at Ernesettle to be used in an EfW plant at HMNB.	
Devon WLP TE51 Heathfield Industrial Estate	The northern part of the allocated site (north of the railway) is occupied by Dainton Business Park. Land south of the railway is partly occupied by a tile-works and by apparently disused former mineral workings, but availability of this land is unknown. The site is accessed either via the Heathfield industrial estate road, the A382 and the A38 Drunbridges junction, or via a restricted access junction with the A38. The former access passes through a mixed use industrial/business/retail and residential area and the latter access is likely to require improvement for use by HGV traffic. There is a terrace of residential properties separated from the southern part of the site by a railway line. A Listed Building, Historic Park and Garden and SSSI are close to, but not within, site. Part of site is within Flood Zone 2. Partly within County Wildlife Site (approximately 45%) Large part of site recorded as having features of archaeological value. The site adjoins a Hazardous Installation Consultation Zone and is within a Mineral Consultation Area. Uncertain CHP heat demand and network. Deliverable CHP potential much lower than North Yard.	The site is at the northern end of the SWDWP area, away from the main concentration of waste arisings and one potential access option restricts vehicles to a one-way direction of travel. There is potential for adverse amenity effects due to the likely access route and close proximity to residential properties. The main part of the site which appears potentially available for development is coincident with a County Wildlife site, an area containing archaeological features and a mineral consultation area. There is no readily available CHP opportunity that is deliverable at the beginning of the SWDWP waste contract timeframe. The balance of advantages and disadvantages supports MVV's choice of North Yard over Heathfield Industrial Estate.

Devon WLP SH17 New England Quarry	The site is not available to MVV, as it is in the ownership of Viridor, the other bidder for the SWDWP waste contract at final tender stage. Viridor has submitted a planning application to Devon County Council to develop an EfW Facility at the site. The Devon Waste Planning Authority recently recommended refusal of planning permission in a report to Development Management Committee dated 20 July 2011. The reasons for refusal included unacceptable loss of ancient woodland and disturbance and fragmentation of the River Yealm valley, impact on Flood Zone 3 and a detrimental impact on the setting of Dartmoor National Park and harmful impact on the character of the local landscape. The site is allocated for energy from waste development in the Devon Waste Local Plan. However, the Plymouth Waste DPD Inspector's Report, in Annex 1 (the 'Schedule of Changes to Make the DPD Sound') states: "After the fourth sentence add the following, to reflect the lack of availability of sites outside Plymouth: …none of the sites identified in the Devon Waste Plan are considered to be either suitable or deliverable for the City's waste management needs, particularly over the short and medium term". There is single residential property approximately 100m from the site boundary, but about 350m from the nearest part of the EfW built development. A new site access road is proposed as part of the Viridor planning application and part of site and much of the access road lies within a County Wildlife Site and Ancient Woodland. At least 12 species of bats (European protected species) have been recorded using the site. The site is designated a Regionally Important Geological/geomorphological Site. The site lies in a rural setting and is approximately 2km form the South Devon AONB and approximately 4km from the Dartmoor National Park. Part of access road lies within Flood Zone 3A. Waste travel time analysis results predict 258-265 hours per week. Uncertain CHP heat demand, connection route and network. Deliverable CHP potential much lower than North Yard. The report to Devon County Council Development Management Committee dated 20 July 2011 notes that the applicant had not undertaken reasonable endeavours to find a user for heat generated and that "*the proposal as it stands is not yet a CHP scheme".*	The site is not available to MVV and is therefore not a reasonable alternative for MVV's proposed EfW CHP Facility. The site is not close to residential areas but (and particularly in the form of development proposed by Viridor) it is affected by a number of environmental development constraints, which have led Devon County Council Waste Planning Authority to recommend refusal of a planning application for EfW development. There is no readily available CHP opportunity that is deliverable at the beginning of the SWDWP waste contract timeframe. The balance of advantages and disadvantages supports MVV's choice of North Yard over New England Quarry.
E60 – Land at Agaton Farm, Ernesettle	Greenfield site. Housing very close to site (off Ernesettle Lane) and site occupies a prominent ridgeline. Access via residential area. Abuts Scheduled Ancient Monument.	Agaton Farm is affected by a number of development constraints, including that it has not been previously developed and has restricted potential to develop a deliverable CHP scheme. The balance of advantages and

