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

Transport Assessment

May 2011

Prepared for

MVV Environment Devonport Ltd

Revision Schedule

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May 2011

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1 Introduction

1.1 Purpose

1.1.1 URS Scott Wilson has been commissioned by MVV Umwelt GmbH to produce a Transport Assessment (TA) in support of a planning application for an Energy from Waste Combined Heat and Power (EfW CHP) facility at North Yard, Devonport, in Plymouth. The site location is illustrated at **FIGURE 1.1**.

1.1.2 The facility will primarily deal with Municipal Solid Waste (MSW) sourced from the South West Devon Waste Partnership (SWDWP) authorities, according to the SWDWP contract. Some Commercial and Industrial (C&I) waste will also be processed on site. There will also be a need to export some residues from the EfW process.

1.2 Background

1.2.1 This TA has been prepared in accordance with the relevant guidance, as set out by the Department for Transport (DfT) in their 'Guidance on Transport Assessments' (March 2007) and the Highways Agency (HA) in their 'Circular 02/2007: Planning and the Strategic Road Network' (March 2007).

1.2.2 As such, a Transport Assessment Scoping Report was prepared and agreed with Plymouth City Council (PCC), as the local highway authority, and with the Highways Agency (HA) in advance of the preparation of the TA itself. In addition, a significant amount of consultation has been undertaken with the relevant planning and highway officers at PCC, specifically relating to the TA methodology.

1.2.3 A summary of the relevant correspondence is included at **ANNEX A** of this TA, and where appropriate, supporting documents such as Technical Notes have also been referred to and included as part of this document.

1.3 Structure

1.3.1 The TA is structured into the following sections:

- Development Proposals;
- Planning Policy Context;
- Sustainable Transport;
- Baseline Conditions;
- Trip Generation and Distribution;
- Operational Assessment; and,
- Parking.

Indicative Site Location

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Figure 1.1

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Site Location.FH11.1

2 Development Proposals

2.1 Background

2.1.1 The proposed EfW CHP facility will have the capacity to process up to 265,000 tonnes of waste per annum, although it is expected that the actual tonnages will be 245,000 per annum, due to calorific values varying with waste composition and possible differences in the duration of plant shutdowns for maintenance. Notwithstanding this, all respective trip estimates presented as part of this TA have been based on the full allocation of 265,000 tonnes, to ensure that a robust assessment is undertaken.

2.1.2 The facility will primarily deal with Municipal Solid Waste (MSW) sourced from the SWDWP authorities, according to the SWDWP contract. Some C&I waste will also be processed on site. There will also be a need to export some residues from the EfW process.

2.1.3 During the 25 Year life of the SWDWP contract and the 40 Year life of the facility, the relative proportion of MSW and C&I waste will be likely to change, but the capacity of the facility will remain approximately the same, within the fluctuations arising from the calorific value of the waste and in the duration of plant shutdowns for maintenance.

2.1.4 The EfW process also uses raw materials, for example to treat exhaust gases, and these will be delivered by HGV's. Staff movements will also be associated with the site.

2.1.5 In light of the above, it is recognised that there are a number of different types of trips which will be associated with the operation of the EfW CHP plant. The different types of travel associated with the site have therefore been divided into three principal groups, as summarised in **TABLE 1.1**.

TABLE 1.1 EfW CHP Trip Types

Operational Trips	Staff Trips	Visitor Trips
MSW delivery C&I Waste delivery Raw Material delivery Removal of Arisings (eg. Ash)	Site Staff	Site Visitors Community Centre / Nature Reserve Visitors

2.2 Site Proposals

2.2.1 As referred to above, the site is located at North Yard, Devonport, in Plymouth. The principal access between the site and the local highway network is provided at the junction between Wolseley Road, Weston Mill Drive and the MoD access road.

Site Access

2.2.2 A number of options have been considered in relation to providing access to and from the proposed EfW CHP facility. Agreement has subsequently been reached between PCC, the

MoD and MVV regarding the provision of a proposed signalised junction on the North Access Road, to allow vehicles to turn right in to and left out of the site access. This junction arrangement will be linked to the signal controller for the Wolseley Road / Weston Mill Drive junction, given the proximity of the proposed signals to the existing junction.

2.2.3 A yellow box or equivalent measure will be provided to ensure that vehicles waiting on the MoD Access Road travelling north east bound (ie. away from the Dockyard area) would not queue through the junction, such that vehicles would be able to turn in and out of the EfW CHP site, during the respective green signal periods.

2.2.4 Alternative access options have also been considered with PCC and the MoD, but these have subsequently been discounted as the proposed signalised access arrangement has been identified as being the most appropriate option. As such, it is considered that the proposed access arrangements allow for pedestrian and cycle connectivity from the Wolseley Road / Weston Mill Drive junction through to the site access and beyond to the HMNB gatehouse, in addition to the management of associated vehicular movements. The lay-by on the northern side of the MoD access road is proposed to be retained, following discussions with the MoD and PCC.

2.2.5 Pedestrian connectivity will also be promoted through the provision of additional uncontrolled pedestrian facilities across the Northern Access Road of the Dockyard junction. This linkage will be facilitated by the provision of dropped kerbs and associated tactile paving.

2.2.6 The access road itself will comprise a new road, formed through the existing car park. At the western end of the existing car park, the new road will pass underneath the Weston Mill railway viaduct and join an existing road, where the gatehouse and weighbridges will be located.

2.2.7 With this in mind however, the existing road will be modified to take account of the type of vehicles which will be accessing / egressing the site, and to accommodate the weighbridges and associated infrastructure. The proposed site access arrangement is included at **ANNEX B**.

Gatehouse and Weighbridges

2.2.8 A gatehouse, through which all vehicles entering the site will need to pass, will be located on the internal access road.

2.2.9 The site will be equipped with two weighbridges positioned to allow weighing in and out of waste vehicles to occur. All delivery vehicles including those transporting waste, consumables, products and residues will be weighed in and out of the site.

Weston Mill Creek

2.2.10 There are currently two existing road crossings of the Weston Mill Creek, located to the west of the proposed location of the gatehouse and weighbridges, neither of which are wide enough in their existing form to accommodate two-way traffic.

2.2.11 The structure that forms the northern crossing has a weight limit of 1.5 tonnes and is therefore unsuitable for vehicles larger than light cars / vans.

2.2.12 The southern crossing has been confirmed as being suitably robust to accommodate the movement of HGVs, but only in one direction at a time.

2.2.13 In light of the above, it is proposed that both of the existing crossings will be replaced as part of the delivery of the EfW CHP facility. A new clear-span bridge will be provided that will be able to cater for the movement of HGVs in both directions.

Internal Layout

2.2.14 The internal road and pedestrian layout has been designed to allow the safe movement of vehicles and pedestrians with due regard to relevant health and safety legislation and industry best practice.

2.2.15 The facility has been designed such that vehicles can progress smoothly through the site, whilst undertaking the following activities from entering the site:

- Weighed on entry (at the weighbridge);
- Waste / Consumables / Products to be unloaded (or loaded);
- Weighed on exit (at the weighbridge); and,
- Exit the site.

2.2.16 Further information regarding the internal operation of the facility is provided in **CHAPTER 7**.

Visitors

2.2.17 The majority of the trips to and from the facility will be associated with the EfW CHP plant operation itself, with some associated staff trips. In addition, a small number of visitor trips associated with the facility and the community centre / nature reserve are also expected.

2.2.18 All trips to the community centre / nature reserve will be by prior appointment and supervised. Visitors are most likely to be school trips which will normally arrive and leave by coach or bus. As these trips will occur outside of peak hours and on an ad hoc basis, they have not been considered as part of the TA.

3 Planning Policy Context

3.1 Background

3.1.1 A review of relevant planning policy documents has been undertaken with a view to establishing the context of the development proposals within national and local guidance. A commentary is provided within this chapter.

3.2 National Policy Guidance

PPG13: Transport

3.2.1 PPG13 has the objective of integrating planning and transport at the national, regional, strategic and local level and promoting sustainable transport choices both for carrying people and for moving freight.

3.2.2 It requires that Local Authorities seek to ensure that strategies in the Development Plan and the Local Transport Plan are complementary. Consideration of Development Plan allocations and local transport priorities and investment should be closely linked. Local authorities should also ensure that their strategies on traffic and demand management are consistent with their overall strategy on planning and transport.

3.2.3 PPG13 recommends that local authorities, freight operators, businesses and developers should work together, to agree on lorry routes, loading and unloading facilities and on reducing vehicle emissions and vehicle noise levels, to enable a more efficient and sustainable approach to deliveries in sensitive locations.

DfT Circular 02/2007: Planning and the Strategic Road Network

3.2.4 The Department for Transport's (DfT) Circular 02/2007: Planning and the Strategic Road Network identifies the role of the Highways Agency (HA) when considering planning applications. The Circular states that the HA will:

- Work with developers to secure delivery of their proposals in such a way that they minimise any additional burden on other users of the strategic road network;
- Take into account the wider impact of the associated traffic on other proposals affecting the strategic network; and,
- Ensure that the mitigation of the environmental impact of highway works resulting from a new development is in line with current guidance.

3.3 Local Policy Guidance

Plymouth Local Development Framework (LDF)

3.3.1 A Local Development Framework (LDF) is a set of documents which guide planning and development in a local authority's area. As such, the Core Strategy forms part of the LDF suite.

3.3.2 The Plymouth Core Strategy sets out the overall planning vision and framework for the city from 2006 until 2021, and beyond. As a strategic document, the Core Strategy provides broad guidance on the scale and distribution of development and the provision of supporting infrastructure in the city.

3.3.3 The Core Strategy contains the 'high level' policies for delivering the spatial vision, guiding broad patterns of development. It also contains policies setting out the criteria to be taken into account by the Local Planning Authority in determining proposals for development and the use of land and buildings.

3.3.4 The document sets out a spatial planning framework for the long term development of the city, ensuring that investment decisions are not made in isolation, but are properly co-ordinated, with a focus on promoting the principles of sustainable development. It has been prepared taking into account the views of all sections of the community and stakeholders, as well as maintaining consistency with national and regional guidance.

3.3.5 The Core Strategy sets out the task for the LDF 'to propose broad locations for new waste recovery facilities', particularly for the large scale treatment facilities. i.e. 'strategic' waste management facilities that will deal with MSW, C&I waste, and construction and demolition waste.

3.3.6 The document also provides a framework for the identification of other sites or areas, where waste management facilities should be located, such as local recycling centres (i.e. bottle and paper banks), small waste sorting and transfer stations and scrap metal and car recycling.

3.3.7 Finally, the Core Strategy sets out Plymouth's approach to waste management as part of the framework for the Waste Development Plan Document.

Plymouth Waste Development Plan Document

3.3.8 PCC have produced a Development Plan Document (DPD) that deals with waste. This DPD aims to set a spatial planning framework to enable the city's waste recovery and recycling targets, arising from European and Government legislation, to be met. The document was adopted by the Council on 21 April 2008.

3.3.9 In terms of transport, Policy W7 requires that proposals for the development of strategic, large scale or local waste management facilities on sites not allocated in the development plan will be permitted, where they *'have good access to the principal road network which should have adequate capacity, or potential to have adequate capacity, to accommodate the transport movements associated with the proposal'*.

3.3.10 In addition, Policy W8 'Considerations for Waste Development Proposals' states that '*development proposals for waste management facilities will be permitted where... adequate space shall be provided on site to ensure vehicles can enter the site, wait, be unloaded and leave safely'*.

Plymouth Municipal Waste Management Strategy

3.3.11 This Strategy has been produced as a guiding document for the future management of waste within Plymouth. It sets out 'how' waste will be managed over the period 2007 - 2030.

3.3.12 The guidance outlined in this document is at a strategic level. As such, the document does not consider specific locations of future waste management infrastructure, and the Development Plan Document should therefore be referred to within this context.

Plymouth Local Transport Plan 2

3.3.13 Plymouth's second Local Transport Plan (LTP2) sets out the transport strategy and implementation programme for transport in Plymouth from 2006 to 2011. This Plan describes the strategy for delivering the Government's shared priorities for transport in the city over the LTP2 period.

3.3.14 Plymouth's LTP2 has seven objectives:

- **Objective 1**: To improve accessibility and social inclusion
- **Objective 2**: To reduce the rate of growth of traffic congestion
- **Objective 3**: To improve road safety
- **Objective 4**: To improve air quality and the environment
- **Objective 5**: To support Plymouth's urban renaissance and sustainable growth
- **Objective 6**: To improve quality of life
- **Objective 7**: To make maintenance more efficient and effective

Plymouth Sustainable Distribution Strategy

3.3.15 PCC produced a Sustainable Distribution Strategy as a supporting document to LTP2. The document recognises that freight is an essential element of the economy of Plymouth and has a wide range of impacts on the transport network.

3.3.16 Businesses and industry can be affected when deliveries are delayed by congestion which can also have negative environmental impacts. Delivering more sustainable distribution to meet the demands of business and the community is a challenge to both the City Council and freight operators.

3.3.17 The document sets out the strategy for freight in the city. In a section entitled 'Barriers to the Provision of Sustainable Freight Distribution' the document mentions waste, stating that *''Plymouth is facing a major issue with waste disposal, as the City's current landfill site at Chelson Meadow is nearing its capacity. This will have implications for the transport network if waste or related products need to be transported around, or out of the City, and the LDF Waste Development Plan document seeks to address this matter by firstly promoting the reduce, reuse, recycle waste hierarchy to make the City more sustainable, and secondly by developing an appropriate infrastructure to allow the City to be as self sufficient as possible in meeting its waste management obligations'*.

Plymouth Local Transport Plan 3

3.3.18 Plymouth has recently produced its third Local Transport Plan. This LTP has a timeframe which replicates the city's growth agenda as detailed in the LDF and will cover the period from 2011 to 2026. The LTP is currently in draft format and is at the consultation stage.

3.3.19 The LTP is split into two main parts; the first is the Transport Strategy which focuses on the problems and opportunities that exist and the role transport has in improving peoples' lives. The second part consists of an Implementation Plan which outlines the measures that will be developed and delivered with the benefits and outcomes they are predicted to provide.

3.3.20 The LTP outlines a vision for transport within Plymouth, which states that "*By 2026 people living in, working in and visiting Plymouth will feel good about how they travel because the transport options available work for them everyday, giving them a unique quality of life aspired to by other cities".*

4 Sustainable Transport

4.1 Background

4.1.1 In accordance with DfT guidance, an analysis has been undertaken of the opportunities for sustainable travel in proximity to the proposed site. Due to the specific nature of the site, and its associated operation, it is anticipated that any opportunities for sustainable travel would be applicable to staff and visitors to the site only, as opposed to those trips associated with the transportation of waste, raw materials and residues.

Waste

4.1.2 Notwithstanding this, consideration was given to the movement of the waste itself. In doing so, it was noted that a significant amount of the waste that will be processed at the EfW CHP facility is currently and will continue to arise in Plymouth. Thus, this waste is currently being transported by road and the provision of the new EfW CHP facility at North Yard will only lead to a redistribution of these trips, rather than the creation of new trips.

4.1.3 Furthermore, given the proximity of the EfW CHP facility to the city, it was not considered to be practical to use alternative transportation methods such as rail or water. This was also the case for traffic movements associated with waste arising from outside of Plymouth, as this will be bulked to reduce vehicle movements, and its transportation by other modes would lead to 'double handling'. Further information is provided relating to this at **ANNEX C**.

Staff and Visitors

4.1.4 Staff trips in particular are likely to be further influenced by operational duties, for example, if they need to travel off site as part of their work, in addition to their shift times. This will be discussed in further detail, in **CHAPTER 6**.

4.1.5 The remainder of this chapter therefore considers the opportunities that currently exist for the staff and visitors that will be associated with the EfW CHP facility to travel to and from the site using sustainable modes. It presents a review of the sustainable travel opportunities currently available within the vicinity of the site and also provides details of the routes and frequencies of the various forms of public transport available. The sustainable travel options are also summarised at **FIGURE 4.1**.

4.1.6 It should be noted that the location of the proposed facility is within a well-defined employment area of the city, comprising Her Majesty's Naval Base (HMNB) Devonport and Devonport Dockyard, and the site is therefore well positioned to take advantage of a number of existing public transport services.

4.2 Walking and Cycling

4.2.1 The majority of Plymouth and the surrounding area is urbanised, and therefore walking routes tend to follow the road network and are presented in the form of segregated footpaths adjacent to the highway network. Footpaths in this form often provide the most direct routes and are perceived as possessing a higher level of safety and security due to passing traffic and the provision of street lighting.

4.2.2 Footways are provided on both sides of the carriageway on both Wolseley Road and Weston Mill Drive, in the vicinity of the site. In addition, pedestrian crossing facilities are provided at the Wolseley Road / Weston Mill Drive junction.

4.2.3 In terms of cycling within the vicinity of the site, there is an on road, signed cycle lane on Wolseley Road which routes in a southerly direction from near to the junction with Weston Mill Drive.

4.3 Public Transport

Bus

4.3.1 Bus travel is one of the most flexible and desirable forms of public transport in the vicinity of the EfW CHP site, as bus routes offer direct services to a number of the residential areas nearby.

4.3.2 The area is served by good quality, high frequency bus services covering twelve routes which all provide bus travel between Monday and Friday. **FIGURE 4.1** shows the extent of the bus services in the immediate area.

