Appendix 5
TN2: Trip Generation Technical Note

M1J15 NORTHAMPTON GATEWAY
STRATEGIC RAIL FREIGHT INTERCHANGE

TECHNICAL NOTE 2: TRIP GENERATION

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APPENDICES

1.0 INTRODUCTION

1.1 ADC Infrastructure Ltd is commissioned by Roxhill (Junction 15) Ltd to provide transport advice regarding their Nationally Significant Infrastructure Project (NSIP) for the development of a Strategic Rail Freight Interchange (SRFI) facility adjacent to M1 Junction 15 in Northamptonshire (known as Northampton Gateway SRFI).

1.2 This Technical Note presents the methodology used to determine the road based trip generation associated with the SRFI for use in the transport modelling work and Transport Assessment (TA) for the scheme. The note builds upon the methodology discussed at the Transport Working Group[1] sessions held on 17 August 2016 and 16 September 2016. The document is structured as follows:

- Section 2 sets out the site's location and its rail connectivity.
- Section 3 details the development proposals along with details of the operation of the SRFI.
- Section 4 provides a general description of the type of trips that the development would generate.
- Section 5 sets out the trip generation for the warehousing and distribution uses.
- Section 6 sets out the trip generation for the rail terminal.
- Section 7 sets of the interaction between the rail terminal and the warehousing uses.
- Section 8 sets out the total person trip generation.
- Section 9 identifies the total assessment traffic flows including for the effect of the Travel Plan.

[1] The Transport Working Group comprises Highways England and their consultants Aecom, Northamptonshire County Council (NCC), ADC Infrastructure Ltd and BWB Consulting Ltd.

2.0 RAIL CONNECTIVITY

2.1 The site is located to the west of M1 Junction 15, approximately 6km from Northampton Town Centre. It is bounded to the east by the M1 Motorway, to the south by the A508, to the north by Collingtree Road, and by the Northampton Loop line of the West Coast Mainline railway to the west. The general site location is shown in **Figure 1.**

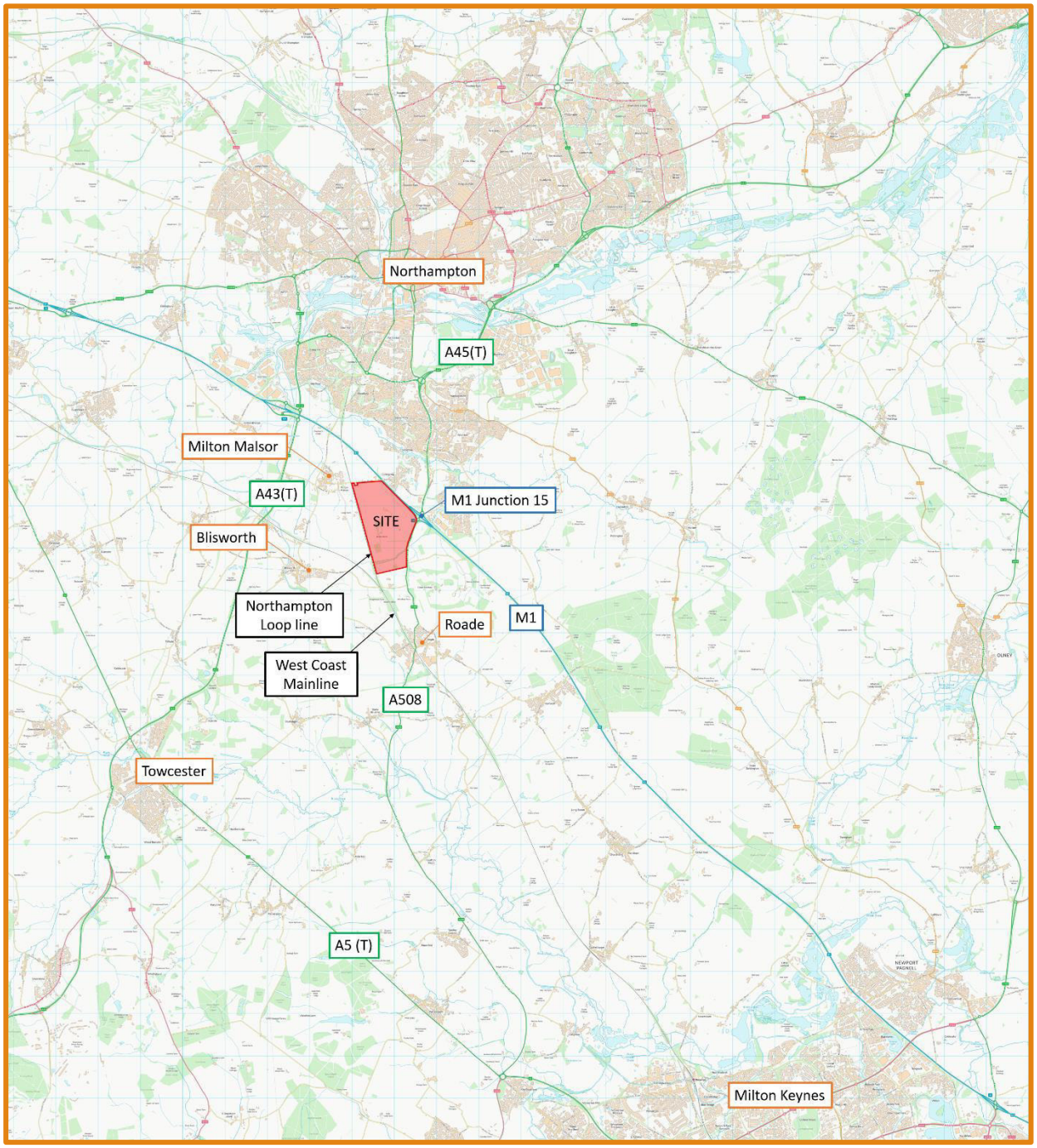

Figure 1: General site location

2.2 Northampton Gateway SRFI would have both south and north facing connections into Network Rail's Northampton Loop. The Northampton Loop branches off the West Coast Main Line at Hanslope Junction to the south and re-joins the main line at Hilmorton Junction immediately to the south of Rugby.

2.3 The Northampton Loop principally serves Northampton and DIRFT at the north end of the loop.

2.4 Further background on SRFI sites, and connectivity of the Northampton Gateway SRFI to the Strategic Freight Network is provide at the 'Strategic Freight Connectivity and HGV Trip Generation' Technical Note, prepared by Geoff Bounds Consulting Ltd, a copy of which is provided at **Appendix B**.

2.5 Geoff Bounds Consulting Ltd conclude that the Northampton Gateway SRFI has excellent rail connection capability to support the movement of intermodal traffic by rail across all key areas of intermodal logistics operations and associated mode shift from road to rail. This is reinforced by the location of the Northampton Gateway SRFI within the so called 'Golden Triangle' for UK logistics and distribution.

3.0 PROPOSED DEVELOPMENT

Development proposals

3.1 The development comprises a large scale SRFI. The SRFI would have two principle development areas, consisting of the 'warehousing and distribution' area on the eastern part of the site, and the 'intermodal rail freight terminal' on the western part of the site, which would also include provision of a Rapid Rail Freight (RRF) facility. The indicative masterplan is contained in **Appendix A**.

Warehousing and distribution units

3.2 The SRFI would take the form of a small number of large scale units that would support a combination of B8 uses. It is not anticipated that small units would make up a significant part of the development as few B8 occupiers require small scale facilities in the modern era, due to the economies afforded by scale.

3.3 The indicative masterplan shows the proposed units, and the table below summarises the gross floor area of each unit. As shown, B1 office use would comprise around 5% of the total area and is therefore ancillary to the predominant B8 use.

unit number	warehouse	offices	total
unit 1	500,000sqft	30,000sqft	530,000sqft
unit 2	515,000sqft	30,000sqft	545,000sqft
unit 3	653,000sqft	30,000sqft	683,000sqft
unit 4	790,000sqft	40,000sqft	830,000sqft
unit 5	657,000sqft	37,000sqft	694,000sqft
unit 6	513,000sqft	35,000sqft	548,000sqft
unit 7	1,150000sqft	41,000sqft	1,191000sqft
total	**4,778,000sqft**	**243,000sqft**	**5,021,000sqft**
%	95.16%	4.84%	100%

3.4 The development masterplan is indicative only at this stage. However, the parameters plan sets out a maximum area for the warehousing and distribution use at the development, which will not exceed 5,037,510sqft (468,000sqm).

3.5 The development could therefore comprise up to 468,000sqm of conventional floor space B8 use. However, to provide some flexibility for future occupiers seeking mezzanine space, the parameter plans includes an allowance for up to one third of the units (155,000sqm) to provide B8 mezzanine floor space use. The trip generation associated with the mezzanine floor space is discussed further at Section 5 of this Technical Note, where it is proposed that a 50% factor is applied to the mezzanine trip generation. This recognises that mezzanines do not typically generate trips on a pro-rata basis with conventional B8 floor space. This provides a total equivalent conventional floor area for assessment purposes of 545,500sqm. (468,000sqm conventional floor space + 50% x 155,000sqm mezzanine floor space).

3.6 The layout makes provision for direct rail served warehouse units by means of dedicated rail connections to four of the warehouse units within the overall site. However, the development will also provide its own dedicated multiple road rail terminal and associated concrete pad, as described below.

Intermodal rail freight terminal

3.7 The intermodal rail freight terminal would take the form of an independent facility and associated container storage, designed to have the capacity to accommodate up to 12 trains per day. The loading and unloading sidings and the associated pad would be able to accommodate trains of up to 775 metres in length, to allow the longest intermodal rail services to be accommodated.

3.8 Container movements to individual warehouse units on the site would either be direct to the individual warehouse unit by means of an adjacent rail loading/unloading pad, where these are provided within the masterplan and required by the warehouse occupier. Or container movements to the individual warehouse units would be by delivery of the containers by rail to the main loading/unloading terminal with the containers then being transferred by tug unit from the terminal to the warehouse unit. The rail freight terminal would connect with the existing Northampton Loop line.

3.9 There will also be capability to provide a RRF facility as part of the intermodal freight terminal.

Operation

3.10 Roxhill (Junction 15) Ltd have indicated a potential for a first phase of development of around 1 million sqft warehousing and distribution units to open in 2021, with an anticipated build out period for the development of five years, which equates to a build out rate of around 1 million sqft per year.

3.11 All the B8 units are likely to operate on a 24-hour basis, seven days a week. The main shifts are therefore likely to be 0600-1400 hours, 1400-2200 hours and 2200-0600 hours, although there will be some variation depending on the individual occupier requirements. Some occupiers may operate a 12 hour shift, for example from 0700-1900 hours and 1900-0700 hours.

3.12 In keeping with most inland rail freight terminals, the rail freight terminal is likely to operate on a 24-hour basis from Monday to Friday, and until Saturday lunchtime. However, volume growth at the main ports could lead to an increase to 6 or 7 day operation in the future.

3.13 Due to the wider aspirations for SRFI sites, and the gradual increase in both the number of trains that can be accommodated on the wider network and the train's capacity, it is anticipated that it would take approximately 30 years before the rail freight terminal at Northampton Gateway would operate at full capacity. Therefore, assuming an opening date of 2021, it could take until 2051 to realise the maximum handling capacity for rail activity. For the purposes of assessment however, and to ensure a robust approach, maximum capacity has been assumed to occur within the time period set for the transport modelling process, which in accordance with DfT Circular 02/2013[2] adopts an opening year of 2021 and a forward planning year of 2031. The latter has been selected to coincide with the end of the Local Plan period, and as required by Northamptonshire County Council.