	Steep access road route from A38. BAA Birdstrike Consultation Zone. Uncertain CHP connection route. Deliverable CHP potential much lower than North Yard.	disadvantages supports MVV's choice of North Yard over Land at Agaton Farm.
North Yard, Devonport	The site is close to residential areas, but a detailed environmental impact assessment of the proposed development has been carried out, which concludes that, with a number of measures built into the scheme to minimise visual and noise and dust impact, mitigation of potential adverse amenity impacts to an acceptable degree is possible. Plymouth Sound and Estuaries SAC, the Tamar Estuaries Complex (Tamar-Tavy Estuary) SPA; and the Tamar/Tavy Estuary SSSI are within 2km of the site. Blackies Wood, an area of semi-natural woodland within the northern area of the site boundary, is within a Biodiversity Network Feature. This area of the site will be enhanced for biodiversity as part of the development. The eastern edge of the Tamar Valley AONB lies approximately 1.5km from the western boundary of the site, across the River Tamar. There site has an influence on the setting of a number of Scheduled Monuments, Registered Parks and Gardens and Grade II Listed structures. The majority of the application site – including the entire central part of the site on which the EfW CHP facility will be constructed – is located within Flood Zone 1. A small section of land in the vicinity of the railway viaduct is located within Flood Zone 2, but the section of new access road in this area will be built up so as to avoid adverse impact on flood risk. The site is accessed from the A3064 via the existing HMNB Devonport Camel's Head Gate junction and a Transport Assessment has demonstrated that there would be no significant effects on junction capacity of the main roads close to the site. Waste travel time analysis results predict 199-219 hours per week. The 2009 Entec Report concludes that there are a number of benefits in locating an EfW facility at HMNB, including the direct provision on heat and steam to the existing Naval Base heat network without significant change to the existing system and that this would constitute an integrated, single site solution, without the need for a pipeline from Ernesettle, which would be costly (£6-9M), logistically difficult and would require relevant permits. A report by Entec for Plymouth City Council in 2008[16] states that "…the most likely site to match heat output from the EFW is the Devonport Dockyards. No other single site would	The site has some potential disadvantages, particularly because it is located close to residential areas. However, the conclusion of the detailed environmental impact assessment, as described in the Environmental Statement and which take account of the design of the facility and the built-in measures to minimise environmental effects, show that potential adverse effects on views and historic environment and from noise can be minimised to an acceptable degree. The site has good access and the broad waste travel time analysis indicates that the North Yard site is consistent with policy objectives of reducing the environmental effects of transporting waste. The close proximity of the site to the existing steam network and heat demand of HMNB Devonport, which enables CHP to be delivered at the beginning of the SWDWP contract period, and the attendant benefits of doing so (see Section 5.5), are very important considerations in the selection of a site for the delivery of EfW with CHP. The balance of advantages and disadvantages supports MVV's choice of North Yard over other reasonable alternatives.

[16] Plymouth City Council. Waste Management Services PFI Contract. Review of EFW-CHP Potential. Draft Report. Entec UK Ltd (April 2008)

	appear to be exactly matched to the heat supply output from either EFW facility" The proposed EfW CHP Facility at the North Yard site MVV can be connected into the existing HMNB steam network within North Yard and MVV has signed an agreement in principle with MOD to provide steam to the Naval Base in the long term, and to lease the North Yard site. The available evidence demonstrates that North Yard is the most deliverable location for an EfW CHP Facility, from the beginning of the SWDWP contract time-frame.	
South Yard, Devonport	Land not immediately available for development due to existing buildings and tenancies. Access/security/deliverability constraint due to difficulty of developing a site with secure access outside of HMNB Devonport security fence. Site is within South Yard area of HMNB Devonport and the access route has to pass through the Naval Base. Access route passes residential area. Heat demand of North Yard is much greater than that in the South Yard. Site not close to the North Yard demand (i.e. it is in the south part of the South Yard).	The site is not as close to residential areas as North Yard, but existing buildings and access/security constraints adversely affect site deliverability. The balance of advantages and disadvantages supports MVV's choice of North Yard over South Yard.
Langage, Devon	Availability of a suitable site area is uncertain, but Langage Employment Estate is allocated for 20ha of employment land in the South Hams Core Strategy (2006). Langage is part of the 'Plymouth Urban Fringe' area identified in the Core Strategy. South Hams District Council published the Plymouth Urban Fringe Site Specific Allocations DPD Preferred Options Stage (June 2006), which identifies areas of land east of the energy park and land north of Holland Road as the most sustainable option for the accommodation of the 20ha of employment land. Paragraph 11.17 of the DPD states that the prime focus of the site should be Use Classes B1 (business) and B2 (general industrial) uses. Proposal 2 of the DPD notes that development of the site should include high quality design, strategic landscaping to assimilate the development in to the countryside and improvements to the A38 Deep Lane junction. The Plymouth Urban Fringe Development Plan Document is in the process of production by South Hams District Council and Plymouth City Council. Consultation documents issued in Spring 2011 provide details of development proposals for Langage. The pamphlet on Langage notes that the area has a high quality landscape setting and wildlife amenity, including ancient woodland to the north, and that highway capacity at the A38 Deep lane junction is at its limit and that parts of the Langage area are unsuitable for development due to flood risk and ecological constraints. Despite the allocation in the Core Strategy, the site was not allocated in the Devon WLP for strategic waste management uses and it is not known whether the local authority (South Hams District Council) would support the development of an EfW CHP Facility.	There is no defined site for an EfW CHP facility at Langage and the detailed planning policy for the site is still developing. The site is not allocated in the Devon Waste Local Plan. There are a few residential properties in the area but it is not a residential area and potential adverse amenity effects may be able to be mitigated to an acceptable degree. The area is allocated for employment development and has a high quality landscape setting and access to the area is via a B-class road which passes a mixed use area. There are highway capacity issues with the junction of this B-class road with the A38, and the preferred solution would be expensive and would take time to deliver. There is no readily available CHP opportunity that is deliverable at the beginning of SWDWP contract time-frame and the balance of advantages and disadvantages supports MVV's choice of North Yard over Langage.