4.3.3 There are a number of bus routes that pass close to the site, serving the various residential areas of Plymouth, as summarised below at **TABLE 4.1**. For clarity, the average service intervals have been provided based on the peak hours, which for the purposes of this analysis are 0800 to 0900 and 1600 to 1700 for the AM and PM respectively.

TABLE 4.1 Bus Services

Service	Destinations	Peak Hour Frequency
1 / 1A	Royal Parade, Saltash Road (Rail Station), Milehouse, St Budeaux Square, Saltash Fore Street, Saltash Rashleigh Avenue, Latchbrook	10 mins
3	Royal Parade, Union Street, Stonehouse Bridge, Devonport Hill, Cumberland Road, Albert Road, Keyham Road, Saltash Road, Wolseley Road, Poole Park Road, Trelawney Road	10 mins
4	Royal Parade, Saltash Road, St Levan Gate, HMS Drake, Ford	15 mins
23D	Royal Parade, Ebrington Street, Mount Gould, Greenbank, Devonport Granby Road, St Budeaux Square	2 Buses
26 / 26B	Royal Parade, Stonehouse Bridge, Cumberland Road, Keyham Road, Saltash Road, Wolseley Road, Barne Road, Bull Point, St Budeaux Square	10 mins
29	Royal Parade, Milehouse, St Budeaux Square, West Park, Transit Way shopping village, Crownhill Fire Station, Derriford Hospital	30 mins
43	Royal Parade, Saltash Road (Rail Station), Milehouse, St Budeaux Square, Ernesettle, St Budeaux Square	10 mins
43(A)	Royal Parade, Saltash Road (Rail Station), Milehouse, St Budeaux Square, Saltash Fore Street, Saltash Business Park	30 mins
43(B)	Royal Parade, Saltash Road (Rail Station), Milehouse, St Budeaux Square, West Park Shops, Ringmore Way, Holly Park	30 mins
46 / 47	Royal Parade, Saltash Road (Rail Station), Stoke Village, Devonport, HMS Drake, Kings Tamerton, Ernesettle, Whitleigh, Southway, Derriford, Estover, Austin Farm, Efford, Mutley Plain	30 mins
76	Bretonside Bus Station, Milehouse, St Budeaux Square, Saltash, Hatt, St Mellion, St Dominick, Callington, Kelly Bray, Launceston	Hourly

Rail

4.3.4 Devonport benefits from a number of rail stations being located in close proximity, providing opportunities to travel in a sustainable manner to neighbouring towns and villages. As the stations are situated upon the national rail network, it is therefore possible to travel to any mainline rail station within the UK.

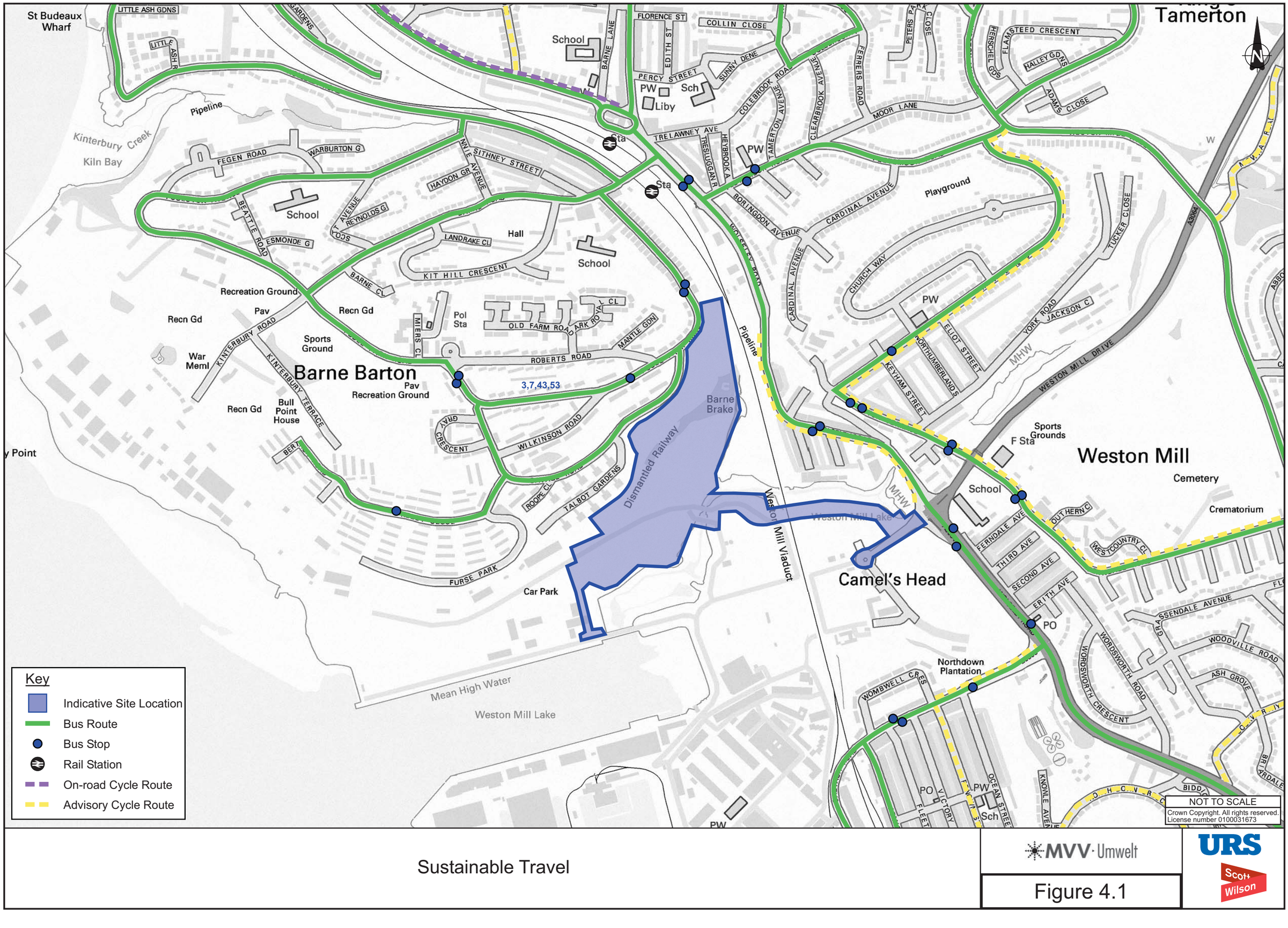
4.3.5 The stations which serve the local area are summarised below, along with approximate walking and cycling times to and from the site:

- **Keyham** is the closest station to the site, situated approximately 1000m away, which is approximately an 18 minute walk or a 7 minute cycle. This station operates as a 'request stop', whereby passengers wishing to alight the train need to inform the driver or conductor that they wish to disembark at Keyham Rail Station, and boarders need to clearly flag down approaching trains from the station platform.

- **St Budeaux Ferry Road** rail station is located approximately 1400m from the site, which is approximately a 20 minute walk, or a 10 minute cycle. This station operates as a 'request stop', as referred to above.

- **Plymouth North Road** station is situated approximately 3400m to the south east of the site (approximately a 50 minute walk or 20 minute cycle journey). This station is the primary rail station within the Plymouth area as it provides the highest frequency of rail services. As such, it is also possible to travel to and from station by bus.

4.3.6 Rail based origins / destinations in the local area include Newton Abbot, Liskeard, Gunnislake and Plymouth's main station, at North Road. Onward travel is available from North Road Station to other destinations, further afield.



Sustainable Travel

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Figure 4.1

5 Baseline Conditions

5.1 Local Highway Network – 2010 Observed

5.1.1 As part of the TA Scoping process, a study area was defined and agreed with PCC in the vicinity of the proposed EfW CHP facility site. This includes the following three junctions, as also illustrated at **FIGURE 5.1**:

- Wolseley Road / Saltash Road
- Wolseley Road / Weston Mill Drive
- Weston Mill Drive / Carlton Terrace

5.1.2 In addition to the above, it was also agreed with the HA that the following locations would also be considered. These locations are also shown at **FIGURE 5.1**.

- Weston Mill Drive / A38 Southern Junction
- Weston Mill Drive / A38 Northern Junction

5.1.3 Traffic data was subsequently obtained for each of the junctions located within the study area for the 12 hour period 0700-1900, on Tuesday 12th October 2010. For the signalised junctions located within the vicinity of the site, queue data was also obtained during the peak periods, to assist with calibrating the junction models which were subsequently prepared.

5.1.4 Analysis of the data and discussions with PCC and the HA have confirmed that the peak hours to be used for the purposes of this TA are 0800-0900 in the AM, bearing in mind that the facility will open at 0800 AM, and 1600-1700 in the PM. The 2010 Observed turning movements are illustrated at **FIGURES 5.2** and **5.3**.

5.1.5 In order to undertake the junction modelling assessments, Signal Layout Drawings (SLDs) and Timing Sheet information was obtained from PCC / Amey, for each of the junctions. This included information regarding the phasing, staging and intergreens which are in operation at each of the junctions.

5.1.6 As part of the information which was provided, it was noted that the signalised Dockyard (Wolseley Road / Weston Mill Drive) and Carlton Terrace (Weston Mill Drive / Carlton Terrace) junctions operate closely together, but are not linked. As such, it was noted that alternative staging plans are run in the peak hours, to best manage the directional traffic flows.

5.1.7 In addition to the above, actual timing information was output from the junction controllers by PCC / Amey and provided to further inform the development of the baseline junction models, which are described in further detail below. In each case, the models have been built using the latest version of LINSIG (3).

Wolseley Road / Saltash Road – 2010 Observed

5.1.8 The Wolseley Road / Saltash Road junction has been modelled in LINSIG utilising the traffic data and signal information referred to above.

5.1.9 As part of the development of the junction model, the modelled queue results have been compared against observed levels (at the time when the traffic survey data was collected), to allow the model to be calibrated and validated.

5.1.10 The 2010 Observed junction model results are presented below in **TABLE 5.1**, which includes the observed queue data, considered as part of the calibration process.

TABLE 5.1 Wolseley Road / Saltash Road – 2010 Observed

Approach	AM (0800-0900)			PM (1600-1700)		
	Sat (%)	MMQ	Obs Q	Sat (%)	MMQ	Obs Q
Wolseley Rd N Ahead	62.6	11.0	7.1	47.8	5.7	5.3
Wolseley Rd N Right	89.2	20.7	12.5	86.0	10.9	11.2
Wolseley Rd S Ahead + Left	83.8	6.7	4.6	87.9	9.3	6.8
Wolseley Rd S Ahead	82.3	6.4	3.4	87.6	9.2	8.7
Saltash Rd Left	27.6	1.9	4.8	79.3	10.0	14.0
Saltash Rd Right	7.8	0.4	0.2	10.4	0.5	0.0
Cycletime (secs)	76			59		
Practical Reserve Capacity (PRC)	89.1%			87.7%		

Sat (%) Refers to the Degree of Saturation where 90% is the optimum level of saturation, meaning that the available greentime is being used efficiently. 100% Saturation indicates the theoretical capacity of the junction.

MMQ Refers to the Mean Max Queue, as modelled by LINSIG.

Obs Q Refers to the level of queuing that was observed on site.

All traffic flows input and queue levels output from the model are in PCUs (passenger car units)

5.1.11 It is noted that in the AM peak, the LINSIG model tends to slightly overestimate the level of queuing, with the exception of the left turn from Saltash Road where the observed average queue of 4.8 slightly exceeds the modelled queue of 1.9.

5.1.12 A similar trend is observed in the PM peak, where the LINSIG model tends to slightly overestimate the level of queuing in most cases.

5.1.13 In both cases, the LINSIG analysis confirms that the junction operates within the recommended capacity thresholds, utilising optimised signal cycletimes of 76 and 59 seconds in the AM and PM peaks, respectively.

Wolseley Road / Weston Mill Drive – 2010 Observed

5.1.14 The Wolseley Road / Weston Mill Drive junction has been modelled in LINSIG utilising the traffic data and signal information referred to above.

5.1.15 As part of the development of the junction model, the modelled queue results have been compared against observed levels (at the time when the traffic survey data was collected), to allow the model to be calibrated and validated.

5.1.16 The 2010 Observed junction model results are presented in **TABLE 5.2**, which includes the observed queue data considered as part of the calibration process.

TABLE 5.2 Wolseley Road / Weston Mill Drive – 2010 Observed

Approach	AM (0800-0900)			PM (1600-1700)		
	Sat (%)	MMQ	Obs Q	Sat (%)	MMQ	Obs Q
Wolseley Rd N Ahead + Left	86.0	7.9	7.7	89.7	8.0	6.1
Wolseley Rd N Ahead + Right	81.9	7.7	7.7	87.2	8.0	6.1
Weston Mill Dr Left	90.4	8.7	6.8	49.0	7.1	2.4
Weston Mill Dr Ahead + Left	89.2	8.6	6.8	42.4	1.6	1.3
Weston Mill Dr Ahead + Right	65.3	4.5	2.5	39.8	2.0	3.7
Wolseley Rd S Ahead + Left	78.8	6.4	8.9	87.0	14.4	13.0
Wolseley Rd S Right	72.3	5.4	7.1	87.8	14.8	12.9
Dockyard Ahead + Left	21.3	1.1	1.9	88.8	9.8	10.0
Dockyard Right	21.6	1.0	1.4	25.3	1.9	3.3
Cycletime (secs)	64			79		
Practical Reserve Capacity (PRC)	90.6%			89.6%		

5.1.17 The model results presented above utilise the observed signal timings provided by PCC / Amey. Whilst the LINSIG results indicate that the junction is operating slightly in excess of the optimum level (by 0.6% PRC) in the AM peak, the modelled and observed queue information is very similar, and thereby provides a good level of validation.

Weston Mill Drive / Carlton Terrace – 2010 Observed

5.1.18 The Weston Mill Drive / Carlton Terrace junction has been modelled in LINSIG utilising the traffic data and signal information referred to above.

5.1.19 As part of the development of the junction model, the modelled queue results have been compared against observed levels (at the time when the traffic survey data was collected), to allow the model to be calibrated and validated.

5.1.20 The 2010 Observed junction model results are presented below in **TABLE 5.3**, which includes the observed queue data considered as part of the calibration process.

TABLE 5.3 Weston Mill Drive / Carlton Terrace – 2010 Observed

Approach	AM (0800-0900)			PM (1600-1700)		
	Sat (%)	MMQ	Obs Q	Sat (%)	MMQ	Obs Q
Carlton Terrace	64.2	5.5	6.4	48.8	3.0	3.1
Weston Mill Dr E Ahead + Left	64.5	13.0	13.6	85.0	11.0	9.7
Weston Mill Dr E Ahead + Right	65.7	14.4	12.6	88.5	13.1	9.6
Ferndale Rd	88.0	8.2	7.0	89.1	8.0	6.4
Weston Mill Dr W Ahead + Left	81.9	11.4	11.6	93.5	18.7	18.0
Weston Mill Dr W Ahead + Right	83.1	12.4	7.5	92.6	18.7	16.4
Cycletime (secs)	100			96		
Practical Reserve Capacity (PRC)	87.8%			93.9%		

5.1.21 The model results presented above utilise the observed signal timings provided by PCC / Amey. Whilst the LINSIG results indicate that the junction is operating slightly in excess of the optimum level (by 3.9% PRC) in the PM peak, the modelled and observed queue information is very similar, and thereby provides a good level of validation.

5.2 Local Highway Network – 2011 Baseline

5.2.1 In order to consider the current operation of the junctions located within the study area, given that the observed traffic flows were recorded during 2010, traffic growth factors have been derived to establish the 2011 Baseline scenario.

5.2.2 Traffic growth factors have been calculated using the Government's TEMPRO database (dataset 5.4), and adjusted by the National Transport Model (NTM 2010) in accordance with the TEMPRO guidance note (April 2006), as set out below:

Traffic Growth Factor = Local Peak TEMPRO / National Average Weekday TEMPRO x NTM

5.2.3 As such, data for the Plymouth (main zone) area was extracted from TEMPRO, and Urban Principal roads in the South West were chosen as parameters for the NTM data. As presented in **TABLE 5.4** below, traffic growth factors were calculated for the period 2010 to 2011 (to establish the Baseline scenario).

TABLE 5.4 Traffic Growth Factor Calculations (2010 – 2011)*

Time Period	Local TEMPRO	National TEMPRO	NTM	Growth Factor
AM	1.014	1.013	1.006	1.008
PM	1.014	1.013	1.006	1.008

*Please note, there may be small discrepancies in the calculations presented, due to rounding

5.2.4 The resultant 2011 Baseline turning movements are illustrated in **FIGURES 5.4** and **5.5**. These flows have subsequently been taken forward as the basis for the 2011 Baseline junction assessments, reported below.

Wolseley Road / Saltash Road – 2011 Baseline

5.2.5 The 2011 Baseline junction model results are presented below in **TABLE 5.5**.

TABLE 5.5 Wolseley Road / Saltash Road – 2011 Baseline

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Wolseley Rd N Ahead	63.1	11.1	48.1	5.7
Wolseley Rd N Right	89.9	21.4	86.6	11.1
Wolseley Rd S Ahead + Left	84.2	6.8	88.9	9.6
Wolseley Rd S Ahead	83.1	6.6	88.1	9.4
Saltash Rd Left	27.8	1.9	79.4	10.5
Saltash Rd Right	7.8	0.4	10.4	0.5
Cycletime (secs)	76		59	
Practical Reserve Capacity (PRC)	89.9%		88.7%	

5.2.6 In both cases, the LINSIG analysis confirms that the junction operates within the recommended capacity thresholds, utilising optimised signal cycletimes of 76 and 59 seconds in the AM and PM peaks, respectively.