3.14 Initially the loading and unloading of containers to and from the rail vehicles at the rail terminal would be by reach stacker, which would be replaced by gantry cranes as volumes and through-put at the rail terminal increased.

3.15 The loading and unloading of containers to and from the rail vehicles on pads adjacent to the individual warehouse units, if required by the end users, is expected to be by reach stacker operation.

[2]Circular 02/2013 'The Strategic Road Network and the Delivery of Sustainable Development' Department for Transport, September 2013

3.16 The RRF facility is designed for the transhipments of light weight commodities such as parcels, chilled good etc, as a roll cage operation rather than a containerised operation. Transfer of goods to and from the rail vehicles is therefore envisaged to be by the movement of roll cages as a cross dock operation between HGV and rail vehicles.

3.17 For SRFI facilities within the UK, to date, the rail volumes (trains per day) typically start at low levels (1-2 trains per day). However, the expectation is that a SRFI, fully developed and over time, will generate somewhere between 10 and 20 trains in and out either onto the main terminal or the individual rail served warehouse units, these serving a variety of end user requirements. Northampton Gateway SRFI has an assumed upper volume of 16 trains per day for such operations across the main terminal (12 trains) and the individual rail served warehouse units (4 trains).

3.18 The RRF facility is a new concept to SRFI operations although, in reality, as a mode of operation it is more akin to a re-emergence of the typical parcels type operation that formed a mainstay of UK rail passenger and parcels operations for much of the 19th and 20th centuries. In this case, it is envisaged as meeting a growing 21st century market demand for high speed lightweight logistics operations being accommodated in passenger type rail vehicles adapted for lightweight freight use and capable of operating at passenger train speeds. At maturity, the RRF facility is expected to operate at a level of up to 12 trains per day. These train volumes are additional to those identified for the main terminal above.

4.0 TRIP GENERATION: GENERAL

4.1 This section describes the development vehicle trip types, and describes the methodology for calculating the forecast traffic generation of the proposed Northampton Gateway SRFI.

4.2 Given the size and nature of the proposed development it is not appropriate to use the TRICS database to calculate the trip rates and traffic generation for the SRFI, as there are no comparative rail served sites within the database.

4.3 Therefore, reference has been made to the work undertaken by Roxhill for their NSIP East Midlands Gateway SRFI at M1 Junction 24 in Leicestershire. The trip generation for the East Midlands Gateway SRFI was calculated using a first principles approach, combined with existing data from similar sites. The calculation methodology and resulting trip generations were agreed by the Transport Working Group for the East Midlands Gateway SRFI, which comprised Highways England and the five local highway authorities. The trip generation was accepted by the Planning Inspectorate as part of the DCO submission for the East Midlands Gateway scheme.

4.4 This approach has therefore been adopted as a starting point for the Northampton Gateway SRFI development and is set out in the following sections.

4.5 The proposed SRFI, comprising both the warehousing and distribution units and the rail terminal, would generate the following type of trips:

1. Employee trips to and from work at both the B8 units and the rail terminal.
2. Visitor and delivery trips to both the B8 units and the rail terminal.
3. HGV traffic to and from the B8 units.
4. HGV traffic to and from the rail terminal.
5. HGV (or tug) traffic between the rail terminal and the B8 units.
6. Rail trips.

4.6 Only trip types one to four would use the off-site highway network. Trip type five would be on the internal road network, between the rail terminal and warehousing area. Trip type six would be on the rail network only, and the capacity of the rail network and the impact of these trips will be examined in a separate report[3].

4.7 This Technical Note therefore focuses on trip types one to four, as the TA is ultimately concerned with the impact of the development on the off-site highway network. However, it is recognised that the number of HGVs generated (trip types 3, 4 and 5) will be related to the number of rail trips (trip type 6) and the size of the containers/type of goods. Furthermore, the amount of external HGV trips (trip types 3 and 4) will be related to the number of internal trips (type 5) and the operation and interaction between the rail terminal and the on-site warehousing.

4.8 The above dependencies and interactions are examined within the following sections, but first the warehousing and rail terminal elements (both the main terminal and the RRF facility) of the SRFI are considered in isolation.

[3] For the rail component at Northampton Gateway SRFI, Roxhill Developments is in discussions with Network Rail to evaluate the engineering and operational viability of connecting into their network and evaluating path availability through a typical 24 hour weekday cycle.

5.0 TRIP GENERATION: WAREHOUSING AND DISTRIBUTION UNITS

Base data

5.1 The Homes and Communities Agency's (HCA) employment density guide (3rd edition 2015) sets out that B8 warehousing uses at national, regional and final mile distribution centres typically accommodate 1 full time equivalent employee per 95sqm, 77sqm and 70sqm, respectively. These figures are based on gross external area (GEA).

5.2 ProLogis also have empirical data on this subject, collected in 2010 and 2014, the latter from the occupiers of 24 of their B8 units (which have a total GFA of 6.05 million sqft). A copy of the ProLogis Technical Note detailing the research findings is contained in **Appendix C**. This confirms that their B8 unit occupiers typically accommodate between 1 employee per 77sqm (2010) and 1 employee per 69sqm (2014). However, most of the units included in the ProLogis Note are smaller than the units proposed at Northampton Gateway and hence the findings are likely to be biased towards the higher end of the employment density range.

5.3 Nevertheless, the ProLogis Technical Note provides a useful indication of the potential split between employee roles. It confirms that warehouse operatives form the majority (50%) of the workforce. Drivers account for around 8% of staff, 21% are admin staff or managerial staff working in the ancillary offices, with 21% represented in the others category (comprising IT, customer service, sales and engineering functions). The Note compares this breakdown with data available from 2003 Cranfield University research and concludes that there has, in recent years, been a positive trend in both the quantity and breadth of jobs provided by B8 warehousing and distribution uses.

5.4 The end occupiers at Northampton Gateway SRFI are not yet known and the development is likely to contain a mixture of distribution centre types. However, the form of the SRFI and the large size of the proposed units means that these centres are more likely to be national and regional in nature. Therefore, when considering an appropriate employment density for the warehousing at the site, a balanced view should be taken between the lowest (1 per 95sqm) and highest (1 per 70sqm) density range. Adopting the 1 per 77sqm ratio for regional distribution centres is considered to be the most appropriate approach given the form of development and the evidence. It provides a robust figure for assessment purposes.

5.5 Based on this information, it is reasonable to apply the 1 per 77sqm ratio to the proposed equivalent 545,500sqm GFA of B8 use at Northampton Gateway SRFI site to provide an estimate of the number of employees that would be associated with warehousing at the site. Assuming that the GFA represents 95% of the GEA, equates to an equivalent GEA of 574,211sqm for the warehousing elements of the scheme. This equates to 7457 full time equivalent employees associated with the proposed B8 use.

5.6 However, there is a difference between the total number of employees, and the number attending during any one time period. To calculate the traffic generation of the employees, it is necessary to obtain a daily profile of trip rates per employee or per 100sqm. It is proposed that this be calculated using the profile from another similar B8 warehousing and distribution site.

5.7 Over a number of years Roxhill Developments has built a considerable number of developments similar to the B8 development proposed. These have, since 1999, been surveyed and the data stored for re-use on future projects. A summary of the recorded trip rates for these sites, along with those for the large scale B8 unit survey data that is available from the TRICS database is summarised at **Table 1,** at the rear of this Note.

5.8 The Swan Valley site is particularly relevant and for the following reasons provides a good base starting point for the assessment of the B8 use that is proposed at Northampton Gateway SRFI:

- it is located on the A43 adjacent to M1 Junction 15a and is therefore similar to the proposed Northampton Gateway SRFI site in terms of location
- the site includes a number of large scale warehouses, which at the time of the survey comprised nearly 1.5 million sqft GFA, is the largest site for which survey data is available, and has a similar percentage of ancillary office space to that proposed at Northampton Gateway SRFI
- it has an employee density of 1 employee per 77sqm
- daily survey data is available for October 2007, which pre-dated the economic recession
- the majority of units at the site operate three shift system (6 – 2 – 10), however Morrisons (formerly Sainsbury's) adopt an extended 12 hour two shift pattern (7 to 7), mainly due to their use of some office space as a Call Centre, and will therefore provide a robust shoulder peak trip rate
- finally, at the time of the survey the site had no bus service with low pedestrian and cycle usage (3%), with a single occupancy car driver usage rate of 92%, and car passenger modal share of 5%, providing a robust car usage figure as a base starting point.

5.9 The masterplan for Swan Valley is included at **Appendix D.** At the time of the 2007 survey 1.48 million sqft of floor space was occupied and operational, including Morrisons, Levi-Strauss, Carlsberg and Outdoor Group. It is proposed to use the Swan Valley site trip rates to calculate the likely daily traffic generation of the proposed B8 uses at Northampton Gateway SRFI. The October 2007 traffic survey for the Swan Valley site is given at **Appendix D**.

5.10 The Swan Valley survey data has been used to calculate the base vehicle trip rates and traffic generation, and this is summarised at **Table 2** at the rear of this report**.** To ensure a robust assessment for the light vehicle trip generation (predominantly employee car traffic), the vehicle trip rates per 100 employees, as determined from the Swan Valley data, has been used based on the estimate of employee numbers (7457), corresponding with the HCA employee density of 1 employee per 77sqm GEA. For the HGV movements, which are principally dependent on the size of the warehouse units and number of loading bays, the trip rates are calculated per 100sqm of GFA.

5.11 Using this methodology gives base figures of 12,112 two-way daily light vehicle trips with the 3,396 two-way daily HGV trips as shown at **Table 2**. This is a total base figure 15,508 two-way daily vehicle trips associated with the equivalent 545,500sqm GFA of proposed B8 use at Northampton Gateway SRFI.

5.12 However, to further check the validity of use of the Swan Valley trip rates several comparisons were undertaken, as set out in the following sections.

Comparison of light vehicle trip rates

5.13 The morning and evening peak hour and daily Swan Valley trip rates for light vehicles were compared with the average light vehicle trip rates for all survey sites given at **Table 1**. Due to the availability of data, this comparison was undertaken based on trip rates per 100sqm of GFA, which for the Swan Valley site have been increased to match the trip generations calculated using the employee figure of 7457.

comparison of Swan Valley light vehicle trip rates per 100sqm to average of all survey sites									
	am peak (0800 to 0900 hrs)			pm peak (1700 to 1800 hrs)			daily (24 hrs)		
	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way
average of sites	0.087	0.036	0.124	0.032	0.083	0.115	0.978	1.102	2.080
Swan Valley	0.128	0.014	0.142	0.031	0.114	0.145	1.119	1.101	2.220

5.14 The comparison demonstrates that the trip rates for Swan Valley are higher than the average trip rates determined across all the survey sites. In addition, the Swan Valley rates produce a distinctly elevated inbound trip rate in the morning peak hour and an elevated outbound trip rate in the evening peak hour. The correlation of these elevated values with the direction of peak tidal flow (inbound in the morning peak hour and outbound in the evening peak hour), adds further robustness to the assessment. It is concluded that the Swan Valley light vehicle trip rates are robust and therefore suitable to represent the large scale warehousing and distribution units that are proposed at Northampton Gateway SRFI.