	The proposed employment site allocation area is partly a green field / agricultural land site on the edge of the urban area, with a rural setting to the north, south and east. The area is generally visible from the A38. EfW CHP development is potentially compatible with existing energy park and energy centre (gas-fired power station), anaerobic digestion facility and solar power developments. There are isolated residential properties close to the proposed allocation area and it may be possible to mitigate potential adverse amenity effects to an acceptable degree. Access to the area is via the B3146, which passes though a mixed-use business park, retail and residential area. The Plymouth Urban Fringe Development Plan Document pamphlet on Langage notes that "the preferred option for (access) improvement, which involves the creation of a further junction where Ledgate Lane crosses the A38, will take considerable time and money to complete. Until that time development on any large scale is unlikely." There is no information regarding whether such a junction would be environmentally acceptable or acceptable to the Highways Authority. There is potential CHP heat demand from industrial estate and proposed new housing development in the locality, but likelihood of demand within existing estate is uncertain, especially in the context of the potential for the existing power station, AD and solar energy park to provide heat. The timing of potential development in the proposed employment allocation area and planned new community at Sherford is not consistent with deliverable CHP from the beginning of the SWDWP contract time-frame.	

Conclusion - The MVV Site Choice

5.3.120 In making its choice of site, MVV had regard to site characteristics required to deliver an EfW CHP Facility that could be operational at the beginning of the SWDWP contract, so that the benefits of EfW CHP could be delivered in the short, medium and long term.

5.3.121 When it identified North Yard as a potential site for its EfW CHP Facility, MVV recognised that there could be some adverse effects from developing the site, particularly because of the close proximity of the site to residential areas. MVV considered these potential constraints at an early stage in its plans and undertook community consultation and detailed environmental assessment, in order to understand how to build-in mitigation of potential adverse effects most effectively.

5.3.122 MVV took the view that on-balance, the benefits of developing a brown field site at North Yard, and particularly the benefits resulting from deliverable CHP from the start of the SWDWP contract, outweigh any potential adverse effects of developing the site and the possible benefits of alternative sites. 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. MVV then worked hard to make sure that the scheme incorporated measures to minimise potential adverse effects to an acceptable degree.

5.3.123 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.

5.3.124 The analysis described in Table 5.15 acknowledges that there is some potential for adverse effects from the development of an EfW CHP Facility at North Yard, including potential adverse amenity effects due to the close proximity to residential areas and some other potential adverse environmental effects. However, the evidence (including this Environmental Statement) and analysis demonstrates that adverse environmental effects can be minimised to an acceptable degree and that the benefits of developing a brown field site within the North Yard part of the Dockyard, where CHP and all the associated benefits can be delivered from the beginning of the SWDWP contract, demonstrate that there is no reasonably preferable site and that MVV's decision to choose North Yard is robust.

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 leant 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.

Design Option 2

5.4.11 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

5.4.12 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.

5.4.13 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

5.4.14 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.

5.4.15 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)

5.4.16 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.

5.4.17 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.

5.4.18 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.

5.4.19 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

5.4.20 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.

5.4.21 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.

5.4.22 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

5.4.23 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.

5.4.24 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.

5.4.25 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.

5.4.26 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 it 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 re-built 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

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

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

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