Wolseley Road / Weston Mill Drive – 2011 Baseline

5.2.7 The 2011 Baseline junction model results are presented below in **TABLE 5.6**.

TABLE 5.6 Wolseley Road / Weston Mill Drive – 2011 Baseline

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Wolseley Rd N Ahead + Left	88.0	8.7	87.8	8.0
Wolseley Rd N Ahead + Right	83.7	8.1	83.9	7.7
Weston Mill Dr Left	86.2	7.4	29.4	3.9
Weston Mill Dr Ahead + Left	88.3	8.5	30.8	4.3
Weston Mill Dr Ahead + Right	64.9	4.5	62.5	3.5
Wolseley Rd S Ahead + Left	73.9	6.0	88.7	15.7
Wolseley Rd S Right	67.5	5.2	89.2	16.0
Dockyard Ahead + Left	22.2	1.0	87.2	10.2
Dockyard Right	22.0	1.0	23.5	1.9
Cycletime (secs)	65		83	
Practical Reserve Capacity (PRC)	88.0%		89.1%	

5.2.8 In both cases, the LINSIG analysis confirms that the junction operates within the recommended capacity thresholds, utilising optimised signal cycletimes of 65 and 83 seconds in the AM and PM peaks, respectively.

Weston Mill Drive / Carlton Terrace – 2011 Baseline

5.2.9 The 2011 Baseline junction model results are presented below in **TABLE 5.7**.

TABLE 5.7 Weston Mill Drive / Carlton Terrace – 2011 Baseline

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Carlton Terrace	64.9	5.6	49.3	3.1
Weston Mill Dr E Ahead + Left	65.4	13.2	86.8	11.5
Weston Mill Dr E Ahead + Right	65.9	14.6	88.3	13.0
Ferndale Rd	89.3	8.5	90.1	8.3
Weston Mill Dr W Ahead + Left	82.5	11.7	93.9	19.1
Weston Mill Dr W Ahead + Right	83.6	12.5	93.6	19.8
Cycletime (secs)	100		96	
Practical Reserve Capacity (PRC)	89.3%		94.4%	

5.2.10 In the AM peak, the LINSIG analysis confirms that the junction operates within the recommended capacity thresholds, utilising the retained, observed signal cycletime of 100 seconds.

5.2.11 In the PM peak, the operation of the junction is reported as being slightly in excess of the optimum threshold (by 4.4% PRC). Notwithstanding this, the modelled queue levels are consistent with on site observations and the data obtained as part of the traffic surveys.

5.3 Road Safety

5.3.1 In accordance with the DfT's latest guidance on the preparation of TAs (2007), Personal Injury Incident (PIA) data has been sourced and analysed for the most recent five year period available, for the area surrounding the site.

5.3.2 The study area considered comprises the highway network situated within the vicinity of the site, specifically including routes which HGV traffic are expected to use. The study area was agreed with PCC and is illustrated at **FIGURE 5.6**.

5.3.3 The PIA data provides details of the location, severity and description of road traffic incidents, thereby providing an opportunity to assess the existing situation and identify if any trends in the location or causality of incidents are prevalent. The data analysed covers the five year period 01/09/2005 – 01/09/2010.

5.3.4 Over the course of the study period, there were 170 reported incidents, as summarised below at **TABLE 5.8**.

TABLE 5.8 Reported Road Safety Incidents, 2005 – 2010

Location	Slight	Serious	Fatal	Total
Dockyard (junction)	15	0	0	**15**
Weston Mill Drive	10	2	0	**12**
Wolseley Road North	9	0	0	**9**
Wolseley Road South	64	4	1	**69**
A38	25	3	0	**28**
Milehouse Junction	35	0	0	**35**
Outland Road	2	0	0	**2**
Total	**160**	**9**	**1**	**170**

5.3.5 Of the reported incidents, there was one fatal accident and nine serious severity accidents. All of the remaining incidents were recorded as being of slight severity. The reported incidents, as summarised above, are illustrated at **FIGURE 5.7**. A more detailed description, by location, is provided below:

Dockyard (Junction)

5.3.6 All of the reported incidents at this location were classified as being of slight severity. There were no particular trends in causality, with a number of contributing factors including drivers disobeying traffic signals, drivers losing control, rear shunts, a pedestrian running out into traffic and an incident involving a motorcycle.

Weston Mill Drive

5.3.7 Analysis of the ten slight accidents which have occurred on Weston Mill Drive has indicated that there is no discernable pattern to the occurrence of the incidents. The causation factors included rear shunts, head on collisions, a driver losing control and two motorcycle incidents, one involving loss of control and the other resulting in a collision.

5.3.8 Two serious accidents occurred, one involving a motorcycle and the other a head on collision.

Wolseley Road North

5.3.9 Nine slight incidents were reported along Wolseley Road North. Of these, three rear shunts occurred in traffic and one at a junction, a dog was stuck by traffic and the other incidents were characterised by drivers losing control.

Wolseley Road South

5.3.10 There were 69 reported incidents along Wolseley Road South during the study period, of which one incident resulted in a fatality and four resulted in serious injuries. The fatal incident occurred when an elderly pedestrian was struck by a bus.

5.3.11 Of the serious incidents, two involved pedestrians being struck by vehicles, one occurred when a car collided with a cyclist and one vehicle collided with the near side of another vehicle.

5.3.12 In relation to the Transport Assessment study area specifically, four slight incidents were reported at the Wolseley Road / Saltash Road junction. Two of these incidents involved drivers disobeying the traffic signals, one involved a rear shunt and one involved a pedestrian.

A38

5.3.13 Three serious accidents occurred in this area, two of which occurred as vehicles changed lanes and one where a vehicle had stopped to assist a driver who had broken down.

5.3.14 Of the 25 reported slight severity accidents there is no discernable pattern to the occurrence of the incidents. The incidents included drivers changing lanes, rear end shunts, accidents occurring during adverse weather conditions, incidents at the exit slip road, misjudgement of speed and loss of control.

Milehouse Junction

5.3.15 All of the 35 reported incidents that occurred at the Milehouse junction during the five year study period were of slight severity. The incidents included drivers disobeying the traffic signals, rear shunts, loss of control, intoxication, pedestrians on the carriageway and a cyclist using a zebra crossing.

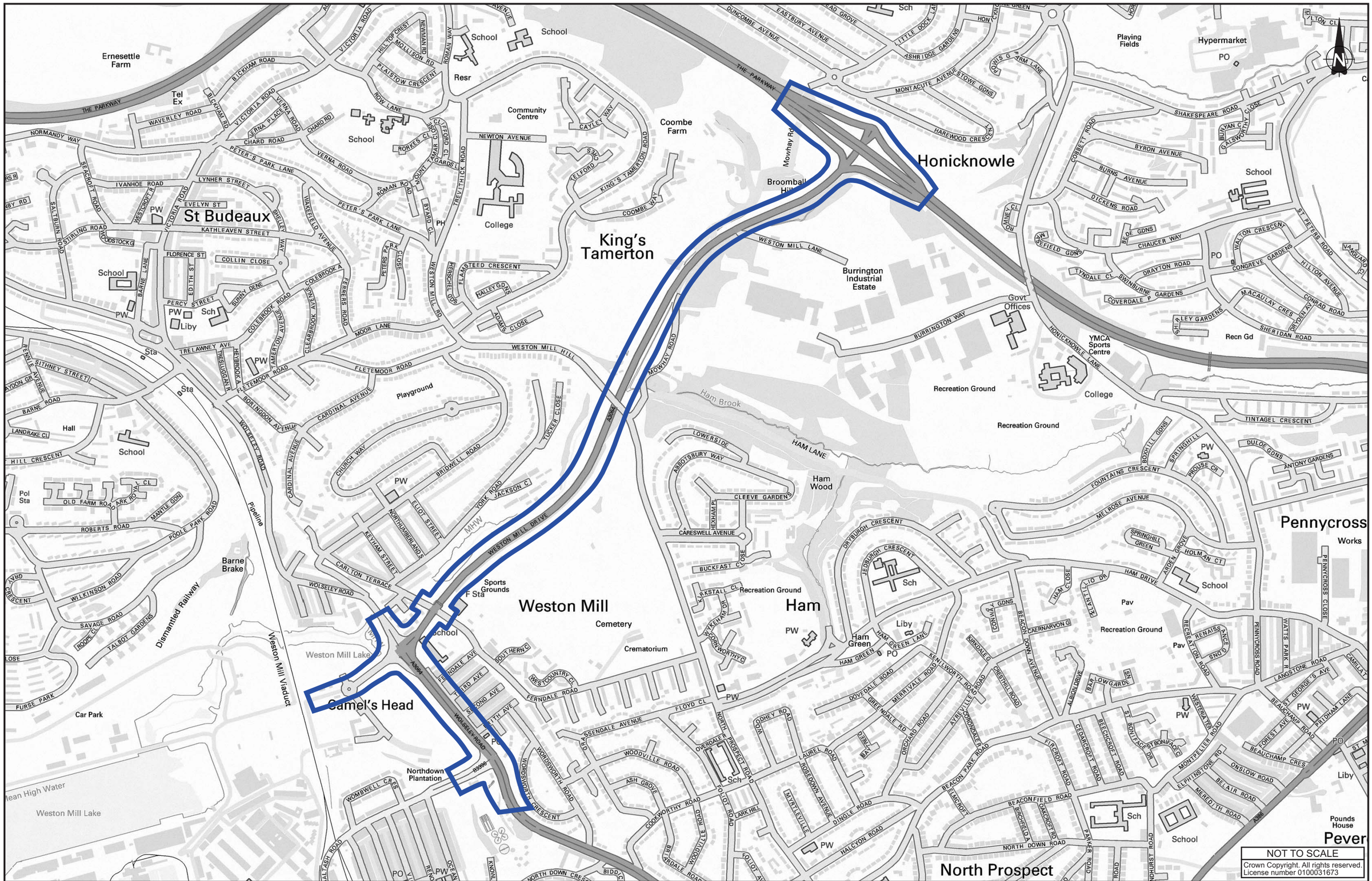
Outland Road

5.3.16 Two slight severity incidents were reported on Outland Road. Both of the incidents were rear shunts, one of which involved a car striking a HGV in traffic and the other occurred at a junction.

Summary

5.3.17 The road safety data summarised above has been reviewed to consider any existing trends in the causality and location of incidents.

5.3.18 The analysis has indicated that the causality, type and quantity of incidents are relatively consistent with the highway network structure and that there are no apparent underlying issues with the highway network in this area.