Comparison of HGV trip rates

5.15 The morning and evening peak hour and daily Swan Valley trip rates for HGV trips per 100sqm were compared with the average HGV trip rates per 100sqm for all survey sites given at **Table 1** and are shown below.

comparison of Swan Valley HGV trip rates per 100sqm to average of all survey sites									
	am peak (0800 to 0900 hrs)			pm peak (1700 to 1800 hrs)			daily (24 hrs)		
	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way
average of sites	0.024	0.022	0.046	0.021	0.019	0.040	0.319	0.277	0.596
Swan Valley	0.012	0.015	0.028	0.013	0.016	0.029	0.306	0.316	0.623

5.16 The comparison shows that Swan Valley has a peak hour HGV profile that is below the average but the daily trip rates is above average. In the morning peak hour the two-way HGV trip rate is 64% lower than the average and in the evening peak hour it is 37% lower. Therefore, for to ensure a robust assessment of the peak hour HGV generations, the average HGV trip rates have been adopted for the peak hour peaks. This has the effect of also increasing the overall daily HGV trip rates, providing further robustness to the assessment.

Assessment of mezzanine floor space

5.17 Northampton Gateway SRFI would provide just over five million sqft (468,000sqm) of conventional B8 floor space use. However, to provide some flexibility for future occupiers seeking mezzanine space, it also includes an allowance for approximately one third of the units (155,000sqm) to provide mezzanine floor space.

5.18 Roxhill do not hold empirical data regarding mezzanine trip rates and no empirical trip rate information was available from the Transport Working Group. It is also noted that the employee density for B8 uses given in the HCA employment density guide are based on GEA, which is not influenced by mezzanine floor space.

5.19 Mezzanines are typically introduced to enhance access to existing high level storage areas, or to house automated operations. In each case, these functions would not result in a pro-rata

increase in staff numbers compared to conventional floor space. The former because, in the absence of mezzanine levels, high level storage is typically used to access the warehouse space. The latter, because automated operations are less staff intensive. It is possible that part of the mezzanine floor space would be used to house the ancillary office functions within the warehousing. However, as shown at paragraph 3.3, the ancillary office space would be a small proportion of the floor space (typically less than 5%). Hence if the ancillary office was housed within the mezzanine level, it would not lead to a significant 'freeing-up' of general warehousing space.

5.20 HGV generations are related to the number of loading bays, which would not be increased. Hence, whilst the mezzanine levels may include automated operations which could improve efficiency and HGV throughput, there would not be a pro-rata increase in HGV numbers as these would be restricted by the number of loading bays.

5.21 Taking all of the above into account, for assessment purposes it is proposed that the mezzanine floor space would generate trips at 50% of the rate of conventional floor space. This recognises that based on the HCA definition of employee densities, the mezzanine floor space would not add to the GEA of the units and hence would not generate additional trips, whilst still providing a robust position in the absence of empirical data. The 50% factor recognises that the mezzanine floor space could generate additional employee and HGV trips, but that these would not be at pro-rata levels compared to conventional floor space.

5.22 This approach provides a total equivalent GFA for assessment purposes of 545,500sqm. (468,000sqm conventional floor space + 50% x 155,000sqm mezzanine floor space).

Resulting trip generation for warehouse and distribution units

5.23 The resulting daily vehicle trip generation profile for the B8 units at Northampton Gateway SRFI based on a GFA of 545,500sqm is shown at **Table 3** at the rear of this Note. This shows that a total of 15,667 two-way vehicle trips are forecast using the adjusted Swan Valley trip rates calculated in the above sections.

5.24 **Table 3** identifies that in the evening, both the pre and post shoulder peak hours are forecast to generate higher light vehicle traffic flows than the traditional 1700 to 1800 peak hour period. The earlier shoulder peak hour of 1600 to 1700 hours has a higher departure rate and the greater total traffic generation. Therefore, to ensure a robust assessment the light vehicle trips, the light vehicle trip rates associated with the shoulder peak hour 1600 to 1700 have been swapped with the light vehicle trip rates for the 1700 to 1800 peak hour. This ensures that any potential overlap of the shoulder peak with the highway network peak hour is considered. This is not an issue in the morning peak hour, where the shift change occurs much earlier.

5.25 On this basis, the actual peak hour and daily trip generations that are proposed for the warehousing and distribution units in isolation are summarised in the table below.

proposed assessment B8 use peak hour and daily vehicle trip generation									
	am peak (0800 to 0900 hrs)			pm peak (1700 to 1800 hrs)			daily (24 hrs)		
	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way
Light	700	75	775	*230**	*804**	*1035**	6104	6008	12112
HGV	131	120	251	115	104	218	1777	1779	3556
Total	831	195	1026	345	908	1253	7881	7787	15667

**shoulder peak of 1600 to 1700 hrs light vehicle traffic used*

6.0 TRIP GENERATION: RAIL TERMINAL

Light vehicle trips

6.1 The rail terminal comprises the intermodal terminal and the RRF facility. The rail terminal would include a 20,000sqft (1,858sqm) freight terminal office.

6.2 The intermodal terminal would employ a small number of staff, typically between 10 to 20 employees per shift. Therefore, an average of 15 staff per shift (0600 – 1400 hours, 1400 - 2200 hours, and 2200 - 0600 hours) is assumed.

6.3 The RRF is assumed to require: 12 operatives (1 per rail vehicle) to undertaken roll cage cross dock transfers and stowage; plus 2 management staff (1 dock supervisor and 1 terminal manager). Hence there would be a total of 14 employees per shift for the RRF, which would also operate a three-shift system.

6.4 **Table 4** provides a summary of light vehicle movements associated with rail terminal employees.

HGV trips - Rapid Rail Freight Terminal

6.5 Section 7 of the Geoff Bounds Consulting Ltd report (**Appendix B**) sets out the background and assumptions regarding the proposed RRF and the calculation of HGV trips that could be associated with this facility at the Northampton Gateway SRFI.

6.6 There is very limited data supporting HGV movements for RRF operations. However the Geoff Bounds Consulting report identifies the following parameters as a useful basis from which to assess HGV movements linked to a RRF operation:

- maximum train consist of 12 vehicles
- a rail vehicle will typically accommodate a load equivalent to 1.5 HGV loads
- a 12 vehicle rapid rail freight train would therefore equate to approximately 18 HGV loads
- as the RRF facility is, insofar as SRFI operations are concerned, a new and untried concept it has been assumed HGV trip generation associated with this operation will be in line with HGV trip generation for the main terminal i.e. a ratio of 1.4 HGV trips per load (see paragraph 6.14)
- it is currently estimated that each train will require 2 hours on the rapid freight terminal to load/unload
- as the Northampton Gateway proposed RRF facility is a single road terminal it therefore follows that the RRF terminal would have a maximum capacity of 12 trains per day.

6.7 Due to the lack of current data on growth profiles for this type of traffic it has been assumed that the Northampton Gateway RRF terminal operation would grow progressively from 1 train/day at start up to 12 trains per day at full maturity. Based on this Table 5 at **Appendix B** sets out the forecast growth of traffic on this facility and the associated HGV movements per day

6.8 Based on the above, it is forecast that the RRF facility could generate 216 equivalent HGV loads per day. This equates to a total of 302 two-way HGV movements (using the 1.4 HGV trips per load).

6.9 As rapid freight services operate at the equivalent of passenger train speeds, integration of these operations onto the Network Rail network is likely to be less time critical than for a traditional intermodal train operation. Based on pathing availability and rapid freight terminal capacity it is therefore assumed that for the high end volumes the spread of rail and hence HGV

movements will be consistent through a 24 hour period. This assumption also reflects the anticipated increase by major retailers in this type of operation.

6.10 It is therefore assumed that the 302 two-way HGV movements would be distributed evenly throughout a 24-hour period, resulting in 13 two-way HGV movements per hour associated with the RRF.

HGV trips - main terminal

6.11 The number of HGVs generated by the main intermodal rail terminal would depend on both the number of trains, the length of each train at the rail terminal, and thus the number of containers/amount of goods that each train can carry. This in turn would vary depending on the type of goods and their ultimate destination. There are three main categories: Deepsea, Domestic and European. Further detail regarding the different types is provided at Section 6.11 of the Geoff Bounds Consulting Ltd Technical Note (**Appendix B**).

6.12 In simple terms, one HGV can carry two 20ft containers, or one 30ft/40ft/45ft container at a time. A HGV can be considered to either arrive at the rail terminal empty, departing with a container(s) offloaded from the train, or arrive with a container(s) and depart empty having loaded it onto the train. However in reality there is doubling up of HGV use at SRFI sites, where a HGV will arrive loaded, but also depart with a new load.

6.13 An assessment of the above factors based on observed data from established intermodal rail freight interchanges (at BIFT in Tamworth, DIRFT in Daventry, Hams Hall in Coleshill, and Widnes in Merseyside) has been undertaken by Geoff Bounds Consulting Ltd (Section 6 and Table 2 of their Technical Note at **Appendix B**).

6.14 Based on information from these other intermodal sites, it is suggested that, depending on the length of the train and the size of the containers (which is related to the type of goods and the ultimate destination of the container – Deepsea, Domestic or European), and the forecast increased in train capacity, each train could on average accommodate between 34 and 45 containers. From the observed data, an average ratio of 1.34 two-way HGV trips per container handled is identified as generally achieved at the existing intermodal rail terminals. However, for to ensure a robust assessment the higher ratio of 1.4 two-way HGV trips per container has been adopted.

6.15 The table below summarises the intermodal trains, by origin/destination per day each way through the selected existing intermodal rail terminals.

	Intermodal trains per day each way through SRFI, 2012					
	BIFT	DIRFT	Hams Hall	Widnes	Total	%
Deep sea	4.0	2.0	4.8	5.5	16.3	64.7%
Domestic	0.0	7.0	0.2	0.0	7.2	28.6%
European	0.0	0.4	0.7	0.6	1.7	6.7%
Total	4.0	9.4	5.7	6.1	25.2	100%

6.16 It is therefore proposed that a similar composition can be expected at Northampton Gateway SRFI, and the use of a 60%/30%/10% split between Deepsea, Domestic and European is proposed for assessment purposes.

6.17 Assuming a growth per annum of around 0.5 trains per year after opening, as well as increase in train capacity, estimates can be made based on an initial 1 train per day up to the maximum

capacity of the Northampton Gateway intermodal terminal (12 trains per 24 hours) and direct rail served warehousing (4 trains per 24 hours).

6.18 On this basis, it is calculated at Table 4 of **Appendix B** that the rail terminal at Northampton Gateway could accommodate a maximum through put of 1384 containers a day, which would equate to 1938 two-way HGV movements per day (based on a handling ratio of 1.4 two-way HGVs per container).

7.0 INTERACTION BETWEEN RAIL AND WAREHOUSING UNITS

7.1 This section identifies the interaction between the rail operation and the warehousing and distribution operations at the SRFI site.

7.2 Typically, containers arriving at a SRFI by rail will be processed on the terminal in the following ways:

- Train to HGV for direct transhipment to final destination with no added value on site. It is envisaged that this type of operation would always take place on the main terminal as opposed to being undertaken at a direct rail served warehouse unit.
- Train to warehouse for breaking down, warehousing and then onward transhipment to either final destination (typically currently road based) or onward distribution to regional distribution centres which was traditionally road based but has clear indications of a movement to rail (Tesco Daventry to Central Scotland). This operation has potential to take place either on the main terminal where a warehouse occupier does not require a dedicated rail terminal alongside the warehouse, or at a direct rail served warehouse terminal if/where required.
- Train to stack on the pad or a designated container storage area and from stack to destination either by road or rail. Again, it is assumed that this type of operation would be totally focused on the main terminal.

7.3 DIRFT is a useful example of likely trends at the Northampton Gateway SRFI both in view of the relative proximity of the two terminals, the location of the site within the Golden Triangle and as DIRFT is the only fully functional SRFI in terms of its relationship with the occupiers on site. It is possible to establish a baseline for bullets 1 and 2 above.