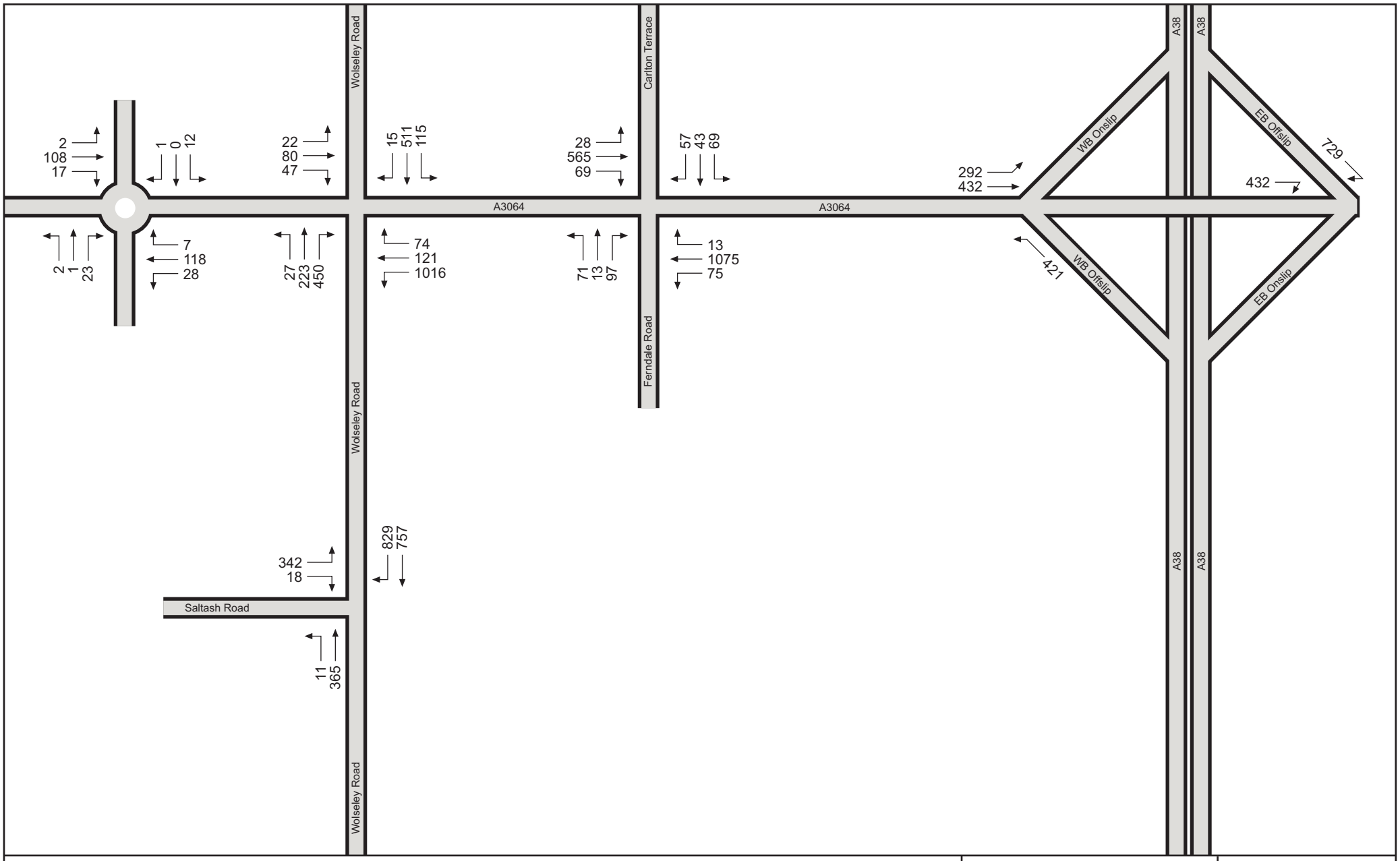
Transport Assessment Study Area

MVV Umwelt

URS Scott Wilson

Figure 5.1

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\TA Study Area.FH11.1



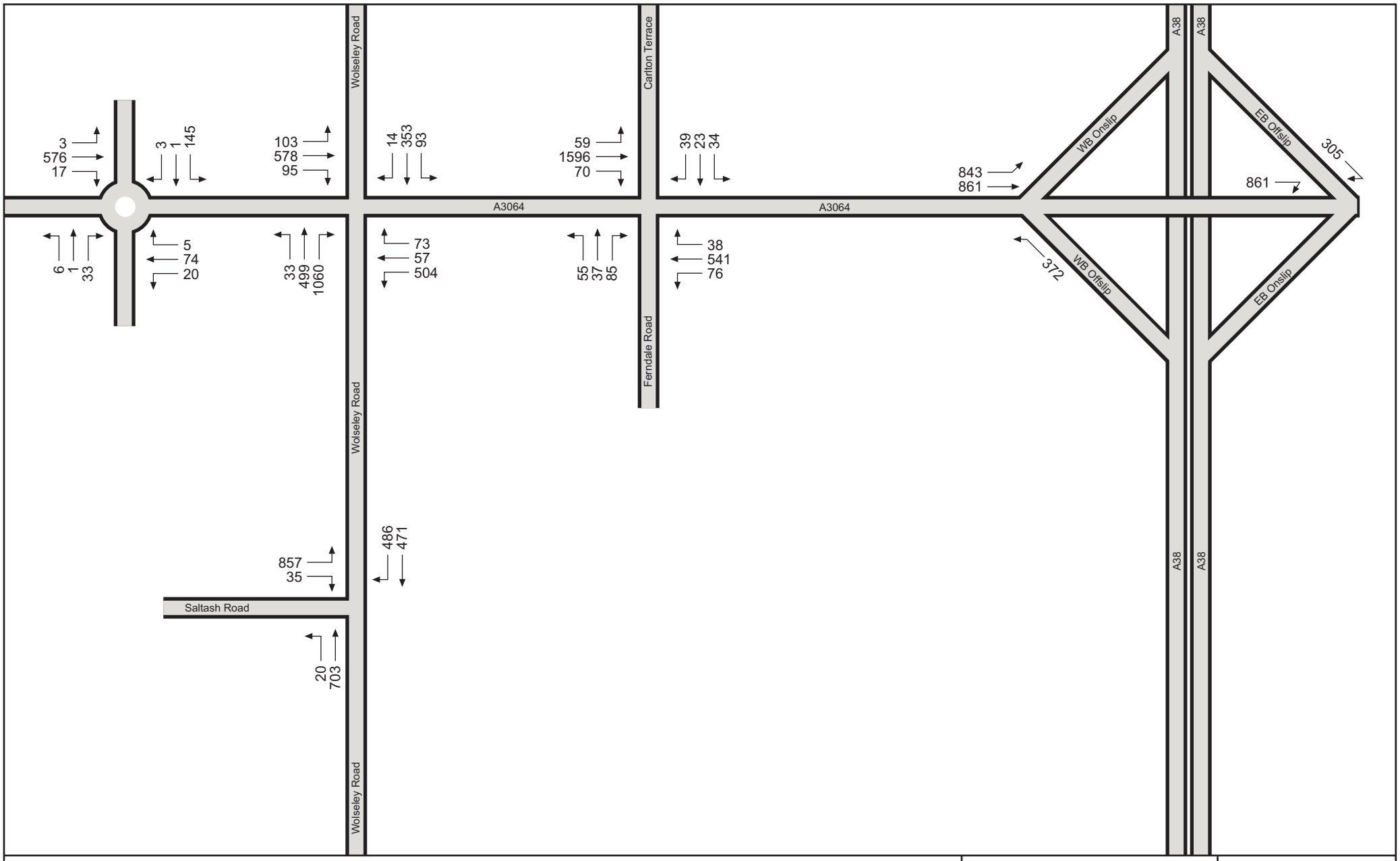
2010 Observed AM
0800 - 0900

MVV Umwelt

Figure 5.2

URS Scott Wilson

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1



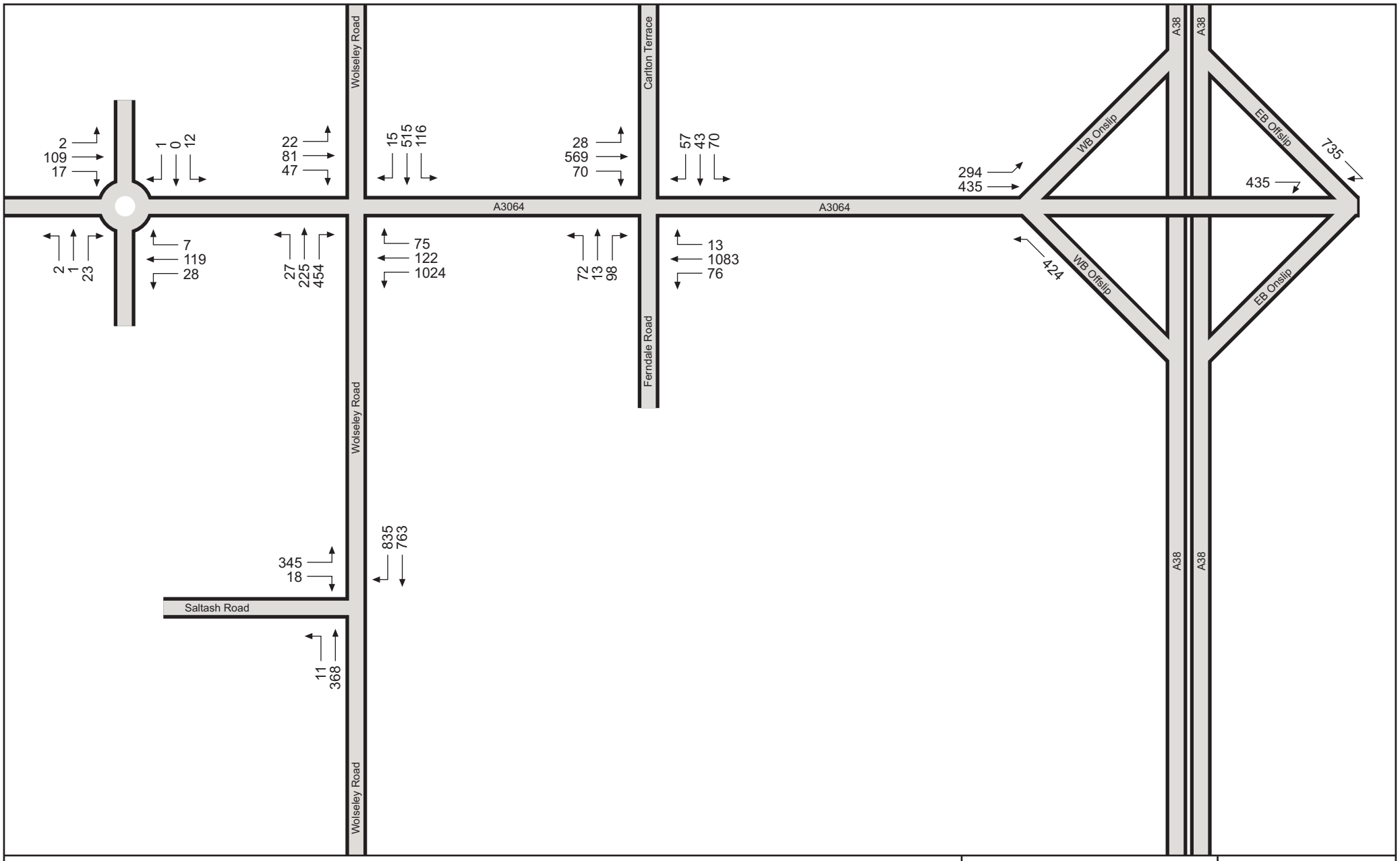
2010 Observed PM
1600 - 1700

MVV Umwelt

Figure 5.3

URS Scott Wilson

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1



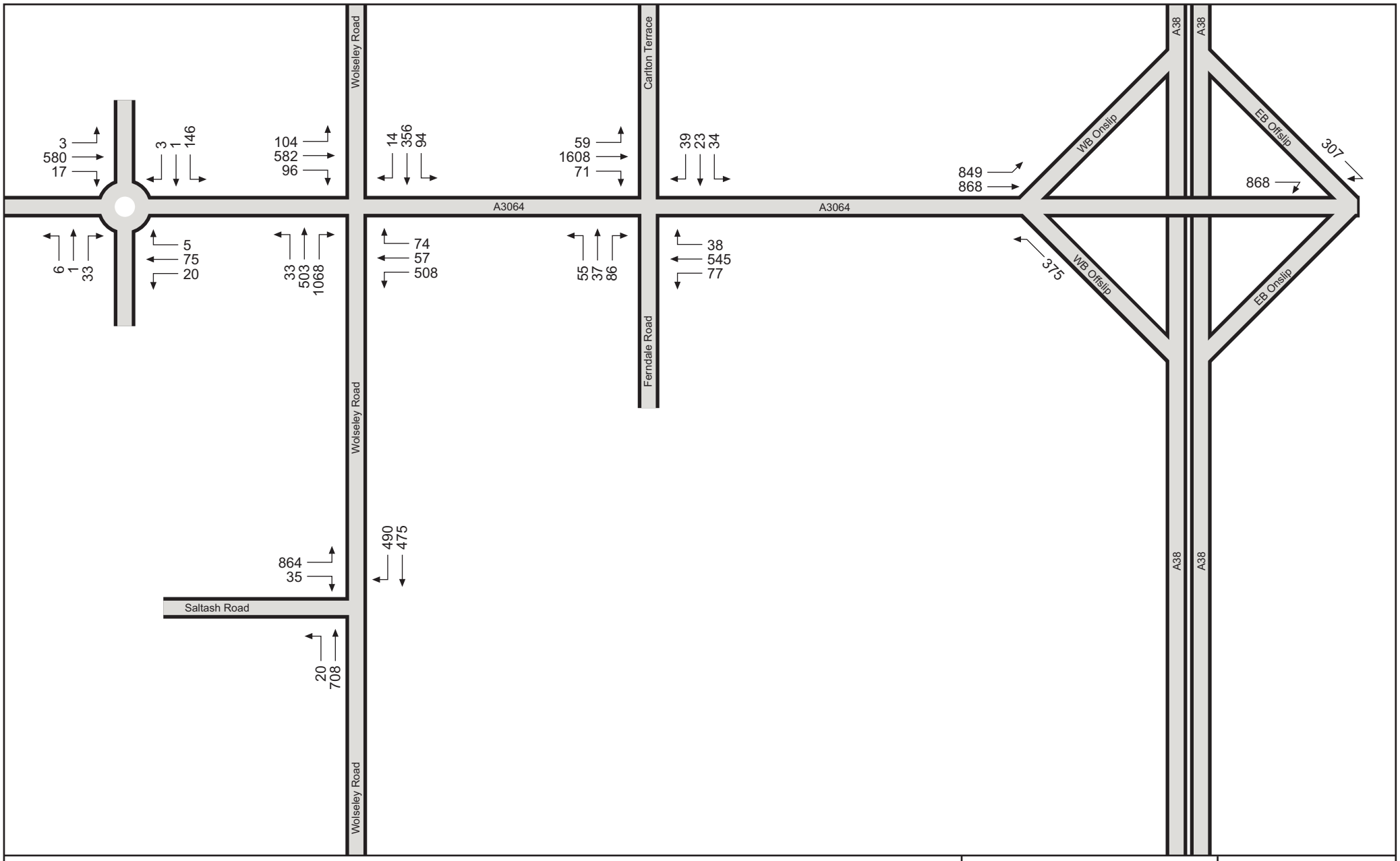
2011 Base AM
0800 - 0900

MVV Umwelt

Figure 5.4

URS Scott Wilson

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1



2011 Base PM
1600 - 1700

MVV Umwelt

Figure 5.5

URS Scott Wilson

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1

PIA Analysis Study Area

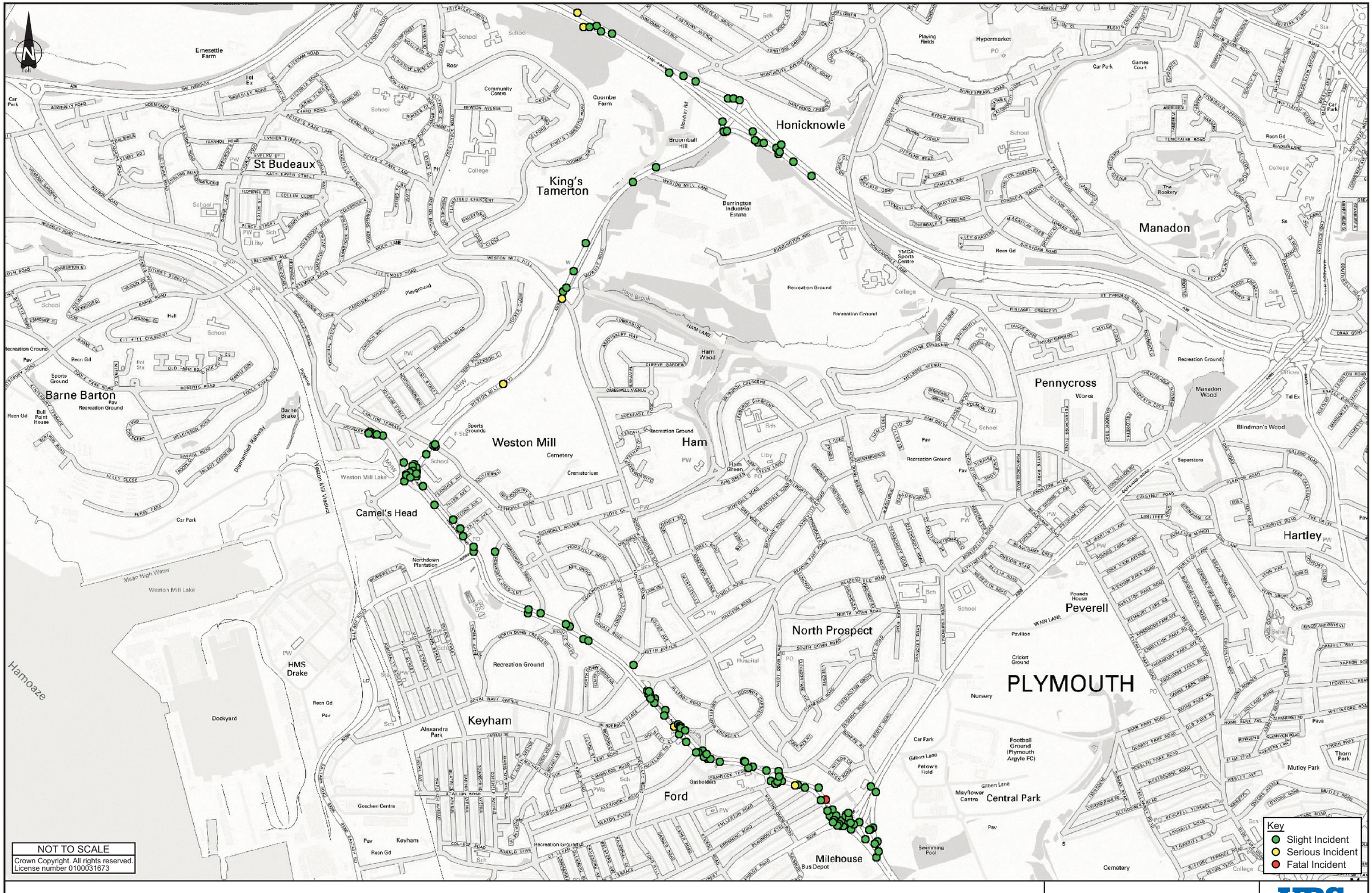
MVV Umwelt

Figure 5.6

URS

Scott Wilson

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\PIA Study Area.FH11.1



Accident Locations

MVV Umwelt

URS Scott Wilson

Figure 5.7

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\PIA Plot.FH11.1

6 Trip Generation and Distribution

6.1 Background

6.1.1 As a pre cursor to the preparation of this TA, a Technical Note was prepared to set out the detailed trip generation and distribution methodologies which have since been employed in this TA. The Technical Note was submitted to both PCC and the HA.

6.1.2 The Technical Note was prepared in consultation with MVV and sought to definitively establish the basis for the traffic movements which will be associated with the EfW CHP facility. The findings of the Technical Note have been summarised below and form the basis of the associated operational and capacity assessments presented herein. A full copy of the Technical Note is included at **ANNEX D**.

6.2 Notes

6.2.1 The Technical Note included a precautionary note that all of the vehicle movements presented in that note (and later in this chapter) have been taken from detailed spreadsheets, either received from MVV and / the SWDWP, or prepared by URS Scott Wilson.

6.2.2 For the purposes of the Technical Note, and this Chapter of the TA therefore, values have been output from the spreadsheets into a series of summary tables. It was therefore recognised that the column and row totals do not tally with the values presented in the respective table columns and rows in all cases. These are not mistakes, but are due to rounding.

6.2.3 From the perspective of this TA, rounding up the hourly values means that flow levels are always predicted to be on the higher, rather than lower side, ensuring that the associated assessment(s) are robust.

Example

To provide an example, ***TABLE 6.6*** *of this Chapter, presented under the sub-heading 'Commercial Waste Vehicle Deliveries' presents information regarding the number of bulked vehicles associated with C&I waste. Taking the associated trips by hour, indicates that there will be 1 delivery each hour, between 0800-1600. This therefore indicates that there will be 10 deliveries.*

In real terms, the calculations have actually identified that there will be less than one delivery each hour, but that this value has been rounded up. Thus, the total presented in the table is 7.

6.3 Vehicle Generation

6.3.1 The EfW CHP facility will receive up to 265,000 tonnes per annum of waste throughout its operational life, but, as described in Section 2, it is expected that the actual tonnages will be 245,000 per annum and that the respective proportions of MSW and C&I waste may vary over time.

6.3.2 Notwithstanding this, all respective trip estimates presented as part of this TA have been based on the full allocation of 265,000 tonnes, to ensure that a robust assessment is undertaken.

Municipal Waste Vehicle Deliveries

6.3.3 MSW trips have been calculated using observed weighbridge data, supplied by the SWDWP for September and November 2009, and February, October and December 2010.

6.3.4 The weighbridge data detailed the number of vehicles that were recorded at the various weighbridges serving Plymouth City Council, Torbay Council and Devon County Council. The figures supplied by the SWDWP were derived using the following datasets:

- Movements resulting from the delivery of Plymouth City Council's non-recycled waste;
- Movements resulting from the delivery of Torbay Council's non-recycled waste;
- Movements resulting from the delivery of West Devon, Teignbridge and South Hams non-recycled waste; and,
- Movements resulting from the delivery of Devon County Council's Household Waste Recycling Centres (HWRCs) non-recycled waste.

6.3.5 Only non-recycled waste (also known as residual waste) will be treated at the EfW CHP facility. Vehicles collecting recyclable materials were therefore not included in the assessment as they will continue to deliver to their current delivery points. Weighbridge data provided by the SWDWP from the current disposal points for those vehicles delivering non-recycled waste was therefore used as the basis for the trip generation analysis. This MSW data was subsequently interrogated by URS Scott Wilson such that the figures could be corroborated.

6.3.6 The SWDWP data has been used as the basis for the forecast of traffic movements for 2014, as the proposed opening year of the EfW CHP facility operation and the associated assessment year of the TA. From analysing the SWDWP data, it is apparent that the predicted peak in waste collection and thus delivery occurs between Monday and Thursday, as shown in **TABLE 6.1** below.

TABLE 6.1 2014 Predicted MSW Vehicle Deliveries

Day	Devon District Bulker	Torbay RTS Bulker	Devon Hookloader CA	South Hams RCV	PCC Hookloader	PCC RCV	Total per Day
Monday	14	6	1	4	17	39	**81**
Tuesday	12	7	1	3	19	38	**80**
Wednesday	14	8	1	3	19	37	**82**
Thursday	12	7	1	6	20	39	**84**
Friday	12	7	1	3	18	7	**47**
Saturday	3	1	1	0	19	1	**24**
Sunday	0	0	2	0	17	0	**19**

Please note there may be some small discrepancies in the 'total' calculations due to rounding (refer to Section 6.2)

6.3.7 Further analysis of the observed Monday, Tuesday, Wednesday and Thursday data has allowed average MSW data to be estimated for these four busiest days, for 2014, thereby representing the predicted level of hourly MSW trips that the EfW CHP facility will generate.