7.4 In this regard two snap shots of the operations of DIRFT are available. The first comes from road side interviews undertaken in February 2010 at DIRFT rail terminal that identified the origins of HGVs arriving at the facility and the designation of HGVs departing the facility[4]. An extract of the DIRFT report is provided at **Appendix E**. The survey found that 31% of HGVs were starting from, or destined for, other locations within DIRFT.

7.5 This 2010 survey predated the new rail-connected Tesco distribution centre coming on line at DIRFT and therefore, based on a review of more recent data, Geoff Bounds Consulting Ltd (**Appendix B**) have summarised more current operations as detailed in the table over the page.

7.6 The information for DIRFT provides a reasonable base of assumption that a modern SRFI located in the Midlands adjacent to the M1 motorway should be capable of capturing up to 56% of the container traffic handled by the intermodal terminal.

7.7 However, for assessment purposes a more conservative average figure of 40% has been adopted to provide a robust assessment.

7.8 For the balance, the size of the catchment area could be anywhere from local up to national (e.g. the bottled water traffic from Evian to DIRFT is understood to be for national distribution), but for most traffic not immediately captured by the SRFI warehousing, a 40-mile radius is considered an appropriate area.

7.9 Containers from 'train – stack' (an inland port type operation) is relatively new as a concept and has little data to support the split between road and rail for containers being distributed from the stack. It is however reasonable to assume that as the market grows, the excellent strategic freight network connectivity potential at Northampton Gateway SRFI would support movement of this traffic by rail.

[4] DIRFT III Expansion: Need Report, January 2012

Assessment of origin and destination of products handled at DIRFT			
Origin / Destination	Trains each way per weekday	Operator /customer	Relationship to DIRFT
Southampton	0.6	Freightliner	Most products distributed to/from surrounding area
Tilbury	1.0	Freightliner	Most products distributed to/from surrounding area
Novara	1.0	Norfolk Line	Most products distributed to/from surrounding area
Coatbridge	1.0	Russell Group	Most products distributed to/from surrounding area
Purfleet	2.0	Russell Group	Most products distributed to/from surrounding area
Evian	2.0	Malcolm Group	Most products handled through warehouses at DIRFT
Grangemouth	1.0	Malcolm Group	Most products handled through warehouses at DIRFT
Mossend	1.0	Malcolm Group	Most products handled through warehouses at DIRFT
Mossend	1.0	Tesco / Stobart	Most products handled through warehouses at DIRFT
Wentloog	1.0	Tesco / Stobart	Most products handled through warehouses at DIRFT
Tilbury	1.0	Tesco / Stobart	Most products handled through warehouses at DIRFT
Total	**12.6**		
of which	5.6	44%	Most products distributed to/from surrounding area
	7.0	56%	Most products handled through warehouses at DIRFT

7.10 Of the above only a lift from the train direct to HGV (assume worst case 60%) would provide a direct correlation between train and HGV movements. If the lifted container is either transferred to a warehouse (40%) or to stack (no data) any HGV movement arising would be totally independent of train arrival and departure times.

7.11 At the development stage for Northampton Gateway SRFI it is impossible to say with certainty the split of container movements or the final pattern of local distribution as identified above, as this will depend on a combination of the finally appointed terminal operator, end customer requirements and inter relationship with other SRFI sites and their sphere of operations. However, such movements are likely to be commercially viable for the Northampton and Wellingborough areas.

7.12 Based on the assessment of a maximum of 1938 two-way HGV movements identified in Section 6 of that could be associated with intermodal rail terminal (12 trains per 24 hours) and direct served warehousing (4 trains per day), the following assessment can be made of operations assuming 40% of all containers handled at the terminal have an origin and destination within Northampton Gateway SRFI.

- 1938 two-way HGV movements
- Of which 60% (1163) would go direct from 'train to HGV' for onward distribution and are therefore directly linked to train arrival times
- And 40% (775) would go to a site warehouse, either via HGV tug or a direct rail served facility, for add on value operations prior to onward distribution. For DIRFT all onward distribution is currently by road with the HGV timings being totally independent of train arrival times.

7.13 The timing of train arrivals and departures is not known in detail as train paths and hence arrival and departure times will depend on a combination of end user requirements, paths bid from

Network Rail by the Freight Operator to meet the end customer needs and the paths granted by Network Rail. For the assumed 60% of containers that go out by road direct from train it is not therefore possible to be precise at this stage on times of day.

7.14 Due to the inability to state with certainty at this stage exactly how HGV movements would correlate with train arrivals and departures it is considered that the best indicator of associated HGV movements can be derived from how other similar terminals within the UK operate and the HGV trip generation that ensues. For this reason, arrival and departure times of the 60% of HGVs assumed to be associated with direct lift from rail to HGV have been evaluated based on available data for the existing rail terminal at Hams Hall (as shown at Figure 4 of **Appendix B**).

7.15 Using the Hams Hall data to determine a daily profile of HGV movements associated with direct rail to HGV movements, the resulting HGV profile for the external HGV trips (60%) associated with the Rail Terminal is shown at **Table 5**, at the rear of this report.

8.0 TOTAL TRIP GENERATION

8.1 The internalised HGV trips would be independent of train times and, as they do not appear on the off-site highway network, they are deducted from the total HGVs that would be generated by the warehousing and distribution units operating in isolation.

8.2 This is summarised at **Table 6** at the rear of this report, which also includes the HGV movements associated with the RRF as calculated at Section 6 of this Note.

8.3 In total, it is forecast that Northampton Gateway SRFI would generate 4245 external two-way HGV trips per 24 hours, with morning and evening peak hour external HGV flows of 269 and 268 two-way movements, respectively.

8.4 Combining the external HGV trips (**Table 6**) with the light vehicle movements (**Tables 3 and 4**) gives the total development trip generation, which is shown at **Table 7** at the rear of this report, and summarised below for the peak hour periods and across the day.

Total development peak hour and daily vehicle trip generation (no Travel Plan)

	am peak (0800 to 0900 hrs)			pm peak (1700 to 1800 hrs)			daily (24 hrs)		
	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way
Light	700	75	775	230	804	1035	6191	6095	12286
HGV	138	131	269	138	130	268	2120	2125	4245
Total	838	206	1044	369	934	1303	8311	8220	16531

8.5 To calculate the overall person trips associated with the development, the light vehicle trips given at **Table 7** have been converted to person trips based on the 92% single occupancy vehicle (SOV) modal split characteristic of the Swan Valley site. As the main purpose of an HGV trip is the transportation of its cargo, the HGV trips are excluded from this calculation.

8.6 The resultant person trip generation is given at **Table 8** at the rear of this note.

8.7 Adding back in the HGV trips, overall it is forecast that Northampton Gateway SRFI would generate 17,657 two-way daily person trips, with 1111 and 1393 two-way person trips forecast in the morning and evening peak hour assessment periods.

9.0 TOTAL TRIP GENERATION WITH TRAVEL PLAN

9.1 In accordance with NCC requirements, the Travel Plan for the Northampton Gateway SRFI will include a target to reduce reliance on the private car by 20%. This will be achieved through the Public Transport Strategy and the promotion of car sharing, cycling and walking at the development.

9.2 Paragraph 25 of Circular 02/2013 sets out that the overall forecast demand against which traffic impacts on the Strategic Road Network should be assessed, should include for *"…any reduction arising from any travel plan or demand management measures that are being proposed".* Therefore, it is appropriate to allow for the effect of the Travel Plan on the forecast vehicle trip generation.

9.3 A 20% reduction in the baseline 92% SOV trips, equates to an 18.4% modal shift and hence an initial target SOV modal split of 73.6%.

9.4 Applying this to the person trips (excluding HGV trips) at **Table 8**, the resultant vehicle trip generation can be calculated (including allowance for the Travel Plan). This is shown at **Table 9**, at the rear of this Note and is summarised in the table below.

Total development peak hour and daily vehicle trip generation (with Travel Plan)									
	am peak (0800 to 0900 hrs)			pm peak (1700 to 1800 hrs)			daily (24 hrs)		
	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way
Light	560	60	620	184	644	828	4953	4918	9871
HGV	138	131	269	138	130	268	2120	2125	4245
Total	698	191	889	323	773	1096	7073	7043	14116

9.5 The above traffic flows represent the likely traffic generation for Northampton Gateway SRFI once the effect of the Travel Plan is considered. However, to ensure a robust assessment of the highway impacts, the Transport Working Group requested that assessment of the vehicle impacts be undertaken using the vehicle trip generation without considering the effect of the Travel Plan. The assessment flows for use in the strategic transport modelling are therefore those given at **Table 7**.

TABLES

			Light vehicle trip rates per 100sqm GFA									HGV trip rates per 100 sqm									Total trip rates per 100sqm GFA								
			AM peak hour			PM peak hour			Daily (24 hours)			AM peak hour			PM peak hour			Daily (24 hours)			AM peak hour			PM peak hour			Daily (24 hours)		
SITE	GFA (in sqm)	Information	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way	arrive	depart	two-way
Grange Park M1 J15, Northants	49,237	Three large units, all occupied by New Wave Logistics, each with approx. 5% ancillary B1	**0.152**	**0.018**	**0.170**	**0.051**	**0.118**	**0.169**	unknown			**0.020**	**0.022**	**0.042**	**0.020**	**0.019**	**0.040**	unknown			**0.172**	**0.040**	**0.212**	**0.071**	**0.138**	**0.209**	unknown		
Marston Gate, M1 J13, Brogborough	92668	Three large units, occupiers UCI Logistics, Wolseley, Amazon and Argos. Average B1 across the three units 7%	**0.110**	**0.048**	**0.158**	unknown			unknown			**0.024**	**0.015**	**0.039**	unknown			unknown			**0.133**	**0.064**	**0.197**	**0.084**	**0.141**	**0.225**	unknown		
Swan Valley, M1 J15A M1 J15A, Northants	137,500	Four large units, occupiers Carlsberg, Levi Strauss and Morrison within two units, approx. 5.6% ancillary B1	**0.122**	**0.013**	**0.135**	**0.029**	**0.108**	**0.137**	**1.060**	**1.043**	**2.103**	**0.012**	**0.015**	**0.028**	**0.013**	**0.016**	**0.029**	**0.306**	**0.316**	**0.622**	**0.134**	**0.028**	**0.162**	**0.042**	**0.124**	**0.166**	**1.366**	**1.359**	**2.725**
EuroHub A43, Corby	80,823	Three large units, occupiers Wincanton, Comet and Sainsbury's. Average ancillary B1 5.7% across the three units	**0.153**	**0.015**	**0.168**	**0.027**	**0.138**	**0.165**	unknown			**0.023**	**0.031**	**0.054**	**0.032**	**0.012**	**0.044**	unknown			**0.175**	**0.046**	**0.222**	**0.059**	**0.150**	**0.209**	unknown		
Gap M6 J1, Rugby	41,805	One large unit, ancillary office space 3.6%	**0.045**	**0.081**	**0.126**	**0.012**	**0.018**	**0.030**	unknown			**0.017**	**0.019**	**0.037**	**0.005**	**0.039**	**0.044**	unknown			**0.062**	**0.100**	**0.163**	**0.017**	**0.057**	**0.074**	unknown		
Sainsbury's M25 J25, Waltham	63,172	One large unit, ancillary office space 2.6%	**0.042**	**0.012**	**0.054**	**0.023**	**0.056**	**0.079**	unknown			**0.050**	**0.038**	**0.087**	**0.038**	**0.020**	**0.058**	unknown			**0.091**	**0.050**	**0.141**	**0.060**	**0.076**	**0.137**	unknown		
DIRFT M1 J18, Crick (Daventry)	60,385		**0.124**	**0.047**	**0.171**	**0.040**	**0.096**	**0.136**	unknown			**0.048**	**0.026**	**0.074**	**0.020**	**0.014**	**0.034**	unknown			**0.172**	**0.073**	**0.245**	**0.060**	**0.110**	**0.170**	unknown		
Sainsbury's M5 J7 Worcester	31,586		unknown			unknown			unknown			unknown			unknown			unknown			**0.166**	**0.064**	**0.229**	**0.039**	**0.173**	**0.212**	unknown		
Andover Airfield A303, Andover	43,500	One large unit occupied by the Co-op, with a high employee density ratio of around 1 per 46 sqm	**0.069**	**0.066**	**0.135**	**0.067**	**0.099**	**0.166**	**1.786**	**2.094**	**3.880**	**0.018**	**0.021**	**0.039**	**0.039**	**0.023**	**0.062**	**0.577**	**0.379**	**0.956**	**0.087**	**0.087**	**0.174**	**0.106**	**0.122**	**0.228**	**2.363**	**2.473**	**4.836**
Ocado (TRICS) Hatfield	80,000	Ocade distrbution centre, one large unit	**0.065**	**0.048**	**0.113**	**0.029**	**0.091**	**0.120**	**0.861**	**1.021**	**1.882**	**0.010**	**0.004**	**0.014**	**0.005**	**0.003**	**0.008**	**0.139**	**0.128**	**0.267**	**0.075**	**0.052**	**0.127**	**0.034**	**0.094**	**0.128**	**1.000**	**1.149**	**2.149**
Argos (TRICS) Darlington	80,066	Argos, two units approx 5% ancillary B1	**0.011**	**0.009**	**0.020**	**0.011**	**0.034**	**0.045**	**0.268**	**0.310**	**0.578**	**0.006**	**0.010**	**0.016**	**0.009**	**0.011**	**0.020**	**0.146**	**0.137**	**0.283**	**0.017**	**0.019**	**0.036**	**0.020**	**0.045**	**0.065**	**0.414**	**0.447**	**0.861**
Tesco (TRICS) Milton Keynes	52,125	Nation distrbution centre, one large unit	**0.068**	**0.042**	**0.110**	**0.031**	**0.069**	**0.100**	**0.915**	**1.041**	**1.956**	**0.036**	**0.042**	**0.078**	**0.025**	**0.035**	**0.060**	**0.426**	**0.425**	**0.851**	**0.104**	**0.084**	**0.188**	**0.056**	**0.104**	**0.160**	**1.341**	**1.466**	**2.807**
		AVERAGE	**0.087**	**0.036**	**0.124**	**0.032**	**0.083**	**0.115**	**0.978**	**1.102**	**2.080**	**0.024**	**0.022**	**0.046**	**0.021**	**0.019**	**0.040**	**0.319**	**0.277**	**0.596**	**0.116**	**0.059**	**0.175**	**0.054**	**0.111**	**0.165**	**1.297**	**1.379**	**2.676**

Table 1: Summary of surveyed vehicle trip rate data for large scale warehousing and distribution uses

Time Window	Swan Valley Traffic Count			Swan Valley Traffic Count			Trip rates per 100 employee			Trip rates per 100 sqm GFA		
							Light vehicles			Light vehicles		
	Arrive			Depart			trip rates per 100 employees			trip rates per 100sqm GFA		
	Lights	Heavies	Total	Lights	Heavies	Total	Arrive	Depart	Two-way	Arrive	Depart	Two-way
00.00-01.00	14	10	24	10	16	26	0.787	0.562	1.348	0.010	0.007	0.017
01.00-02.00	9	15	24	3	15	18	0.506	0.169	0.674	0.007	0.002	0.009
02.00-03.00	6	16	22	23	16	39	0.337	1.292	1.629	0.004	0.017	0.021
03.00-04.00	10	11	21	13	17	30	0.562	0.730	1.292	0.007	0.009	0.017
04.00-05.00	32	15	47	15	10	25	1.798	0.843	2.640	0.023	0.011	0.034
05.00-06.00	224	23	247	108	14	122	12.584	6.067	18.652	0.163	0.079	0.241
06.00-07.00	107	23	130	79	10	89	6.011	4.438	10.449	0.078	0.057	0.135
07.00-08.00	123	21	144	39	28	67	6.910	2.191	9.101	0.089	0.028	0.118
08.00-09.00	167	17	184	18	21	39	9.382	1.011	10.393	0.121	0.013	0.135
09.00-10.00	80	22	102	25	20	45	4.494	1.404	5.899	0.058	0.018	0.076
10.00-11.00	62	25	87	38	27	65	3.483	2.135	5.618	0.045	0.028	0.073
11.00-12.00	47	22	69	35	21	56	2.640	1.966	4.607	0.034	0.025	0.060
12.00-13.00	68	17	85	76	15	91	3.820	4.270	8.090	0.049	0.055	0.105
13.00-14.00	111	14	125	80	23	103	6.236	4.494	10.730	0.081	0.058	0.139
14.00-15.00	54	17	71	122	27	149	3.034	6.854	9.888	0.039	0.089	0.128
15.00-16.00	31	11	42	154	21	175	1.742	8.652	10.393	0.023	0.112	0.135
16.00-17.00	55	23	78	192	14	206	3.090	10.787	13.876	0.040	0.140	0.180
17.00-18.00	40	18	58	149	22	171	2.247	8.371	10.618	0.029	0.108	0.137
18.00-19.00	123	22	145	122	18	140	6.910	6.854	13.764	0.089	0.089	0.178
19.00-20.00	18	19	37	46	13	59	1.011	2.584	3.596	0.013	0.033	0.047
20.00-21.00	21	21	42	24	17	41	1.180	1.348	2.528	0.015	0.017	0.033
21.00-22.00	48	13	61	18	19	37	2.697	1.011	3.708	0.035	0.013	0.048
22.00-23.00	4	12	16	34	15	49	0.225	1.910	2.135	0.003	0.025	0.028
23.00-00.00	3	14	17	11	16	27	0.169	0.618	0.787	0.002	0.008	0.010
Totals	1457	421	1878	1434	435	1869	81.9	80.6	162.42	1.060	1.043	2.103

Predicted Traffic Profile		
Light vehicles		
M1J15 B8		
Arrive	Depart	Two-way
59	42	101
38	13	50
25	96	121
42	54	96
134	63	197
938	452	1391
448	331	779
515	163	679
700	75	775
335	105	440
260	159	419
197	147	344
285	318	603
465	335	800
226	511	737
130	645	775
230	804	1035
168	624	792
515	511	1026
75	193	268
88	101	189
201	75	277
17	142	159
13	46	59
6104	6008	12112

Time Window	Swan Valley Traffic Count			Swan Valley Traffic Count		
	Arrive			Depart		
	Lights	Heavies	Total	Lights	Heavies	Total
00.00-01.00	14	10	24	10	16	26
01.00-02.00	9	15	24	3	15	18
02.00-03.00	6	16	22	23	16	39
03.00-04.00	10	11	21	13	17	30
04.00-05.00	32	15	47	15	10	25
05.00-06.00	224	23	247	108	14	122
06.00-07.00	107	23	130	79	10	89
07.00-08.00	123	21	144	39	28	67
08.00-09.00	167	17	184	18	21	39
09.00-10.00	80	22	102	25	20	45
10.00-11.00	62	25	87	38	27	65
11.00-12.00	47	22	69	35	21	56
12.00-13.00	68	17	85	76	15	91
13.00-14.00	111	14	125	80	23	103
14.00-15.00	54	17	71	122	27	149
15.00-16.00	31	11	42	154	21	175
16.00-17.00	55	23	78	192	14	206
17.00-18.00	40	18	58	149	22	171
18.00-19.00	123	22	145	122	18	140
19.00-20.00	18	19	37	46	13	59
20.00-21.00	21	21	42	24	17	41
21.00-22.00	48	13	61	18	19	37
22.00-23.00	4	12	16	34	15	49
23.00-00.00	3	14	17	11	16	27
Totals	1457	421	1878	1434	435	1869

Trip rates per 100sqm GFA		
Heavy vehicles		
trip rates per 100sqm GFA		
Arrive	Depart	Two-way
0.007	0.012	0.019
0.011	0.011	0.022
0.012	0.012	0.023
0.008	0.012	0.020
0.011	0.007	0.018
0.017	0.010	0.027
0.017	0.007	0.024
0.015	0.020	0.036
0.012	0.015	0.028
0.016	0.015	0.031
0.018	0.020	0.038
0.016	0.015	0.031
0.012	0.011	0.023
0.010	0.017	0.027
0.012	0.020	0.032
0.008	0.015	0.023
0.017	0.010	0.027
0.013	0.016	0.029
0.016	0.013	0.029
0.014	0.009	0.023
0.015	0.012	0.028
0.009	0.014	0.023
0.009	0.011	0.020
0.010	0.012	0.022
0.306	0.316	0.623

Predicted Traffic Profile		
Heavy vehicles		
M1J15 B8		
Arrive	Depart	Two-way
40	63	103
60	60	119
63	63	127
44	67	111
60	40	99
91	56	147
91	40	131
83	111	194
67	83	151
87	79	167
99	107	206
87	83	171
67	60	127
56	91	147
67	107	175
44	83	127
91	56	147
71	87	159
87	71	159
75	52	127
83	67	151
52	75	127
48	60	107
56	63	119
1670	1726	3396

Time Window
00.00-01.00
01.00-02.00
02.00-03.00
03.00-04.00
04.00-05.00
05.00-06.00
06.00-07.00
07.00-08.00
08.00-09.00
09.00-10.00
10.00-11.00
11.00-12.00
12.00-13.00
13.00-14.00
14.00-15.00
15.00-16.00
16.00-17.00
17.00-18.00
18.00-19.00
19.00-20.00
20.00-21.00
21.00-22.00
22.00-23.00
23.00-00.00
Totals