These delivery movements, as provided by the SWDWP, are summarised in **TABLE 6.2** below and take into account the change in journey times relating to the redistribution of trips on the highway network.

TABLE 6.2 2014 Predicted Average MSW Vehicle Deliveries, by Hour

Time	Devon District Bulker	Torbay RTS Bulker	Devon Hookloader CA	South Hams RCV	PCC Hookloader (CM & PR)	PCC Hookloader WM CA	PCC RCV	Total MSW Deliveries per hour
08:00-09:00	1	1	0	0	2	0	0	**4**
09:00-10:00	0	1	0	0	1	0	2	**5**
10:00-11:00	0	1	0	0	2	0	8	**12**
11:00-12:00	2	1	0	1	1	0	6	**11**
12:00-13:00	1	1	0	0	2	0	2	**7**
13:00-14:00	1	1	0	1	1	0	6	**10**
14:00-15:00	2	1	0	2	3	0	10	**17**
15:00-16:00	2	1	0	0	3	1	3	**9**
16:00-17:00	1	1	0	0	1	0	0	**3**
17:00-18:00	2	0	0	0	0	0	0	**2**
18:00-19:00	1	0	0	0	0	0	0	**1**
Total	**13**	**6**	**1**	**4**	**16**	**3**	**38**	**81**

Please note there may be some small discrepancies in the 'total' calculations due to rounding (refer to Section 6.2)

6.3.8 The analysis has therefore identified that the EfW CHP facility is predicted to generate 81 MSW deliveries on average, on a daily basis. During the morning peak hour (0800-0900), on average, four vehicle deliveries will be generated. In the evening peak hour (1600-1700), on average, three vehicle deliveries will be generated.

Commercial Waste Vehicle Deliveries

6.3.9 The maximum quantum of waste that can be processed at the EfW CHP facility (per year) has been provided by MVV and is 265,000 tonnes. This total volume has subsequently been divided between MSW and C&I waste, as summarised in **TABLE 6.3**, based on information provided by the SWDWP.

TABLE 6.3 2014 Waste Processing Volumes at the EfW CHP Facility (in Tonnes)

Waste Processing Volumes	
MSW	168429
C&I	96571
Total	265000

6.3.10 MVV has advised that it anticipates that approximately 60% of the C&I waste will be transported by 8 tonne vehicles (RCVs) and that the remaining 40% will travel by 22.5 tonne vehicles (bulked). This information is derived from the professional experience of MVV employees and from recent discussions with waste management companies collecting C&I waste in the South West of England. The precise split between RCVs and bulkers will not be known until the EfW CHP facility becomes operational and begins receiving C&I waste. For this reason a considered estimate has been made for the purposes of this TA. The corresponding tonnage carried by these vehicles is shown below in **TABLE 6.4**.

TABLE 6.4 2014 Approximate C&I Waste at the EfW CHP Facility, by Vehicle Type (in Tonnes)

C&I Waste	
Total C&I	96571
60% of waste will travel by 8 tonne vehicles	57943
40% of waste will travel by 22.5 tonne vehicles	38628

6.3.11 In order to quantify the number of commercial vehicles which will be generated by the EfW CHP facility it is necessary to define the average payload of the vehicles.

6.3.12 For bulked vehicles, a commercial operator stated that their average payload for an arctic delivering residual waste (either C&I or municipal) would be 22-23 tonnes per load. 22.5 tonnes for bulked vehicles has therefore been assumed. Smaller RCV type vehicles will have a payload of between 7 and 9 tonnes depending on the operator. The assumed payload has therefore been taken as being 8 tonnes.

6.3.13 Applying these payloads subsequently allowed the average daily number of delivery loads to be estimated, as shown below in **TABLE 6.5**. It should be noted that C&I waste deliveries are only expected to occur during weekdays and the application of this assumption therefore represents a worst-case by concentrating these movements during these times.

TABLE 6.5 2014 Average Daily C&I Deliveries

	Based upon 8 tonne loads	Based upon 22.5 tonne loads	Total movements
Annual Tonnage	57943	38628	-
Average Annual Loads	7243	1717	-
Average Weekly Loads (49 operational weeks)	148	35	-
Average Daily Loads (5 operational days)	30	7	**37**

6.3.14 In order to inform the trip generation and traffic modelling calculations and to consider a worst case scenario, a profile of arrivals and departures for C&I waste traffic has been calculated by applying the inverse profile of the observed municipal waste deliveries.

6.3.15 This is to say that when there are less municipal waste deliveries, there will be a corresponding increase in the number of C&I waste deliveries. Additionally, it has been assumed that no C&I waste traffic will be accepted into the site either before 8am, or after 6pm. In reality, it may also

be the case that no C&I deliveries will be made during the peak hours, and it is understood that MVV intend to have a variable pricing mechanism for C&I waste to discourage peak time deliveries. This assumption has not been included within this analysis, to ensure a robust assessment is undertaken.

6.3.16 **TABLE 6.6** presents the average delivery profile for C&I Waste, for 2014.

TABLE 6.6 2014 Predicted Average C&I Vehicle Deliveries, by Hour

Time	RCV	Bulked	Total
08:00-09:00	3	1	**4**
09:00-10:00	3	1	**4**
10:00-11:00	3	1	**3**
11:00-12:00	3	1	**4**
12:00-13:00	3	1	**4**
13:00-14:00	3	1	**4**
14:00-15:00	3	1	**3**
15:00-16:00	3	1	**4**
16:00-17:00	3	1	**4**
17:00-18:00	3	1	**4**
18:00-19:00	0	0	**0**
Total	**30**	**7**	**37**

Please note there may be some small discrepancies in the 'total' calculations due to rounding (refer to Section 6.2)

6.3.17 The analysis identifies that the EfW CHP facility is predicted to generate 37 C&I deliveries on average, on a daily basis. During both the morning and evening peak hours (0800-0900 and 1600-1700), on average four vehicle deliveries are expected to be generated.

Raw Material Inputs & Residual Material Outputs

6.3.18 In addition to the waste deliveries that will be associated with the EfW CHP facility, there are a number of inputs required to keep the plant in operation and a number of outputs from the plant that will generate traffic.

6.3.19 Inputs include chemical deliveries and outputs include Incinerator Bottom Ash (IBA) and Air Pollution Control Residues (APCR). It is also predicted that there will be a small amount of rejected waste (i.e. waste delivered to the EfW CHP facility that cannot be processed in the plant, e.g. gas bottles incorrectly put into wheelie bins by residents).

IBA & APCR

6.3.20 It is assumed that the plant will operate 8,000 hours per year. Of the waste combusted, MVV have calculated based on other operational plants that 24% by weight will form IBA and 3.5% by weight will form APCR. **TABLE 6.7** outlines the estimated output of IBA and APCR.

TABLE 6.7 IBA and APCR Average Outputs

Output	Annual Tonnage	Hourly Tonnage	Daily Tonnage	Weekly Tonnage
IBA output	63,600	7.95	190.80	1335.60
APCR output	9,275	1.16	27.83	194.78

6.3.21 Whilst IBA and APCR outputs will be generated by the EfW CHP facility 24 hours per day, seven days a week, due to the continual operation of the EfW CHP facility, it is anticipated that collection of the materials will only take place during normal operating hours. Whilst collections could therefore occur on any day during operation hours, it has been assumed that these collections will all take place over the five day working week, to ensure a worst-case assessment. **TABLE 6.8** below therefore summarises the tonnage of these outputs, per day, that will be available for collection and removal from site.

TABLE 6.8 IBA and APCR Average Collections (Daily), in Tonnes

Output	Days / Week	Tonnes / Day
IBA output	5	267
APCR output	5	39

6.3.22 **TABLE 6.9** shows the resultant number of HGV's associated with the export of IBA and APCR from the site, based on an estimated average vehicle capacity of 20 tonnes.

TABLE 6.9 IBA and APCR Average Collections per Day

Output	Load in Tonnes	Loads / Day	Loads / Hour
IBA output	20	13.36	1.67
APCR output	20	1.95	0.19

6.3.23 For the IBA, the departure profile has been based on the predicted MSW delivery profile, and has assumed an 8 hour day (0800-1600). With respect to the two daily APCR departures it has been assumed that these will occur in the two peak hours, to ensure a robust assessment, although it is most likely that these trips will occur outside of these times. The resultant IBA and APCR collection trips are summarised below in **TABLE 6.10**.

TABLE 6.10 2014 Predicted Average IBA and APCR Vehicle Collections, by Hour

Time	IBA	APCR	Total
08:00-09:00	1	1	**2**
09:00-10:00	1	0	**1**
10:00-11:00	2	0	**2**
11:00-12:00	2	0	**2**
12:00-13:00	1	0	**1**
13:00-14:00	2	0	**2**
14:00-15:00	3	0	**3**
15:00-16:00	2	0	**2**
16:00-17:00	0	1	**2**
17:00-18:00	0	0	**0**
18:00-19:00	0	0	**0**
Total	**13**	**2**	**15**

Please note there may be some small discrepancies in the 'total' calculations due to rounding (refer to Section 6.2)

6.3.24 The analysis identifies that the EfW CHP facility is predicted to generate 15 vehicle collections on average, on a daily basis. During the morning and evening peak hours (0800-0900 and 1600-1700 respectively), on average two vehicle collections will be generated.

6.3.25 It is recognised that these residues will be created at the facility throughout the day, suggesting that a 'flat' vehicle collection profile could be applied. In light of this, PCC identified that it could be assumed that 2 vehicle collections would be generated, every hour. Whilst this has been noted, the method employed has not been adjusted as 2 vehicle collections have been calculated as arising in both the AM and PM peak hours, which are the assessment hours considered as part of this TA.

Rejected Waste

6.3.26 It is likely that some of the waste that is delivered to the facility will not be accepted because it is not treatable in the facility. MVV has calculated that 1,700 tonnes of waste will be rejected every year, on this basis.

6.3.27 If the waste is transported by HGV (capacity of 9 tonnes), this would equate to approximately 189 trips a year, providing that each of the vehicles are full. Assuming a 51 week working year, 3.7 trips will be generated per week, with 0.6 one way trips a day (assuming a 6 day week).

6.3.28 Subsequently, this quantum of trips has not been deemed to be significant in transport terms and has therefore not been included within this assessment, bearing in mind that these trips are unlikely to occur during the peak hours and the other assumptions that have already been made to ensure that the assessment is robust.

Material Deliveries

6.3.29 In addition to the waste volumes delivered to the EfW facility and the removal of 'arisings' (as discussed above), there will be some deliveries of materials needed to operate and maintain the facility, for example sodium bicarbonate, activated carbon and urea.

6.3.30 MVV has calculated that the materials delivered will be approximately 4,600 tonnes per year. Further information is provided in **TABLE 6.11** below.

TABLE 6.11 Approximate Material Deliveries

Material Input	Tonnage Used				Deliveries	
	Annual	Hourly	Weekly	Per day	Vehicle Capacity (Tonnes)	Loads/wk
Bicarbonate	4084	0.51	85.77	12.25	25	**3.43**
Activated Carbon	199	0.02	4.18	0.59	20	**0.21**
Urea	304	0.04	6.38	0.91	20	**0.32**
HCl	30	0.01	0.64	0.09	10	**0.06**
NaOH	11	0.01	0.24	0.03	10	**0.02**
Total	**4628**					**4.04**

6.3.31 These inputs will be delivered in vehicles with between a 10 and 25 tonne capacity (as shown above). There will therefore be approximately 4 deliveries per week. This equates to approximately 0.58 one way trips a day, over 7 days. Subsequently, this quantum of trips has not been deemed to be significant in transport terms and has therefore not been included within this assessment bearing in mind that these trips are unlikely to occur during the peak hours and the other assumptions that have already been made to ensure that the assessment is robust.

Staff Vehicle Movements

6.3.32 In addition to the inputs and outputs that will be associated with the processing of waste at the proposed EfW CHP facility, a number of staff will also be based at the site. As such, these staff members will need to travel to and from the site, in order to undertake their tasks and the associated movements have therefore been estimated.

6.3.33 The staffing level of the site has been calculated by MVV as being 31.5 full time equivalent staff (35 actual staff), made up of:

- Management / Admin / Maintenance Staff – 13 full time
- Tipping Hall Supervisors / Weighbridge Operators – 7 part time (3.5 full time equivalent)
- Waste Plant Operators – 15 full time (covering 3 shifts (06:00-14:00, 14:00-22:00 and 22:00-06:00))

6.3.34 A number of the Tipping Hall Supervisors / Weighbridge Operators will need to be on site prior to the opening time of 08:00. As such, it has been assumed that 3 staff members will arrive between 07:00-08:00 with the other staff (4) arriving between 08:00-09:00. This assumption therefore ensures that appropriate staff movements are included within the peak hour.

6.3.35 In terms of departures from the site, the part time shift (Tipping Hall Supervisors) is understood to finish at 15:30, meaning that the part time staff are assumed to leave the site between 15:00-16:00. The remaining Weighbridge operators are assumed to leave the site between 16:00-17:00.

6.3.36 The full time staff (Management / Admin / Maintenance) have also been assumed to arrive either between 07:00-08:00 or 08:00-09:00, based on the same assumptions presented above. Meaning that 6 arrivals are expected between 07:00-08:00 and 7 between 08:00-09:00. These staff are expected to leave the site between 16:00-17:00 and 17:00-18:00 respectively.

6.3.37 Waste Plant Operators have been assumed to arrive to site the hour prior to their shift commencing (and conversely depart the site the hour following their shift ending).

6.3.38 A full summary of the estimated staff movements is provided below at **TABLE 6.12**.

TABLE 6.12 Estimated Staff Arrival and Departure Movements

Time	Arrivals	Departures
05:00-06:00	5	
06:00-07:00		5
07:00-08:00	(6+3) = 9	
08:00-09:00	(7+4) = 11	
09:00-10:00		
10:00-11:00		
11:00-12:00		
12:00-13:00		
13:00-14:00	5	
14:00-15:00		5
15:00-16:00		4
16:00-17:00		(6+3) = 9
17:00-18:00		7
18:00-19:00		
19:00-20:00		
20:00-21:00		
21:00-22:00	5	
22:00-23:00		5
Total	**35**	**35**

6.3.39 Of the 31.5 full time equivalent staff (35 actual members of staff), it has thus been assumed that all staff will arrive on site during the course of the day, and then leave again (taking into account shift patterns), resulting in the total movement of 70 trips, to and from the site. A final summary of predicted staff trips is therefore provided in **TABLE 6.13** below.

6.3.40 It should be noted that no adjustment to staff trips has been made to take into account the possibility of car sharing or the use of sustainable modes to access the site, thereby implying that all staff will be assessed as entering and exiting the site by single-occupancy car trips. It has also been assumed that all staff will be present on site, at some point during the same day.

TABLE 6.13 Summary of Staff Movements

Time	Total
05:00-06:00	5
06:00-07:00	5
07:00-08:00	9
08:00-09:00	11
09:00-10:00	0
10:00-11:00	0
11:00-12:00	0
12:00-13:00	0
13:00-14:00	5
14:00-15:00	5
15:00-16:00	4
16:00-17:00	9
17:00-18:00	7
18:00-19:00	0
19:00-20:00	0
20:00-21:00	0
21:00-22:00	5
22:00-23:00	5
Total	**70**

6.3.41 The maximum number of employees commuting during the morning peak hour has been estimated to be 11, with 9 employees leaving the site during the afternoon peak hour.

Summary

6.3.42 The trip generation analysis presented in the Technical Note (**ANNEX D**) and summarised above has presented the predicted traffic inputs and outputs that will be associated with the typical daily operation of the proposed EfW CHP facility, in terms of vehicle trips. As such, combining each of the trips identified in the summary tables concerning MSW (**TABLE 6.2**), C&I (**TABLE 6.6**), IBA & APCR (**TABLE 6.10**) and Staff (**TABLE 6.13**) allows the combined trip generation estimates to be established.

6.3.43 It should be noted however, that a distinction has been made between the types of trips that will be associated with the EfW CHP facility, for the purposes of preparing the Technical Note and the information presented herein.

6.3.44 All HGV trips referred to relate to deliveries (or collections). As such, for every delivery (or collection) trip that arrives at the EfW CHP facility, a corresponding departure trip will take place. For assessment purposes, it has been assumed that the associated arrival and departure trips will always occur in the same hour.

6.3.45 In all cases, only the arrival trip (delivery or collection) has been reported. The combined average hourly HGV trips are therefore summarised below at **TABLE 6.14** (at the end of this section). In the first instance, HGV trips have been based on the information presented above and therefore indicate the average predicted number of arrival trips which will occur at the EfW CHP. Two-way movements are also presented in the summary table however, for clarity.

6.3.46 Staff vehicle movements have been presented, however, by arrival and departure, as the two constituent parts of each of these trips will not be expected to occur during the same hour. These trip estimates are replicated in the table below.

6.3.47 Finally, the combined total number of hourly trips expected to be associated with the EfW CHP facility is summarised in the table.

6.3.48 As indicated, on average the EfW CHP facility will be expected to generate 11 staff movements and 9 waste deliveries / collections (18 two-way movements) in the AM Peak. Thus the total trip generation of the EfW CHP facility in the AM peak is predicted to be 29 trips.