Resultant Trip rates per 100sqm GFA									Predicted Traffic Profiles								
Light vehicles			Heavy vehicles			Total vehicles			Light vehicles			Heavy vehicles			Total vehicles		
trip rates per 100sqm GFA			trip rates per 100sqm GFA			trip rates per 100sqm GFA			M1J15 B8			M1J15 B8			M1J15 B8		
Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way
0.011	0.008	0.018	0.007	0.012	0.019	0.018	0.019	0.037	59	42	101	40	63	103	98	105	204
0.007	0.002	0.009	0.011	0.011	0.022	0.018	0.013	0.031	38	13	50	60	60	119	97	72	169
0.005	0.018	0.022	0.012	0.012	0.023	0.016	0.029	0.046	25	96	121	63	63	127	89	160	248
0.008	0.010	0.018	0.008	0.012	0.020	0.016	0.022	0.038	42	54	96	44	67	111	86	122	207
0.025	0.012	0.036	0.011	0.007	0.018	0.035	0.019	0.054	134	63	197	60	40	99	194	103	296
0.172	0.083	0.255	0.017	0.010	0.027	0.189	0.093	0.282	938	452	1391	91	56	147	1030	508	1538
0.082	0.061	0.143	0.017	0.007	0.024	0.099	0.068	0.167	448	331	779	91	40	131	540	371	910
0.094	0.030	0.124	0.015	0.020	0.036	0.110	0.050	0.160	515	163	679	83	111	194	599	274	873
0.128	0.014	0.142	0.012	0.015	0.028	0.141	0.029	0.170	700	75	775	67	83	151	767	159	926
0.061	0.019	0.081	0.016	0.015	0.031	0.077	0.034	0.111	335	105	440	87	79	167	422	184	607
0.048	0.029	0.077	0.018	0.020	0.038	0.066	0.049	0.115	260	159	419	99	107	206	359	266	625
0.036	0.027	0.063	0.016	0.015	0.031	0.052	0.042	0.094	197	147	344	87	83	171	284	230	514
0.052	0.058	0.111	0.012	0.011	0.023	0.065	0.069	0.134	285	318	603	67	60	127	352	378	730
0.085	0.061	0.147	0.010	0.017	0.027	0.095	0.078	0.174	465	335	800	56	91	147	521	426	947
0.041	0.094	0.135	0.012	0.020	0.032	0.054	0.113	0.167	226	511	737	67	107	175	294	618	912
0.024	0.118	0.142	0.008	0.015	0.023	0.032	0.134	0.165	130	645	775	44	83	127	174	728	902
0.042	0.147	0.190	0.017	0.010	0.027	0.059	0.158	0.217	230	804	1035	91	56	147	322	860	1182
0.031	0.114	0.145	0.013	0.016	0.029	0.044	0.130	0.174	168	624	792	71	87	159	239	712	951
0.094	0.094	0.188	0.016	0.013	0.029	0.110	0.107	0.217	515	511	1026	87	71	159	603	583	1185
0.014	0.035	0.049	0.014	0.009	0.023	0.028	0.045	0.072	75	193	268	75	52	127	151	244	395
0.016	0.018	0.035	0.015	0.012	0.028	0.031	0.031	0.062	88	101	189	83	67	151	171	168	339
0.037	0.014	0.051	0.009	0.014	0.023	0.046	0.028	0.074	201	75	277	52	75	127	253	151	403
0.003	0.026	0.029	0.009	0.011	0.020	0.012	0.037	0.049	17	142	159	48	60	107	64	202	266
0.002	0.008	0.011	0.010	0.012	0.022	0.012	0.020	0.033	13	46	59	56	63	119	68	110	178
1.119	1.101	2.220	0.306	0.316	0.623	1.425	1.418	2.843	6104	6008	12112	1670	1726	3396	7774	7733	15508

B8 Swan Valley Statistics	
GFA /sqm	137500
Employees	1780
Ratio	1 per 77 sqm GFA

B8 M1J15	
GFA sqm	545500
GEA sqm	574211
Employees	7457
Ratio	1 per 77 sqm GEA

Table 2: Vehicle trips for warehousing and distribution uses (based on Swan Valley trip rates per employee and per 100sqm GFA)

Time Window	Swan Valley Traffic Count			Swan Valley Traffic Count			Trip rates									Predicted Traffic Profiles for M1J15 Northampton Gateway B8 use								
							Light vehicles			Heavy vehicles			Total vehicles			Light vehicles			Heavy vehicles			Total vehicles		
	Arrive			Depart			trip rates per 100sqm GFA			trip rates per 100 sqm GFA			trip rates per 100 sqm GFA			M1J15 B8			M1J15 B8			M1J15 B8		
	Lights	Heavies	Total	Lights	Heavies	Total	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way
00.00-01.00	14	10	24	10	16	26	0.011	0.008	0.018	0.007	0.012	0.019	0.018	0.019	0.037	59	42	101	40	63	103	98	105	204
01.00-02.00	9	15	24	3	15	18	0.007	0.002	0.009	0.011	0.011	0.022	0.018	0.013	0.031	38	13	50	60	60	119	97	72	169
02.00-03.00	6	16	22	23	16	39	0.005	0.018	0.022	0.012	0.012	0.023	0.016	0.029	0.046	25	96	121	63	63	127	89	160	248
03.00-04.00	10	11	21	13	17	30	0.008	0.010	0.018	0.008	0.012	0.020	0.016	0.022	0.038	42	54	96	44	67	111	86	122	207
04.00-05.00	32	15	47	15	10	25	0.025	0.012	0.036	0.011	0.007	0.018	0.035	0.019	0.054	134	63	197	60	40	99	194	103	296
05.00-06.00	224	23	247	108	14	122	0.172	0.083	0.255	0.017	0.010	0.027	0.189	0.093	0.282	938	452	1391	91	56	147	1030	508	1538
06.00-07.00	107	23	130	79	10	89	0.082	0.061	0.143	0.017	0.007	0.024	0.099	0.068	0.167	448	331	779	91	40	131	540	371	910
07.00-08.00	123	21	144	39	28	67	0.094	0.030	0.124	0.015	0.020	0.036	0.110	0.050	0.160	515	163	679	83	111	194	599	274	873
08.00-09.00	167	17	184	18	21	39	0.128	0.014	0.142	0.024	0.022	0.046	0.152	0.036	0.188	700	75	775	131	120	251	831	195	1026
09.00-10.00	80	22	102	25	20	45	0.061	0.019	0.081	0.016	0.015	0.031	0.077	0.034	0.111	335	105	440	87	79	167	422	184	607
10.00-11.00	62	25	87	38	27	65	0.048	0.029	0.077	0.018	0.020	0.038	0.066	0.049	0.115	260	159	419	99	107	206	359	266	625
11.00-12.00	47	22	69	35	21	56	0.036	0.027	0.063	0.016	0.015	0.031	0.052	0.042	0.094	197	147	344	87	83	171	284	230	514
12.00-13.00	68	17	85	76	15	91	0.052	0.058	0.111	0.012	0.011	0.023	0.065	0.069	0.134	285	318	603	67	60	127	352	378	730
13.00-14.00	111	14	125	80	23	103	0.085	0.061	0.147	0.010	0.017	0.027	0.095	0.078	0.174	465	335	800	56	91	147	521	426	947
14.00-15.00	54	17	71	122	27	149	0.041	0.094	0.135	0.012	0.020	0.032	0.054	0.113	0.167	226	511	737	67	107	175	294	618	912
15.00-16.00	31	11	42	154	21	175	0.024	0.118	0.142	0.008	0.015	0.023	0.032	0.134	0.165	130	645	775	44	83	127	174	728	902
16.00-17.00	55	23	78	192	14	206	0.042	0.147	0.190	0.017	0.010	0.027	0.059	0.158	0.217	230	804	1035	91	56	147	322	860	1182
17.00-18.00	40	18	58	149	22	171	0.031	0.114	0.145	0.021	0.019	0.040	0.052	0.133	0.185	168	624	792	115	104	218	282	728	1010
18.00-19.00	123	22	145	122	18	140	0.094	0.094	0.188	0.016	0.013	0.029	0.110	0.107	0.217	515	511	1026	87	71	159	603	583	1185
19.00-20.00	18	19	37	46	13	59	0.014	0.035	0.049	0.014	0.009	0.023	0.028	0.045	0.072	75	193	268	75	52	127	151	244	395
20.00-21.00	21	21	42	24	17	41	0.016	0.018	0.035	0.015	0.012	0.028	0.031	0.031	0.062	88	101	189	83	67	151	171	168	339
21.00-22.00	48	13	61	18	19	37	0.037	0.014	0.051	0.009	0.014	0.023	0.046	0.028	0.074	201	75	277	52	75	127	253	151	403
22.00-23.00	4	12	16	34	15	49	0.003	0.026	0.029	0.009	0.011	0.020	0.012	0.037	0.049	17	142	159	48	60	107	64	202	266
23.00-00.00	3	14	17	11	16	27	0.002	0.008	0.011	0.010	0.012	0.022	0.012	0.020	0.033	13	46	59	56	63	119	68	110	178
Totals	**1457**	**421**	**1878**	**1434**	**435**	**1869**	**1.119**	**1.101**	**2.220**	**0.326**	**0.326**	**0.652**	**1.445**	**1.427**	**2.872**	**6104**	**6008**	**12112**	**1777**	**1779**	**3556**	**7881**	**7787**	**15667**

peak hour HGV trip rates adjusted to match average from Table 1

	B8 Swan Valley Statistics
GFA /sqm	137500
Employees	1780
Ratio	1 per 77sqm

	Proposed B8 use at M1J15
GFA sqm	545500
GEA sqm	574211
Employees	7457
Ratio	1 per 77 sqm

Table3: Forecast vehicle trips for warehousing and distribution uses (based on adjusted Swan Valley trip rates)

Time Window	Rail Terminal (including RRF) Light vehicles employee movements		
	Arrive	Depart	Two-way
00.00-01.00	0	0	0
01.00-02.00	0	0	0
02.00-03.00	0	0	0
03.00-04.00	0	0	0
04.00-05.00	0	0	0
05.00-06.00	29	0	29
06.00-07.00	0	29	29
07.00-08.00	0	0	0
08.00-09.00	0	0	0
09.00-10.00	0	0	0
10.00-11.00	0	0	0
11.00-12.00	0	0	0
12.00-13.00	0	0	0
13.00-14.00	29	0	29
14.00-15.00	0	29	29
15.00-16.00	0	0	0
16.00-17.00	0	0	0
17.00-18.00	0	0	0
18.00-19.00	0	0	0
19.00-20.00	0	0	0
20.00-21.00	0	0	0
21.00-22.00	29	0	29
22.00-23.00	0	29	29
23.00-00.00	0	0	0
Totals	87	87	174

Table 4: Light vehicle trips associated with Rail Terminal

Time window	HGV arrivals at Hams Hall							
	Mon 01/02/2010	Tue 02/02/2010	Wed 03/02/2010	Thu 04/02/2010	Fri 05/02/2010	Sat 06/02/2010	Average M-F	Arrival as %
00:00	0	0	0	2	2	0	0.8	0.22%
01:00	0	3	3	1	0	0	1.4	0.39%
02:00	0	0	3	1	3	5	1.4	0.39%
03:00	0	2	1	1	1	0	1.0	0.28%
04:00	0	8	4	2	0	1	2.8	0.78%
05:00	0	22	6	12	7	0	9.4	2.61%
06:00	32	27	16	18	16	1	21.8	6.05%
07:00	35	20	34	30	25	5	28.8	7.99%
08:00	20	20	23	11	19	4	18.6	5.16%
09:00	27	16	22	16	11	2	18.4	5.11%
10:00	27	27	33	21	20	4	25.6	7.10%
11:00	25	18	24	25	29	2	24.2	6.71%
12:00	34	34	30	34	28	5	32.0	8.88%
13:00	30	25	26	22	26	2	25.8	7.16%
14:00	14	22	23	18	15	1	18.4	5.11%
15:00	34	23	18	27	26		25.6	7.10%
16:00	33	18	33	34	26		28.8	7.99%
17:00	33	24	23	28	24		26.4	7.33%
18:00	33	16	24	21	28		24.4	6.77%
19:00	31	8	11	8	15		14.6	4.05%
20:00	5	8	12	3	1		5.8	1.61%
21:00	4	2	5	1	1		2.6	0.72%
22:00	4	1	0	1	0		1.2	0.33%
23:00	0	2	1	0	0		0.6	0.17%
Total	**421**	**346**	**375**	**337**	**323**	**32**	**360.4**	**100%**

Rail Terminal** HGV trips (in isolation) i.e. 100%		
Arrive	Depart	Two-way
2	2	4
4	4	8
4	4	8
3	3	5
8	8	15
25	25	51
59	59	117
77	77	155
50	50	100
49	49	99
69	69	138
65	65	130
86	86	172
69	69	139
49	49	99
69	69	138
77	77	155
71	71	142
66	66	131
39	39	79
16	16	31
7	7	14
3	3	6
2	2	3
969	**969**	**1938**

Rail Terminal external HGV trips		
	60%	external
Arrive	Depart	Two-way
1	1	3
2	2	5
2	2	5
2	2	3
5	5	9
15	15	30
35	35	70
46	46	93
30	30	60
30	30	59
41	41	83
39	39	78
52	52	103
42	42	83
30	30	59
41	41	83
46	46	93
43	43	85
39	39	79
24	24	47
9	9	19
4	4	8
2	2	4
1	1	2
581	**581**	**1163**

**Arrivals based on Hams Hall

Assume 50%/50% split between Arrivals and Departures

Table 5: HGV movements associated with Intermodal Rail Terminal

Time Window	HGVs M1J15 B8 warehouses			Intermodal Internal 40% Intermodal Internal*			Intermodal External 60% Intermodal external HGVs**			Rapid Rail Freight external HGVs***			Total external HGVs SRFI		
	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way
00.00-01.00	40	63	103	-9	-13	-22	1	1	3	6	6	13	38	58	96
01.00-02.00	60	60	119	-13	-13	-26	2	2	5	6	6	13	55	55	110
02.00-03.00	63	63	127	-14	-14	-28	2	2	5	6	6	13	58	58	116
03.00-04.00	44	67	111	-10	-14	-24	2	2	3	6	6	13	42	61	103
04.00-05.00	60	40	99	-13	-9	-22	5	5	9	6	6	13	57	42	99
05.00-06.00	91	56	147	-20	-12	-32	15	15	30	6	6	13	93	65	158
06.00-07.00	91	40	131	-20	-9	-29	35	35	70	6	6	13	113	73	185
07.00-08.00	83	111	194	-18	-24	-42	46	46	93	6	6	13	118	139	258
08.00-09.00	131	120	251	-29	-26	-55	30	30	60	6	6	13	138	131	269
09.00-10.00	87	79	167	-19	-17	-36	30	30	59	6	6	13	104	98	202
10.00-11.00	99	107	206	-22	-23	-45	41	41	83	6	6	13	125	132	257
11.00-12.00	87	83	171	-19	-18	-37	39	39	78	6	6	13	114	110	224
12.00-13.00	67	60	127	-15	-13	-28	52	52	103	6	6	13	110	105	215
13.00-14.00	56	91	147	-12	-20	-32	42	42	83	6	6	13	91	119	211
14.00-15.00	67	107	175	-15	-23	-38	30	30	59	6	6	13	88	120	208
15.00-16.00	44	83	127	-10	-18	-28	41	41	83	6	6	13	81	113	194
16.00-17.00	91	56	147	-20	-12	-32	46	46	93	6	6	13	124	96	220
17.00-18.00	115	104	218	-25	-23	-48	43	43	85	6	6	13	138	130	268
18.00-19.00	87	71	159	-19	-16	-35	39	39	79	6	6	13	114	101	215
19.00-20.00	75	52	127	-16	-12	-28	24	24	47	6	6	13	89	70	159
20.00-21.00	83	67	151	-18	-15	-33	9	9	19	6	6	13	81	68	149
21.00-22.00	52	75	127	-11	-17	-28	4	4	8	6	6	13	51	69	120
22.00-23.00	48	60	107	-10	-13	-23	2	2	4	6	6	13	46	54	100
23.00-00.00	56	63	119	-12	-14	-26	1	1	2	6	6	13	51	57	108
Totals	**1777**	**1779**	**3556**	**-389**	**-386**	**-775**	**581**	**581**	**1163**	**151**	**151**	**302**	**2120**	**2125**	**4245**

* Based on Swan Valley HGV profile

** Based on Hams Hall Train Arrivals

*** Based on consistent use through the day

Table 6: Total external HGVs including for interaction between rail and warehousing and distributions uses

Time Window	Predicted Traffic Profiles for M1J15 Northampton Gateway SRFI no Travel Plan								
	Light vehicles			Heavy vehicles			Total vehicles		
	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way
00.00-01.00	59	42	101	38	58	96	97	99	196
01.00-02.00	38	13	50	55	55	110	93	68	160
02.00-03.00	25	96	121	58	58	116	83	155	238
03.00-04.00	42	54	96	42	61	103	83	116	199
04.00-05.00	134	63	197	57	42	99	191	105	296
05.00-06.00	967	452	1420	93	65	158	1060	517	1578
06.00-07.00	448	360	808	113	73	185	561	433	994
07.00-08.00	515	163	679	118	139	258	633	303	936
08.00-09.00	700	75	775	138	131	269	838	206	1044
09.00-10.00	335	105	440	104	98	202	439	203	642
10.00-11.00	260	159	419	125	132	257	385	291	675
11.00-12.00	197	147	344	114	110	224	311	257	568
12.00-13.00	285	318	603	110	105	215	395	423	818
13.00-14.00	494	335	829	91	119	211	585	454	1040
14.00-15.00	226	540	766	88	120	208	315	660	975
15.00-16.00	130	645	775	81	113	194	211	758	970
*16.00-17.00**	168	624	792	124	96	220	292	721	1012
*17.00-18.00**	230	804	1035	138	130	268	369	934	1303
18.00-19.00	515	511	1026	114	101	215	629	613	1242
19.00-20.00	75	193	268	89	70	159	165	262	427
20.00-21.00	88	101	189	81	68	149	169	169	338
21.00-22.00	230	75	306	51	69	120	281	145	426
22.00-23.00	17	171	188	46	54	100	63	226	288
23.00-00.00	13	46	59	51	57	108	63	103	166
Totals	**6191**	**6095**	**12286**	**2120**	**2125**	**4245**	**8311**	**8220**	**16531**

* light vehicle generation for 1600 to 1700 hrs from Table 3 swapped 1700 to 1800 hrs generation to ensure worst case shoulder peak is assessed

	Proposed B8 use at M1J15
GFA sqm	545500
GEA sqm	574211
Employees	7457
Ratio	1 per 77 sqm GEA

Table 7: Total development traffic (no Travel Plan)

Time Window	Person Trip* (excluding HGV drivers)			Person Trip (HGV driver)			Total Person Trips		
	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way
00.00-01.00	64	103	167	38	58	96	102	161	263
01.00-02.00	41	14	55	55	55	110	96	69	165
02.00-03.00	27	105	132	58	58	116	85	163	248
03.00-04.00	46	59	105	42	61	103	87	120	207
04.00-05.00	146	68	214	57	42	99	203	110	313
05.00-06.00	1052	492	1543	93	65	158	1144	557	1701
06.00-07.00	487	391	879	113	73	185	600	464	1064
07.00-08.00	560	178	738	118	139	258	678	317	995
08.00-09.00	760	82	842	138	131	269	899	213	1111
09.00-10.00	364	114	478	104	98	202	469	212	680
10.00-11.00	282	173	455	125	132	257	407	305	712
11.00-12.00	214	159	373	114	110	224	328	270	597
12.00-13.00	310	346	656	110	105	215	420	451	871
13.00-14.00	537	364	901	91	119	211	628	483	1112
14.00-15.00	246	587	833	88	120	208	334	707	1041
15.00-16.00	141	701	842	81	113	194	222	815	1037
16.00-17.00	182	679	861	124	96	220	306	775	1081
17.00-18.00	250	874	1125	138	130	268	389	1004	1393
18.00-19.00	560	556	1116	114	101	215	674	657	1331
19.00-20.00	82	209	291	89	70	159	171	279	450
20.00-21.00	96	109	205	81	68	149	177	178	354
21.00-22.00	250	82	332	51	69	120	301	151	452
22.00-23.00	18	186	205	46	54	100	64	241	305
23.00-00.00	14	50	64	51	57	108	64	107	171
Totals	**6729**	**6682**	**13412**	**2120**	**2125**	**4245**	**8850**	**8807**	**17657**

*Based on Swan Valley Single vehicle occupancy of 92%

Table 8: Total person trips

Time Window	Predicted Traffic Profiles for M1J15 Northampton Gateway SRFI with Travel Plan								
	Light vehicles			Heavy vehicles			Total vehicles		
	Arrive	Depart	Two-way	Arrive	Depart	Two-way	Arrive	Depart	Two-way
00.00-01.00	47	76	123	38	58	96	85	133	219
01.00-02.00	30	10	40	55	55	110	85	65	150
02.00-03.00	20	77	97	58	58	116	78	135	214
03.00-04.00	34	44	77	42	61	103	75	105	180
04.00-05.00	107	50	158	57	42	99	165	92	257
05.00-06.00	774	362	1136	93	65	158	867	427	1294
06.00-07.00	359	288	647	113	73	185	471	361	832
07.00-08.00	412	131	543	118	139	258	530	270	800
08.00-09.00	560	60	620	138	131	269	698	191	889
09.00-10.00	268	84	352	104	98	202	372	182	554
10.00-11.00	208	127	335	125	132	257	333	259	592
11.00-12.00	158	117	275	114	110	224	271	228	499
12.00-13.00	228	255	483	110	105	215	338	359	698
13.00-14.00	395	268	663	91	119	211	487	387	874
14.00-15.00	181	432	613	88	120	208	269	552	822
15.00-16.00	104	516	620	81	113	194	185	629	814
16.00-17.00	134	499	633	124	96	220	258	596	854
17.00-18.00	184	644	828	138	130	268	323	773	1096
18.00-19.00	412	409	821	114	101	215	526	510	1037
19.00-20.00	60	154	215	89	70	159	150	224	373
20.00-21.00	70	80	151	81	68	149	151	149	300
21.00-22.00	184	60	244	51	69	120	235	130	365
22.00-23.00	13	137	151	46	54	100	59	192	251
23.00-00.00	10	37	47	51	57	108	61	94	155
Totals	**4953**	**4918**	**9871**	**2120**	**2125**	**4245**	**7073**	**7043**	**14116**

	Proposed B8 use at M1J15
GFA sqm	545500
GEA sqm	574211
Employees	7457
Ratio	1 per 77 sqm GEA

Travel Plan single occpancy car target 73.6%

Table 9: Total development traffic with Travel Plan

APPENDIX A

INDICATIVE DEVELOPMENT MASTERPLAN

FOOTPATH KEY

- Footpath existing
- Footpath existing
- Footpath Proposed

GROSS INTERNAL AREAS

	Square ft	(Square m)
UNIT 1		
Warehouse	500,000 ft²	
Office	30,000 ft²	
TOTAL	530,000 ft²	(49,238 sqm)
UNIT 2		
Warehouse	515,000 ft²	
Office	30,000 ft²	
TOTAL	545,000 ft²	(50,632 sqm)
UNIT 3		
Warehouse	653,000 ft²	
Office	30,000 ft²	
TOTAL	683,000 ft²	(63,452 sqm)
UNIT 4		
Warehouse	790,000 ft²	
Office	40,000 ft²	
TOTAL	830,000 ft²	(77,109 sqm)
UNIT 5		
Warehouse	657,000 ft²	
Office	37,000 ft²	
TOTAL	694,000 ft²	(64,474 sqm)
UNIT 6		
Warehouse	513,000 ft²	
Office	35,000 ft²	
TOTAL	548,000 ft²	(50,910 sqm)
UNIT 7		
Warehouse	1,150,000 ft²	
Office	41,000 ft²	
TOTAL	1,191,000 ft²	(110,648 sqm)
FREIGHT TERMINAL		
Offices	20,000 ft²	(1858 sqm)
GRAND TOTAL	5,041,000 ft²	(468,324 sqm)

M1 Junction 15 West Northampton

ROXHILL

pHp Architects
www.peter-haddon.com

INDICATIVE MASTERPLAN
-

Drawing Status:	PRELIMINARY
CAD Reference:	4054-R003a
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Date:	Jun2016
Scale @A0:	1/2500

Project No:	Drawing No:	Rev:
4054	R001	P28

APPENDIX B

STRATEGIC FRIEGHT NETWORK CONNECTIVITY AND HGV TRIP GENERATION TECHNICAL NOTE

J15 Proposed SRFI

Strategic Freight Network Connectivity & HGV Trip Generation. Technical Note

Geoff Bounds Consulting Ltd

Version: Draft 5

October 2016

DRAFT 5

J15 Proposed SRFI

Strategic Freight Network Connectivity & HGV Trip Generation. Technical Note

Index

DRAFT 5

1. Version Control

Version	Detail	Date
Draft 1	First draft report for review	07/09/2016
Draft 2	Second draft report for review	22/09/2016
Draft 3	Changes to Section 6 to reflect potential HGV movements	27/09/2016
Draft 4	Review changes	29/09/2016
Draft 5	Section 7.12 Bullet 4 amended	26/10/2016

2. Abbreviations

BRUTE	**B**ritish **R**ail **U**niversal **T**rolley **E**quipment
DfT	Department for Transport
DIRFT	Daventry International Rail Freight Terminal
HGV	Heavy Goods Vehicle
LDHS	Long Distance High Speed (passenger operations)
SFN	Strategic Freight Network
SRFI	Strategic Rail Freight Interchange
TEU	Twenty Foot Equivalent Unit i.e. a standard 60' intermodal wagon will have a 3 TEU capability
RFF	Rapid Freight Facility

3. Background to this Note

3.1 This note has been produced in support of the work being undertaken in respect of trip generation from the proposed SRFI at J15 Northampton.