6.3.49 On average the EfW CHP facility will be expected to generate 9 staff movements and 8 waste deliveries / collections (16 two-way movements) in the PM Peak. Thus the total trip generation of the EfW CHP facility in the PM peak is predicted to be 25 trips.

TABLE 6.14 2014 Combined Average Hourly Trip Generation Predictions

Time	HGV Based on Chapters 2-6	HGV (Two-Way Movements)	Staff	Combined Total Based on Two-Way HGV Movements)
05:00-06:00	0	0	5	5
06:00-07:00	0	0	5	5
07:00-08:00	0	0	9	9
08:00-09:00	9	18	11	29
09:00-10:00	10	20	0	20
10:00-11:00	17	34	0	34
11:00-12:00	16	32	0	32
12:00-13:00	12	24	0	24
13:00-14:00	15	30	5	35
14:00-15:00	23	46	5	51
15:00-16:00	15	30	4	34
16:00-17:00	8	16	9	25
17:00-18:00	6	12	7	19
18:00-19:00	1	2	0	2
19:00-20:00	0	0	0	0
20:00-21:00	0	0	0	0
21:00-22:00	0	0	5	5
22:00-23:00	0	0	5	5
Total	**132**	**264**	**70**	**334**

Please note there may be some small discrepancies in the 'total' calculations due to rounding (refer to Section 6.2)

6.4 Vehicle Distribution

6.4.1 In order to assess the implications of the traffic movements, that are predicted to be associated with the proposed EfW CHP facility, it is necessary to estimate the distribution of the vehicle trips, across the local highway network.

6.4.2 Based on the type of vehicle trips that have been identified as being associated with the EfW CHP facility (presented above), distributions have therefore been calculated and are presented in this section of the report. It should be noted that in all cases, the same routes for arriving and departing vehicles has been assumed.

MSW

6.4.3 Information provided by the SWDWP has been used to establish the distribution of municipal waste traffic arriving from each waste authority, on both a vehicle by vehicle and day by day basis. As such, the distribution has been based on the same information used to derive the average trip generation of the facility, as discussed previously.

6.4.4 In establishing the distribution of MSW, the SWDWP has made the following assumptions:

- Apart from PCC RCV's and PCC Hookloaders from Weston Mill recycling site, all other vehicles will approach the EfW from the A38 and A3064 St. Budeaux by-pass.
    - Of the vehicles approaching the site from the A38, given the relative location of the EfW CHP facility, it is assumed that all A38 vehicles will be travelling to and from the east.
- The PCC RCV vehicles have been distributed according to crew and daily routes, accessing the proposed facility either from Wolseley Road west, B3396 Saltash Road, A3064 Wolseley Road east, or the A3064 St. Budeaux by-pass.
- PCC Hookloaders from Weston Mill recycling site are assumed to travel along Carlton Terrace, turning onto the A3064 St. Budeaux by-pass.

6.4.5 As the information provided by the SWDWP regarding distribution relates to a day-by-day basis, an average distribution of the Monday to Thursday municipal waste traffic was calculated and used to inform the distribution of the average trips, presented above, as these were the busiest days. As such, **TABLE 6.15** presents the resulting percentage distribution, on a vehicle by vehicle basis.

TABLE 6.15 Municipal Waste Average Distribution

Route	Devon District Bulker	Torbay RTS Bulker	Devon Hookloader CA	South Hams RCV	PCC Hookloader (CM & PR)	PCC Hookloader WM CA	PCC RCV
A386, A3064, Wolseley Road E	0%	0%	0%	0%	0%	0%	35%
B3396, A3064, Wolseley Road E	0%	0%	0%	0%	0%	0%	8%
A38, A3064, Weston Mill Drive	100%	100%	100%	100%	100%	0%	40%
Carlton Terrace, Weston Mill Drive	0%	0%	0%	0%	0%	100%	0%
Wolseley Road W	0%	0%	0%	0%	0%	0%	6%
A3064, Wolseley Road E	0%	0%	0%	0%	0%	0%	11%

C&I Waste

6.4.6 As discussed, 60% of the C&I waste is expected to be transported in RCV's and 40% by bulk.

6.4.7 The C&I waste distribution has subsequently been calculated according to the municipal waste distribution, according to the following assumptions:

- C&I RCV's will follow the same distribution as PCC RCV's
- C&I bulk vehicles will travel along the A38 and St Budeaux by-pass

- Based on the population locations in the south-west, it has been assumed for the purposes of this TA that 90% of the A38 related traffic will travel to and from the east, with the remaining 10% travelling to and from the west

Residual Waste

6.4.8 It has been assumed that all residual waste vehicles (e.g. IBA and APCR) will follow the same distribution pattern as the C&I bulk vehicles, travelling along the A38 and St Budeaux by-pass.

Staff

6.4.9 The distribution of staff trips has been established using 2001 Census journey-to-work data for those people travelling to the Devonport Ward for work. The data indicates that there are approximately 6,357 car driver trips to the Devonport ward, from a total of 62 surrounding wards.

6.4.10 The anticipated route of these car trips to the Devonport ward was established using an internet based route finder, coupled with local knowledge. As such, **TABLE 6.16** presents the anticipated distribution of staff trips, based on the Census 2001 journey-to-work data.

TABLE 6.16 Staff Distribution – Census Data

Direction	Journey-to-work Data (Car Driver Trips)	Proportional Distribution
A38 W	696	11%
A38 E	3361	53%
A3064 W	234	4%
A3064 E	2066	32%
TOTAL	**6357**	**100%**

Application

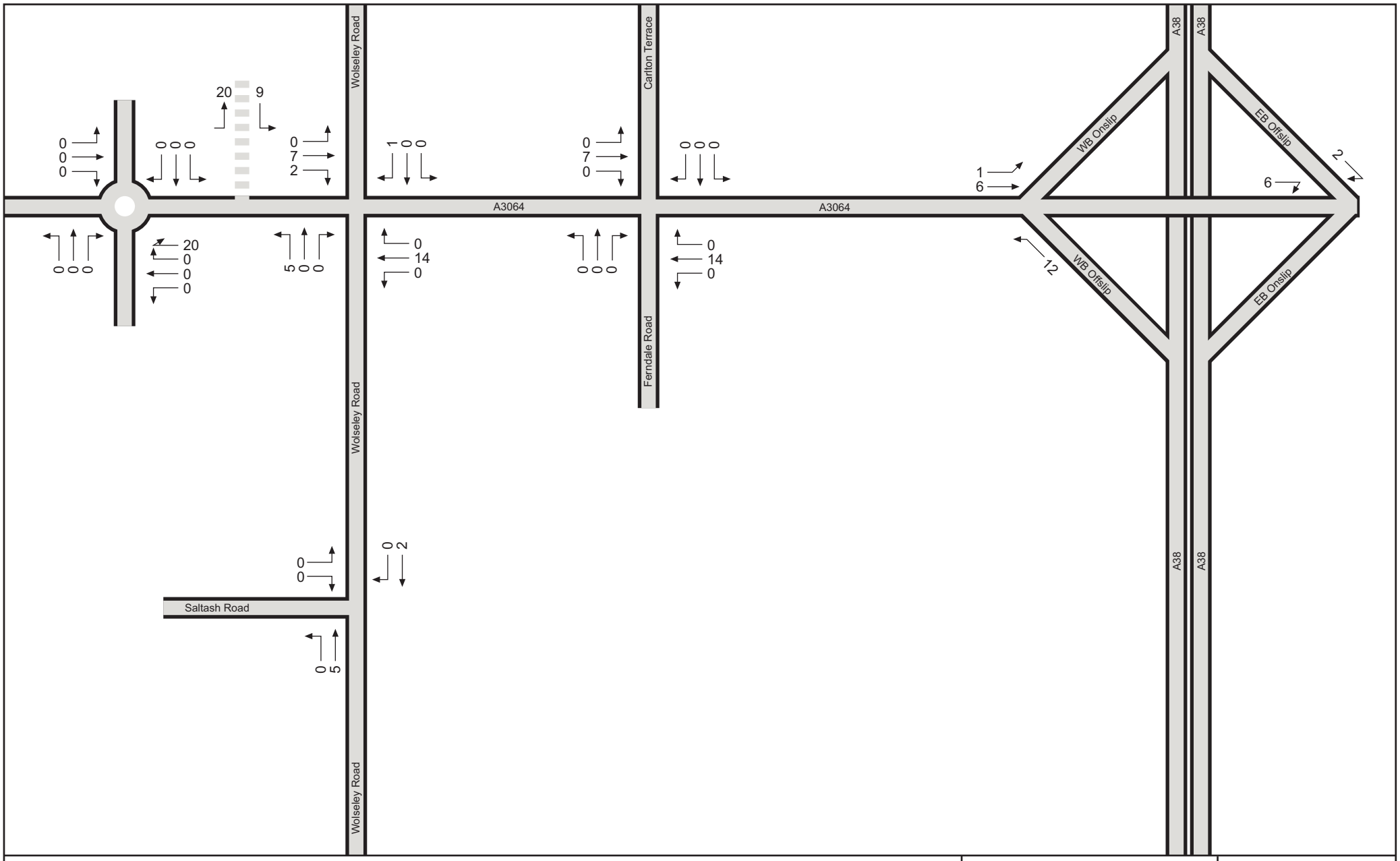
6.4.11 As a result of the above analysis, the distribution(s) have been applied to the total estimated trip generation data presented above, such that the estimated vehicle movements can be considered in relation to the local highway network.

6.4.12 Turning Movement diagrams have therefore been prepared, illustrating the proposed traffic movements for the AM and PM peak hours. These diagrams are shown at **FIGURES 6.1** and **6.2**.

6.5 Supplementary Information

6.5.1 In preparing this TA, URS Scott Wilson and MVV have consulted with PCC and the HA extensively, throughout the process. In light of this, it is noted that regarding some matters, supplementary information has been requested. The following additional information is therefore provided to accompany the TA, at the following locations:

- Alternative Modes – **ANNEX C**
- Construction Traffic – **ANNEX E**
- Framework Staff Travel Plan – **ANNEX F**
- Sensitivity Analysis – **ANNEX G**
- Waste Travel Time – **ANNEX G**



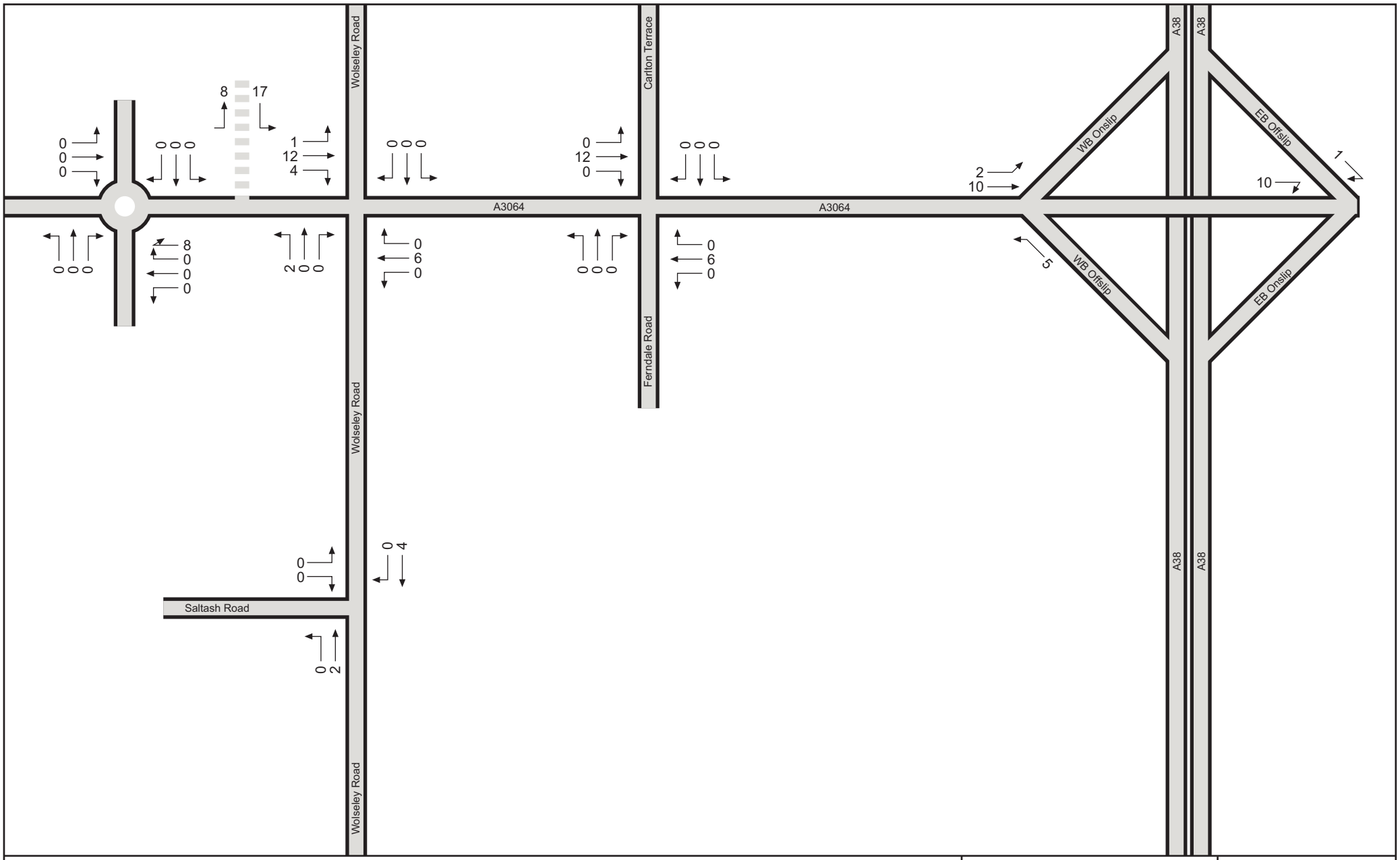
Proposed Development Flows AM
0800 - 0900

MVV Umwelt

URS Scott Wilson

Figure 6.1

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1



Proposed Development Flows PM
1600 - 1700

MVV Umwelt

URS Scott Wilson

Figure 6.2

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1

7 Operational Assessment

7.1 Local Highway Network – 2014 Do Minimum & Do Something

7.1.1 In order to consider the future operation of the junctions located within the study area, given that the observed traffic flows were recorded during 2010, traffic growth factors have been derived to establish the 2014 Do Minimum scenario, as 2014 is predicted opening year of the EfW CHP facility.

7.1.2 As previously, traffic growth factors have been calculated using the Government's TEMPRO database (dataset 5.4), and adjusted by the National Transport Model (NTM 2010) in accordance with the TEMPRO guidance note (April 2006). The resultant growth factors are presented in **TABLE 7.1** below.

TABLE 7.1 Traffic Growth Factor Calculations (2010 – 2014)*

Time Period	Local TEMPRO	National TEMPRO	NTM	Growth Factor
AM	1.053	1.042	1.025	**1.036**
PM	1.052	1.042	1.025	**1.035**

*Please note, there may be small discrepancies in the calculations presented, due to rounding

7.1.3 These growth factors have been applied to the observed traffic flows and the resultant 2014 Do Minimum turning movements are illustrated in **FIGURES 7.1** and **7.2** for the AM and PM peaks respectively.

7.1.4 Consultation with PCC and the HA as part of the preparation of this TA has identified that there no 'committed developments' (i.e. developments which have been granted planning permission but have not yet been built / occupied) located in the vicinity of the proposed EfW CHP facility. Thus, traffic relating to committed developments has not needed to be included within the Do Minimum scenario referred to above.

7.1.5 Discussions with PCC have indicated however, that there are two 'potential developments' which may come forward in the future. These are the Royal Marines Landing Craft Co-Location Project and the Weston Mill Local Centre Project. In light of this, and in response to PCC's request, a sensitivity assessment has been undertaken to include the traffic that may be associated with these developments. Further information regarding this sensitivity assessment is presented at **ANNEX G**.

7.1.6 Regarding the 2014 Do Minimum scenario, operational assessments have been undertaken for the AM and PM peaks, with the results being presented below. In each case, comparative results are also presented for the 2014 Do Something scenario which represents the 2014 Do Minimum traffic plus the addition of EfW CHP facility related traffic. The associated turning movement diagrams are presented at **FIGURES 7.3** and **7.4** for the 2014 Do Something scenarios.

Wolseley Road / Saltash Road – 2014 Scenarios

7.1.7 The 2014 Do Minimum and 2014 Do Something junction model results are presented below at **TABLES 7.2** and **7.3**.

TABLE 7.2 Wolseley Road / Saltash Road – 2014 Do Minimum

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Wolseley Rd N Ahead	62.7	11.6	47.6	5.9
Wolseley Rd N Right	89.1	22.3	88.7	12.5
Wolseley Rd S Ahead + Left	83.2	7.0	83.0	8.7
Wolseley Rd S Ahead	81.9	6.8	81.2	8.4
Saltash Rd Left	28.3	2.0	85.3	13.8
Saltash Rd Right	8.7	0.5	11.2	0.6
Cycletime (secs)	81		62	
Practical Reserve Capacity (PRC)	89.0%		88.5%	

TABLE 7.3 Wolseley Road / Saltash Road – 2014 Do Something

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Wolseley Rd N Ahead	63.0	11.7	48.7	6.1
Wolseley Rd N Right	89.2	22.4	87.4	11.9
Wolseley Rd S Ahead + Left	84.3	7.3	87.1	9.4
Wolseley Rd S Ahead	83.4	7.2	87.3	9.6
Saltash Rd Left	28.4	2.0	81.9	11.9
Saltash Rd Right	8.7	0.5	11.0	0.6
Cycletime (secs)	81		61	
Practical Reserve Capacity (PRC)	89.1%		87.1%	

7.1.8 In both cases, the LINSIG analysis confirms that the junction is predicted to operate within the recommended capacity thresholds, utilising optimised signal cycletimes.

7.1.9 The predicted differences in operation between the respective Do Minimum and Do Something scenarios are marginal, with queue levels expected to be very similar, between the two cases.

Wolseley Road / Weston Mill Drive – 2014 Scenarios

7.1.10 The 2014 Do Minimum and 2014 Do Something junction model results are presented below at **TABLES 7.4** and **7.5**.

TABLE 7.4 Wolseley Road / Weston Mill Drive – 2014 Do Minimum

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Wolseley Rd N Ahead + Left	85.2	8.2	89.7	8.5
Wolseley Rd N Ahead + Right	83.5	8.6	88.5	8.9
Weston Mill Dr Left	88.3	8.5	52.4	8.2
Weston Mill Dr Ahead + Left	87.9	8.7	43.5	1.7
Weston Mill Dr Ahead + Right	69.8	4.9	44.4	2.3
Wolseley Rd S Ahead + Left	72.4	6.2	85.8	15.2
Wolseley Rd S Right	65.8	5.3	86.6	15.6
Dockyard Ahead + Left	24.2	1.1	88.9	11.0
Dockyard Right	23.5	1.1	25.9	2.1
Cycletime (secs)	67		84	
Practical Reserve Capacity (PRC)	88.1%		89.6%	

TABLE 7.5 Wolseley Road / Weston Mill Drive – 2014 Do Something

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Wolseley Rd N Ahead + Left	87.9	8.4	89.7	8.5
Wolseley Rd N Ahead + Right	88.3	9.5	88.5	8.9
Weston Mill Dr Left	89.6	8.7	57.9	9.4
Weston Mill Dr Ahead + Left	89.8	9.2	43.3	2.0
Weston Mill Dr Ahead + Right	68.6	4.8	45.4	2.3
Wolseley Rd S Ahead + Left	76.1	6.3	89.1	16.2
Wolseley Rd S Right	69.4	5.4	89.4	16.4
Dockyard Ahead + Left	26.0	1.2	86.5	10.4
Dockyard Right	24.4	1.1	26.1	2.2
Cycletime (secs)	65		84	
Practical Reserve Capacity (PRC)	89.8%		89.6%	

7.1.11 In both cases, the LINSIG analysis confirms that the junction is predicted to operate within the recommended capacity thresholds, utilising optimised signal cycletimes.

7.1.12 The predicted differences in operation between the respective Do Minimum and Do Something scenarios are marginal, with queue levels expected to be very similar, between the two cases. This relates to both PCC's adopted highway network, as well as the MoD's internal access road, which connects the signalised cross-road junction to the Camel's Head roundabout.

Weston Mill Drive / Carlton Terrace – 2014 Scenarios

7.1.13 The 2014 Do Minimum and 2014 Do Something junction model results are presented below at **TABLES 7.6** and **7.7**.

TABLE 7.6 Weston Mill Drive / Carlton Terrace – 2014 Do Minimum

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Carlton Terrace	68.8	3.7	50.3	3.8
Weston Mill Dr E Ahead + Left	88.1	11.9	89.7	14.8
Weston Mill Dr E Ahead + Right	89.9	13.5	90.1	16.2
Ferndale Rd	75.7	4.3	90.8	9.9
Weston Mill Dr W Ahead + Left	82.8	7.6	89.9	20.0
Weston Mill Dr W Ahead + Right	83.4	8.1	88.8	20.3
Cycletime (secs)	55		120	
Practical Reserve Capacity (PRC)	89.9%		90.9%	

TABLE 7.7 Weston Mill Drive / Carlton Terrace – 2014 Do Something

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Carlton Terrace	70.0	3.8	50.3	3.8
Weston Mill Dr E Ahead + Left	87.9	12.3	91.4	15.7
Weston Mill Dr E Ahead + Right	87.8	13.1	91.8	17.1
Ferndale Rd	77.1	4.5	90.8	9.9
Weston Mill Dr W Ahead + Left	85.9	8.3	90.6	20.4
Weston Mill Dr W Ahead + Right	86.8	8.9	90.1	21.3
Cycletime (secs)	56		120	
Practical Reserve Capacity (PRC)	87.7%		92.0%	

7.1.14 In the AM peak, the LINSIG analysis confirms that the junction is predicted to operate within the recommended capacity thresholds, utilising optimised signal cycletimes.

7.1.15 In the PM peak, the operation of the junction is reported as being slightly in excess of the optimum threshold of 90%, in both the 2014 Do Minimum (without EfW CHP facility) and 2014 Do Something (with EfW CHP facility) scenarios.

7.1.16 The predicted differences in operation between the Do Minimum and Do Something are marginal however, with queue levels expected to be very similar, between the two cases.

7.2 Strategic Highway Network 2014 Do Minimum & Do Something

7.2.1 In addition to the consideration of the local highway network, discussions with the HA also indicated that the TA should consider the relative implications of the proposed EfW CHP facility on the operation of their highway network at the A38, as discussed at **SECTION 5**.

7.2.2 As such, a comparison of the 2014 Do Minimum and Do Something flows has been undertaken and the results of this analysis are presented below at **TABLE 7.8**.

TABLE 7.8 Strategic Highway Network – 2014 Do Minimum / Do Something Comparison

Approach	AM (0800-0900)			PM (1600-1700)		
	2014 DM	2014 DS	% Change	2014 DM	2014 DS	% Change
Weston Mill Drive / A38 WB On-slip	302	303	0.3%	873	874	0.1%
Weston Mill Drive / A38 WB Off-slip	436	448	2.8%	385	391	1.6%
Weston Mill Drive / A38 EB On-slip	448	454	1.3%	891	902	1.2%
Weston Mill Drive / A38 EB Off-slip	757	757	0.0%	316	316	0.0%

7.2.3 As indicated above, the total flow at the respective junctions has been compared for the 2014 Do Minimum and Do Something scenarios, for the two junctions (on and off slips) between Weston Mill Drive and the A38.

7.2.4 The analysis indicates that the EfW CHP facility will only lead to marginal changes in traffic flows at these junctions, during the peak hours. The largest predicted increase is estimated to be 2.8%, in the AM peak, at Weston Mill Drive / A38 Southern Junction (west bound off-slip). In this case, the increase in real terms would be equivalent to 12 additional vehicle movements, or one vehicle every five minutes.

7.3 Site Access

7.3.1 A signalised junction will be provided on the Northern Access Road, which will facilitate access to and from the proposed EfW CHP facility. The proposed signals will be linked under the existing controller, to the Wolseley Road / Weston Mill Drive junction.

7.3.2 As such, the LINSIG model which has been prepared for the aforementioned signalised cross-road junction (presented at **TABLES 7.4** and **7.5** above) has been revisited, such that the proposed access arrangements could be incorporated.

7.3.3 The results of this analysis are presented below at **TABLE 7.9** again for the 2014 Do Something (with development) scenario.

TABLE 7.9 Wolseley Road / Weston Mill Drive / Site Access – 2014 Do Something

Approach	AM (0800-0900)		PM (1600-1700)	
	Sat (%)	MMQ	Sat (%)	MMQ
Wolseley Rd N Ahead + Left	87.9	8.4	89.2	8.4
Wolseley Rd N Ahead + Right	88.3	9.5	88.9	9.0
Weston Mill Dr Left	89.8	8.7	56.2	9.0
Weston Mill Dr Ahead + Left	89.7	9.1	40.6	1.7
Weston Mill Dr Ahead + Right	71.9	5.2	50.7	2.7
Wolseley Rd S Ahead + Left	76.1	6.3	89.1	16.2
Wolseley Rd S Right	69.2	5.4	89.7	16.7
Dockyard Ahead + Left	26.0	1.2	86.5	10.7
Dockyard Right	24.4	1.1	26.1	2.0
Site Access Left	3.0	0.3	8.3	0.6
Dockyard Ahead (Exit)	11.3	0.6	29.5	3.2
Cycletime (secs)	65		84	
Practical Reserve Capacity (PRC)	89.7%		89.7%	

7.3.4 The analysis presented above indicates that the revised signalised junction complex is predicted to operate within the recommended capacity threshold in both the AM and PM peak hours, in the 2014 Do Something scenario.

7.4 Site Operation

7.4.1 As set out within **CHAPTER 2**, vehicles will enter the EfW CHP facility by way of a new junction which will provide a signalised right turn in and left turn out, located to the west of the Wolseley Road / Weston Mill Drive junction.

7.4.2 Within the site, a gatehouse will be located along the access road through which all vehicles entering / exiting the site will pass. Visitors will be expected to park at the gatehouse initially so that they can be registered and instructed on how they should proceed to their location within the site.

7.4.3 In terms of the movement of waste vehicles, the access procedure will be as follows:

- Vehicle arrives at site and passes through gatehouse;
- Vehicle stops at weighbridge;
- Security checks are undertaken and vehicle is weighed-in;
- Vehicle proceeds on to site and is unloaded / loaded;
- Vehicle returns to weighbridge and is weighed-out;

- Vehicle passes through gatehouse and exits site.

7.4.4 There will be traffic lanes provided in parallel to the weighbridge lanes that will allow vehicles not requiring to be weighed to bypass the weighbridge facility. The layout is such that the weighbridge lanes will accommodate two vehicles each, without obstructing the bypass lanes.

7.4.5 Dimensions taken from the site layout plans indicate that there is a length of approximately 165m between the weighbridge and the site access junction. It is therefore estimated that approximately 13 large vehicles, or a greater number of smaller vehicles, could be accommodated within the site and any queuing within the site is therefore not expected to impact on the external highway network.

7.4.6 In accordance with the SWDWP Output Specification for the EfW CHP facility (i.e. what MVV is required contractually to provide for the SWDWP), maximum vehicle turnaround times associated with waste delivery vehicles are prescribed and should not be exceeded. This turnaround time is based on the elapsed time between the vehicle being weighed-in and weighed-out.

7.4.7 The associated turnaround times are summarised below at **TABLE 7.10**.

TABLE 7.10 Vehicle Turnaround Times

Vehicle Type	Turnaround Time (mins)
RCV	15
Hook Loader (roll-on-off Loader)	15
Tractor Unit and Ejector Trailer (Ram Ejector)	20
Tractor Unit and Ejector Trailer (Walking Floor Ejector)	25

7.4.8 There will be five tipping bays provided at the EfW CHP facility which will be served by an additional waiting bay, should a vehicle arrive to site at a time when each of the tipping bays are occupied.

7.4.9 By definition, in each hour, each tipping bay will be available for 60 minutes of waste 'tipping'. Thus five bays allow a total of 300 minutes worth of tipping to occur, per hour.

7.4.10 In order to consider the operation of the EfW CHP facility, the maximum predicted number of HGV movements has been derived from **TABLE 6.14** which indicates that between 1400-1500, there will be 23 HGVs entering the site. Of these, three of the HGV's (**TABLE 6.10**) will be associated with IBA / APCR and will therefore not be 'tipping'.

7.4.11 Of the remaining 20 HGV's, the trip generation analysis indicates that 17 deliveries will be related to the MSW (**TABLE 6.2**) and the remaining three deliveries will be related to C&I (**TABLE 6.6**). These deliveries, by vehicle type, have subsequently been derived from their respective tables which are presented in the **CHAPTER 6**. The deliveries are replicated below, by vehicle type at **TABLE 7.11**. In absolute terms, the table indicates that there will be more than 20 deliveries. For a more detailed explanation of this, please refer to **SECTION 6.2** of this TA.

TABLE 7.11 Maximum Predicted 'Tipping' Deliveries (1400-1500)

Waste Type	Number of Deliveries	Vehicle Type	Turnaround Time (mins)	Maximum Time Taken (mins)
MSW	12	RCV	15	180
MSW	3	Hook Loader	15	45
MSW	3	Bulker	20-25	60-75
C&I	3	RCV	15	45
C&I	1	Bulker	20-25	20-25
				350-370

7.4.12 The table above has been prepared to summarise the maximum predicted number of 'tipping' deliveries which are expected to take place between 1400-1500, as the busiest hour of the day. Assuming that the maximum turnaround time is taken for every one of these vehicles, which includes travelling to and from the weighbridge, not the time spent at the tipping bay in isolation, it has been possible to estimate the absolute worst-case processing time for the associated vehicles.

7.4.13 The analysis indicates that assuming the maximum time is taken by all of the vehicles, between 350 and 370 processing minutes would be required. Bearing in mind that the five bays provide 300 minutes worth of processing time per hour, it is also noted that a waiting bay is provided, which offers an additional processing time of 60 minutes.

7.4.14 Thus, in this worst case scenario, one vehicle may be required to be held at the weighbridge for up to 10 minutes. As referred to above however, there is capacity for approximately 13 large vehicles to be held at this location, if necessary, thus any queuing within the site is therefore not expected to impact on the external highway network.

7.5 Sensitivity Assessment

7.5.1 A Sensitivity Assessment has been prepared in response to comments provided by PCC and the HA, and is presented at **ANNEX G**. It should be noted that this builds on information presented within the Trip Generation Technical Note (included at **ANNEX C**), although further information is provided below, as well as part of the assessment itself.

7.5.2 The assessment is principally concerned with the following aspects:

'Maximum Scenario'

7.5.3 The analysis presented herein has been based around the estimation of the 'typical' average daily situation which is expected to occur at the EfW CHP facility, following its proposed opening in 2014. The typical average scenario has been generated from real traffic data at existing waste delivery points and from the best available assumptions of the SWDWP and from MVV, as discussed herein.

7.5.4 From the perspective of the TA, this approach accords with the relevant best practice guidance, such that the real-world implications of the proposed development can be assessed. This

approach has been accepted by PCC and the HA, but a possible 'maximum traffic' scenario has also been identified as providing a useful scenario, for testing purposes.

7.5.5 A sensitivity assessment has thus been undertaken to supplement the analysis presented within the TA itself, and this is presented at **ANNEX G**, as discussed.

Variation and Impact on the Strategic Road Network

7.5.6 Discussions with the HA, as well as PCC, have indicated that the seasonal variability of traffic conditions and the impact of the EfW CHP more generally, should be considered in relation the HA network.

7.5.7 This matter is therefore also presented as part of the sensitivity assessment shown at **ANNEX G**.

Waste Miles Assessment

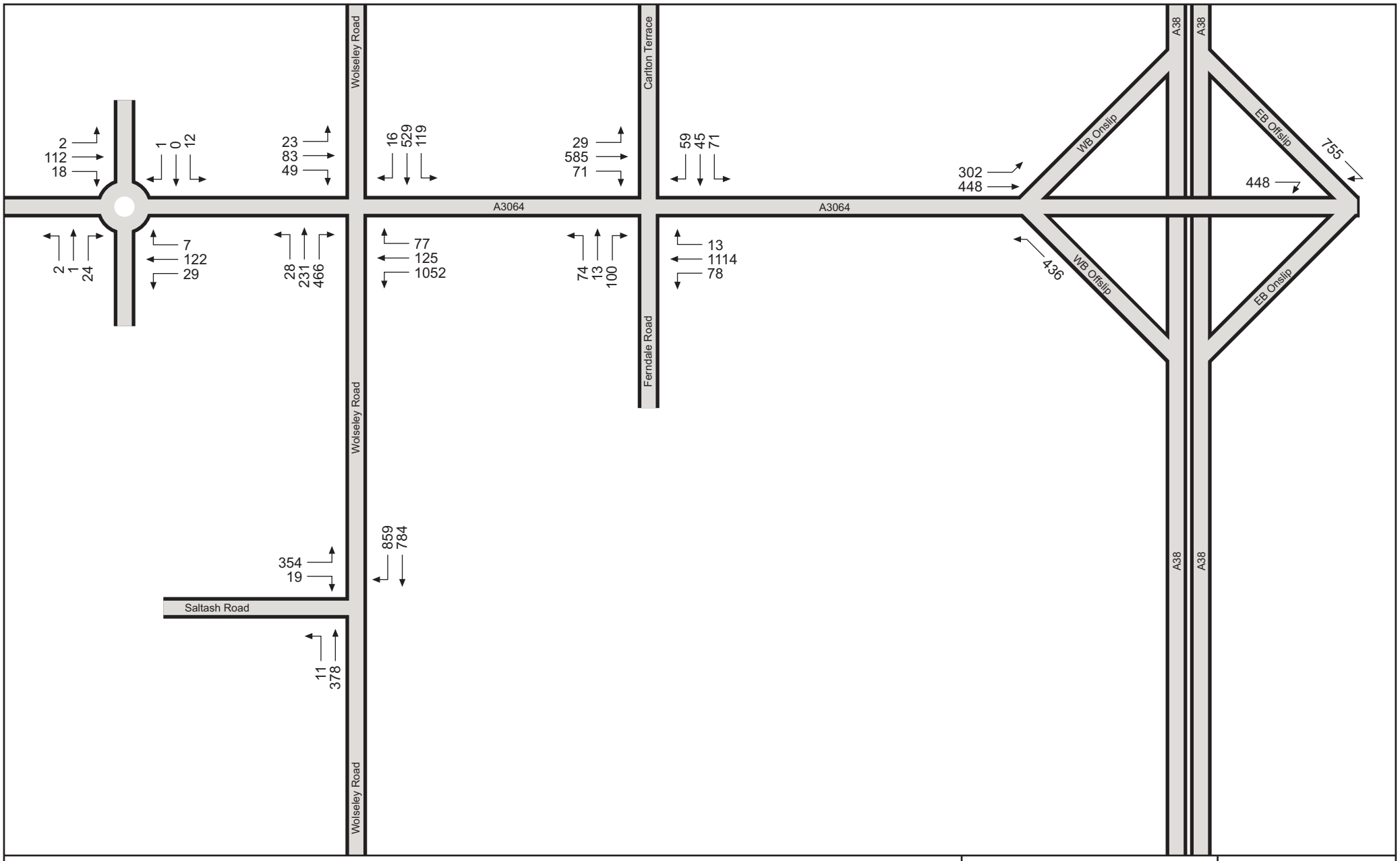
7.5.8 Liaison with PCC has indicated that a 'Waste Miles' assessment should be undertaken, comparing the distances (and time) travelled by waste related vehicles associated with the EfW CHP facility, against those of comparator sites.

7.5.9 This assessment is also presented at **ANNEX G**.

Potential Development

7.5.10 In addition to the above and as discussed previously, the incremental operational implications of two potential (but not committed) developments located in the vicinity of the EfW CHP facility have also been considered at the request of PCC and the HA, as part of the Sensitivity Assessment.

7.5.11 This aspect of the assessment is therefore also presented at **ANNEX G**.



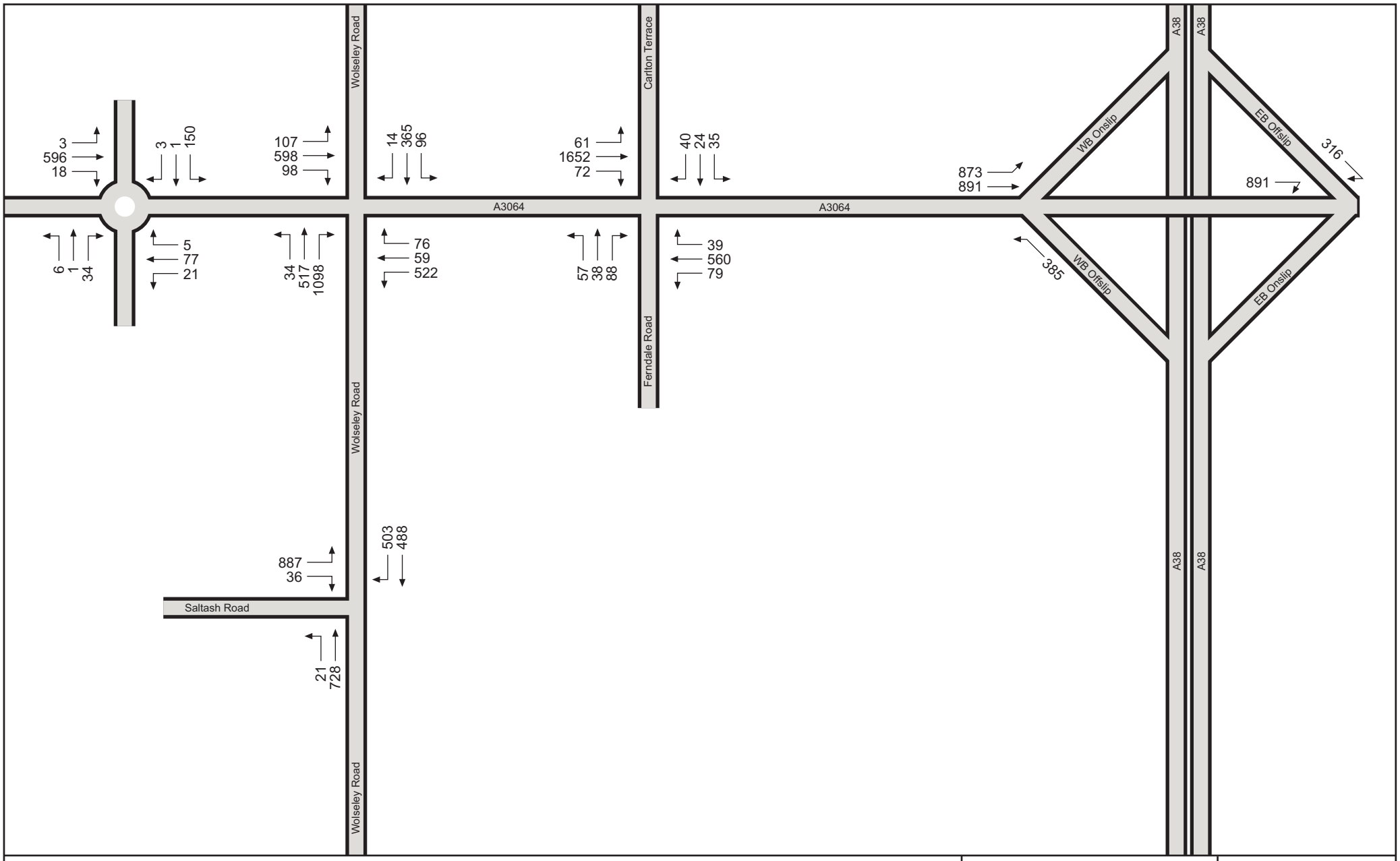
2014 Do Minimum AM
0800 - 0900

MVV Umwelt

Figure 7.1

URS Scott Wilson

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1



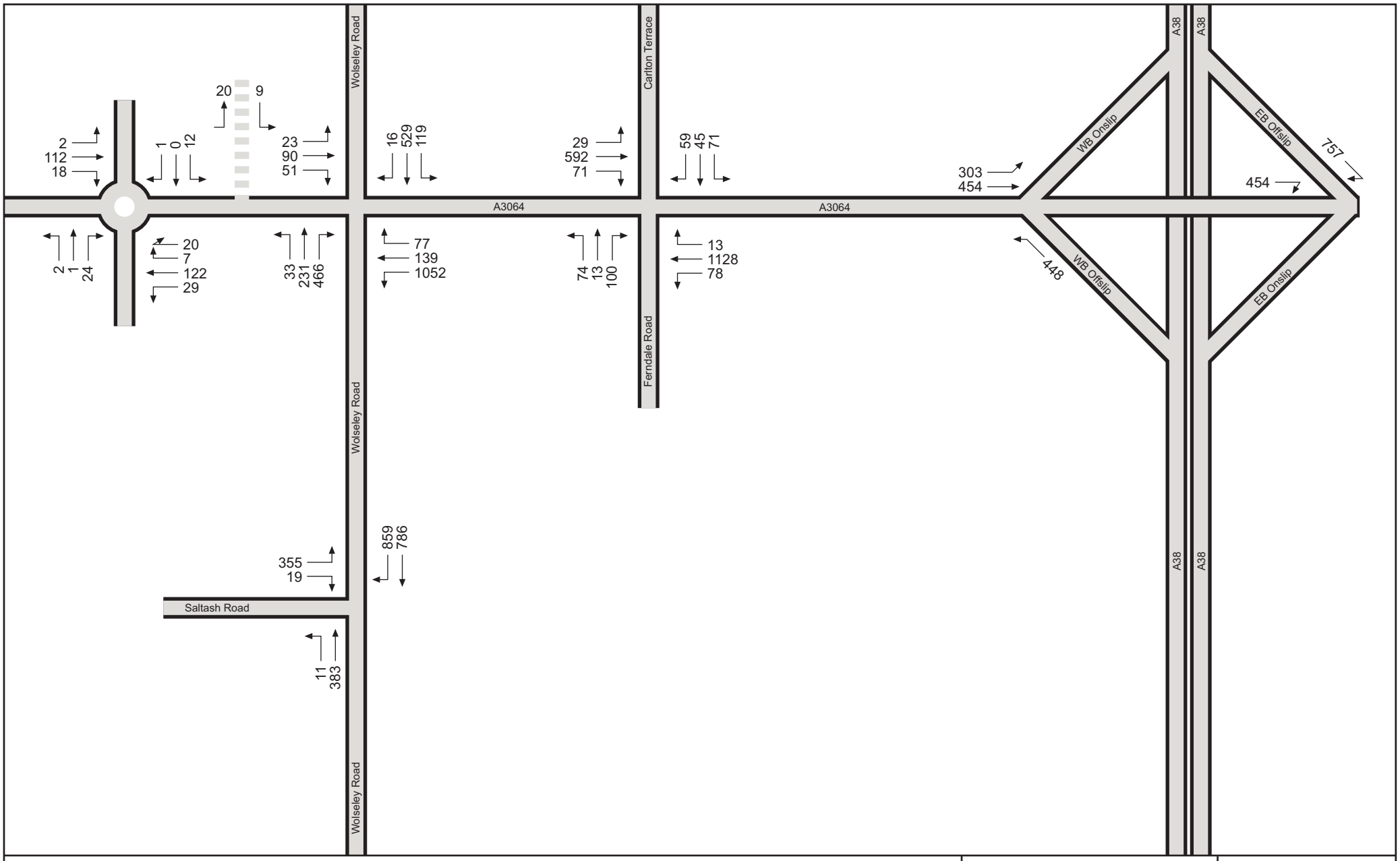
2014 Do Minimum PM
1600 - 1700

MVV Umwelt

Figure 7.2

URS Scott Wilson

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1



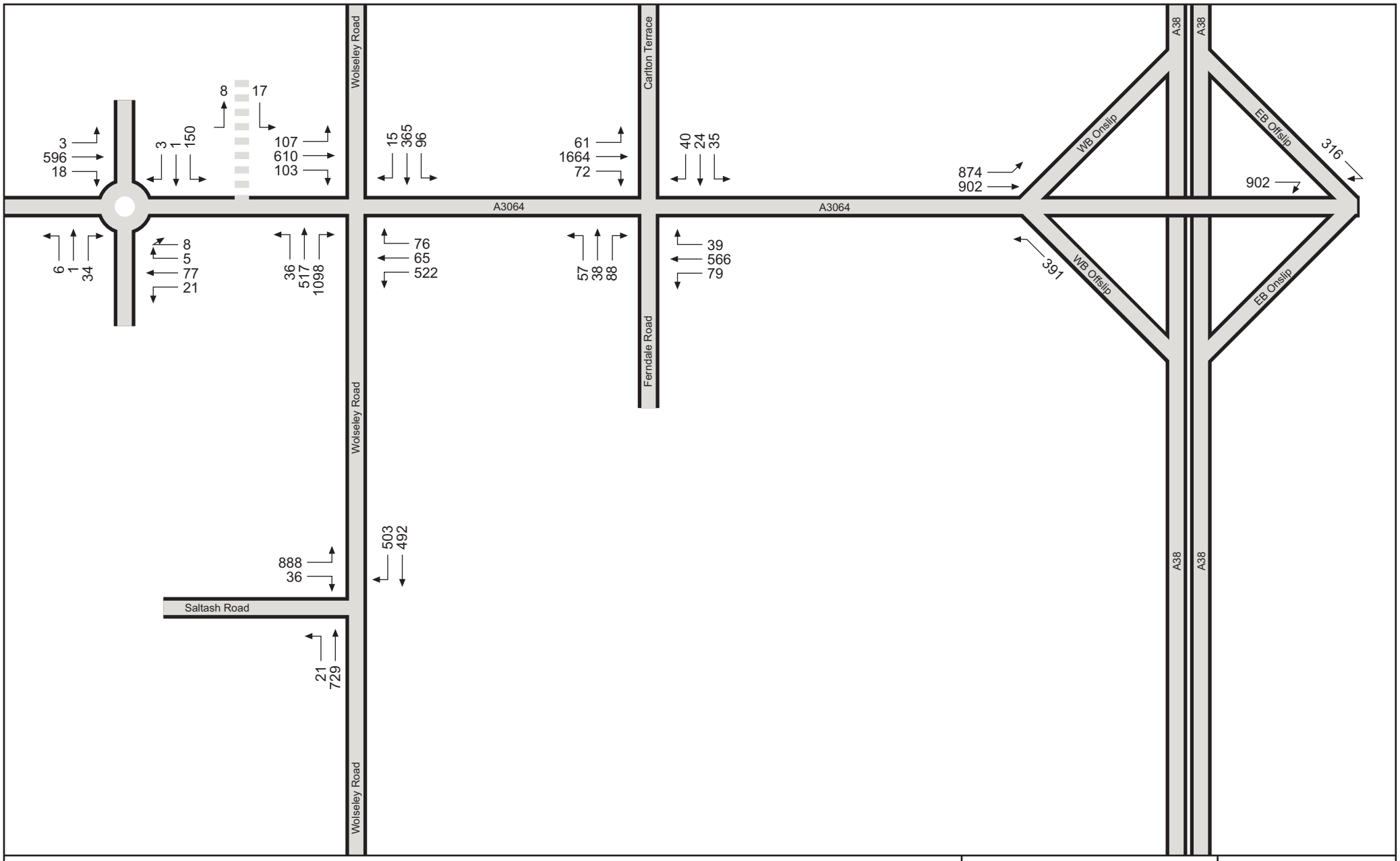
2014 Do Something AM
0800 - 0900

MVV Umwelt

Figure 7.3

URS Scott Wilson

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1



2014 Do Something PM
1600 - 1700

MVV Umwelt

URS Scott Wilson

Figure 7.4

Drawing Ref:M:\Development Control\D123356 Plymouth - Energy From Waste\Drawings\Figures\Turning Movements.FH11.1

8 Parking

8.1.1 The maximum parking guidelines for Plymouth are set out in the Supplementary Planning Document (SPD), 'Development Guidelines', produced by PCC in April 2010.

8.1.2 This document sets out the maximum recommended level of parking according to various development types. It is considered however, that the proposed development does not conform with the general land use guidelines that are provided within the SPD.

8.1.3 As such, it is proposed that 10 bicycle parking spaces will be provided on site. These spaces will allow cycles to be securely stored, in a covered location. Further information is provided at **ANNEX F** within the Framework Staff Travel Plan. In addition, five motorcycle parking spaces will be provided on site.

8.1.4 In terms of vehicular parking, it is proposed that 51 car parking spaces will be provided at the EfW CHP facility, 4 of which will be marked for disabled use. 5 car parking spaces will be provided specifically in proximity to the gatehouse which will be for short term use by visitors who will call at the gatehouse / weighbridge to obtain access and instructions to enter the site, including details of where they can park once they are on site.

8.1.5 Of the remaining 42 car parking spaces (51 – 4 – 5 = 42), it is envisaged that these will be available for use by staff and visitors. Although the site will include some shift based staff, it is recognised that at shift change over times both the current shift staff and the replacement shift staff will be parked on site at the same time, for a short period and thus the full staff quantum has been considered in relation to the site parking requirements.

8.1.6 Assuming therefore that all of the 35 staff drive to work, on their own and are present on site at the same time as a worst-case, 7 spaces would be available for use by visitors and any additional business users. This level of provision should therefore ensure that off-site parking issues in the local area do not arise as a result of the EfW CHP facility development.

8.1.7 One coach parking space will be provided for visits to the visitor centre. The coach parking space is provided for school visits and these visits will be managed to ensure that only one coach is on site at any one time.

9 Conclusions

9.1.1 This Transport Assessment has been prepared by URS Scott Wilson on behalf of MVV Umwelt GmbH in support of a planning application for an Energy from Waste Combined Heat and Power (EfW CHP) facility at North Yard, Devonport, in Plymouth.

9.1.2 The TA has been prepared in accordance with relevant guidance and the Transport Assessment Scoping Report which was agreed in advance with PCC, and the HA. In addition, a significant amount of consultation has been undertaken with the relevant planning and highway officers at PCC, specifically relating to the TA methodology, and reference has been made to this within the TA, wherever appropriate.

9.1.3 The TA has identified that the site is located within the Devonport Dockyard, which is an established employment area of the city which is therefore relatively well served in terms of sustainable travel, including walking, cycling and both bus and rail based forms of public transport.

9.1.4 A detailed assessment of the trip generation which is expected to be associated with the proposed EfW CHP facility has been undertaken. As such, a Technical Note was submitted and consulted on with PCC as part of the TA preparation process and this has been summarised herein.

9.1.5 In summary, the proposed development is expected to generate a total of 29 vehicles in AM peak hour and 25 vehicles in the PM peak hour.

9.1.6 Operational assessments have subsequently been undertaken to consider the relative implications of providing the EfW CHP facility at the proposed site. This analysis has indicated that the junctions located within the TA study area have sufficient capacity to accommodate the vehicle demands.

9.1.7 It is noted that the Carlton Terrace junction is predicted to operate slightly in excess of the recommended saturation threshold of 90% in the '2014 Do Something' scenario, but that this is also the case in the comparative without development '2014 Do Minimum' scenario.

9.1.8 To accompany the TA, consultation with PCC and the HA has identified a number of supplementary areas which the authorities have requested information regarding. As such, a number of Annexes are included with this TA, which seek to specifically respond to these additional items. A Framework Construction Plan and a Framework Staff Travel Plan have been prepared to accompany the TA, and are also included as Annexes.

9.1.9 Overall, the TA has confirmed that the EfW CHP facility is predicted to be able to be delivered at the proposed location via the provision of a signalised T-junction, located to the west of the Wolseley Road / Weston Mill Drive junction. This junction arrangement will allow traffic to turn right into and left out of the site.