3.2 The aim of the note is to set out the principles governing the establishment and operation of the SRFI facility at J15 Northampton, SFN connectivity, the emergence of RRF as a freight concept and the material bearing these factors are expected to have on HGV trip generation.

3.3 Evidence to support analysis of HGV trip generation is drawn from:

- Current trends at other equivalent SRFI facilities within the UK
- Volume growth trends (containers/train) on the UK rail network including the 2013 Freight Market Study which considered the scope for further growth in both deep sea and domestic operations within the UK through to 2043.

3.4 This technical note sets out the assumptions and observed data from which to estimate HGV trip generation from the intermodal terminal at the proposed J15 SRFI.

3.5 It also analyses the HGV trip generation potential for the proposed rapid rail freight facility.

4. The Background Need for SRFI Facilities

4.1 Traditionally rail freight terminals have been developed to allow the transshipment of single commodities by rail i.e. coal, steel, petrochemicals, aggregates etc.

4.2 The single commodity focus provides a clear basis of understanding of how the terminal will work in terms of rail volumes in/out, rail source points/end destinations and the interaction with road vehicle movements related to the terminal operation specifically relative to HGV movements on/off the public highway.

4.3 The advent of the containerised movement of goods from the 1960s onwards has revolutionised the way that goods are moved both nationally and internationally.

4.4 The ability of containers to be moved by ship, road and rail provides a remarkable level of flexibility in terms of transportation options and gives rise to the term “intermodal freight”.

4.5 However SRFI facilities by nature of both the multiplicity of commodities carried and differing supply chain requirements gives rise to the need for terminals that are more flexible in their approach than the traditional single commodity terminal where the terminal is, typically, located immediately adjacent to the wider processing operation. Examples of single commodity terminals include:

- Petrochemical terminals
- Aggregate and other bulk commodity (coal/biomass) terminals

Fig 1 - Single commodity (ESI coal) rail terminal at Immingham

4.6 An SRFI (Fig 2) is typically a large warehousing and distribution facility with multiple warehouse units of up to 1m sq ft floor area serving a variety of end users. Although the J15 SRFI makes provision for direct rail served warehouse units by means of dedicated rail connections within the overall park, an SRFI will also be equipped with its own dedicated multiple road rail terminal and associated concrete pad. For modern terminals loading/unloading sidings and the associated pad will be 775m long to allow the longest planned intermodal rail services to be accommodated.

Fig 2 DIRFT SRFI

4.7 It is an assumption of this note that container movements to individual warehouse units on the park will either be direct to the individual warehouse unit by means of an adjacent rail loading/unloading pad where these are provisioned within the master plan and required by the warehouse occupier or by delivery of the containers by rail to the main loading/unloading terminal with the containers then being transferred by tug unit from the terminal to the warehouse unit.

4.8 The J15 SRFI also makes provision for a Rapid Rail Freight facility separate to the main terminal. The rationale for this facility and its potential impact on both rail movements and HGV trip generation are considered at Section 6 of this note.

4.9 Loading/unloading of containers to/from rail vehicles on the main terminal will either be by reach stacker or, for terminals with more than two loading/unloading sidings, gantry cranes.

4.10 Loading/unloading of containers to/from rail vehicles on pads adjacent to individual warehouse units (if provided) is expected to be by reach stacker operation.

4.11 The Rapid Rail Freight facility is designed for the transshipment of light weight commodities such as parcels, chilled goods etc as a roll cage operation as opposed to a containerised operation. Transfer of goods to/from rail vehicles is therefore envisaged to be by the movement of roll cages as a cross dock operation between HGV and rail vehicle.

4.12 Although for SRFI facilities within the UK to date the rail volumes (trains/day) typically start at low levels (1-2 trains/day) the expectation is that an SRFI, fully developed and over time, will generate somewhere between 10 and 20 trains in and out either onto the main terminal or the individual rail served warehouse units, these serving a variety of end user requirements. All of these trains will be traditional intermodal type operations. J15 SRFI has an assumed upper volume of 16 trains/day for such operations across the main terminal and the individual rail served warehouse units.

4.13 The Rapid Rail Freight facility is a new concept to SRFI operations although, in reality, as a mode of operation it is more akin to a re-emergence of the typical parcels type operation that formed a mainstay of UK rail passenger and parcels operations for much of the 19th and 20th centuries. In this case it is envisaged as meeting a growing 21st century market demand for high speed lightweight logistics operations being accommodated in passenger type rail vehicles adapted for lightweight freight use and cap[able of operating at passenger train speeds. At maturity the Rapid Rail Freight facility is expected to operate at a level of up to 12 trains/day. It should be noted that these train volumes are additional to those identified at 4.12 above.

5. J15 SRFI – Rail Connectivity

5.1 Network Rail, under direction from the DfT are developing the SFN. This is a network of key existing rail routes that will be enhanced in terms of their capability to accommodate forecast growth in freight traffic.

5.2 Freight capability enhancement on SFN routes includes a combination of gauge clearance (to allow the movement of 9'-6" high deep sea containers on 1m high platform wagons), train lengthening, capacity enhancement and measures to allow the better integration of freight and passenger operations without and adverse impact on either operation.

5.3 Fig 3 shows the proposed SFN network and the position of the J15 SRFI relative to the emerging SFN network.

5.4 The SFN is a committed (funded) programme which commenced in 2008 and has a funding commitment from the Government until at least 2019. Development of the SFN network supports the Government's objectives for freight mode shift from road to rail wherever this is considered to be commercially viable. Importantly the SFN programme has not been impacted by Government spending reviews. This is regarded therefore as a clear demonstration of the Government's ongoing commitment to this programme.

5.5 The 2013 Network Rail Freight Market Study confirmed that intermodal traffic, particularly deep sea and UK domestic is forecast to be the largest growth sector for rail freight through the period up to 2043. This is borne out by trends to date both in the growth of intermodal traffic generally and in the context of mode shift from road to rail.

5.6 Intermodal traffic within the UK originates typically from thee deep sea container ports, currently Felixstowe, Southampton and London Gateway or the Channel Tunnel. To date onward distribution from an SRFI has been in the main by road. However the following factors:

- Fuel pricing
- Carbon reduction
- Drivers working hours directives
- Shortage of HGV drivers
- Supply chain reliability
- Cost

have the [potential to influence onward distribution between regional distribution clusters by rail.

5.7 Decisions by retailers and logistics operators to move inter regional distribution from road to rail are likely to be driven by a mix of commercial/policy decision making by individual organisations. The Tesco operation from Daventry (DIRFT) to Central Scotland and the further planned major expansion of this operation is a clear indicator of the opportunities for growth in inter regional distribution.

5.8 Local distribution, sometimes referred to as “last mile” distribution is expected to remain with road as this is distribution from regional hubs to individual outlets (retail or manufacturing units) and is an area where for obvious reasons rail cannot compete effectively.

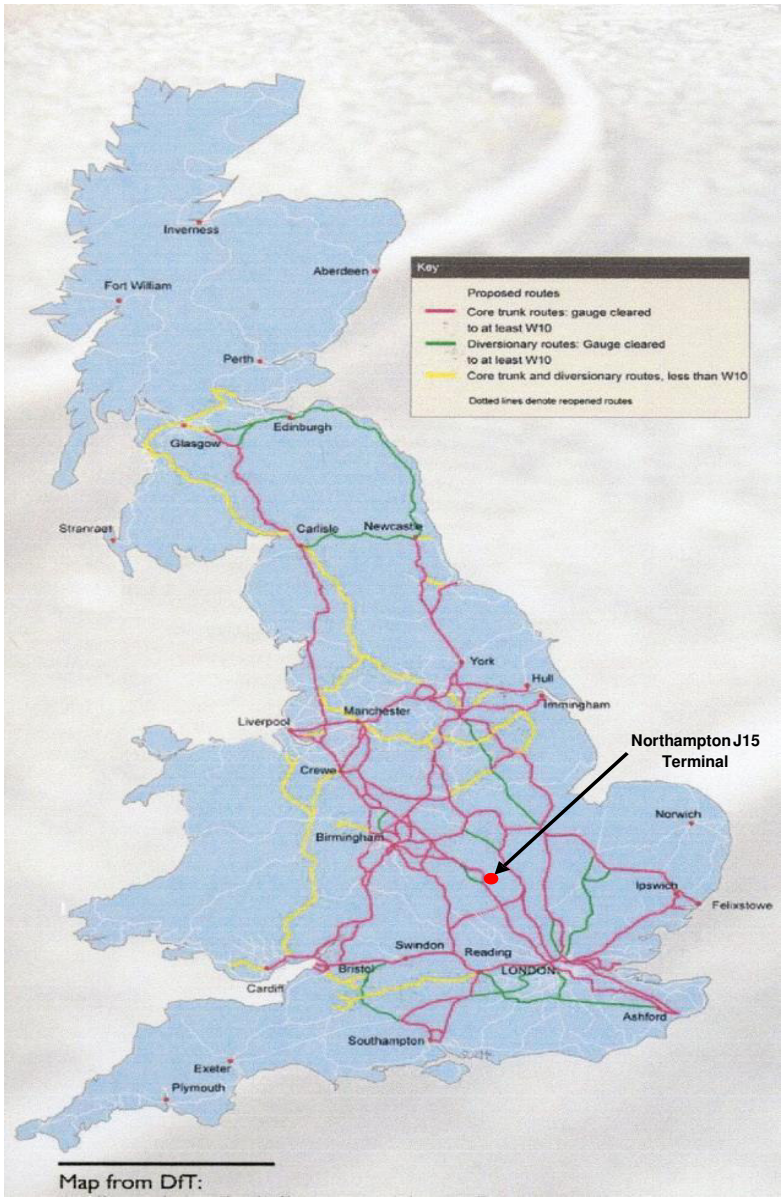


Fig 3 SFN Network

5.9 Regional distribution clusters within the UK are well defined and are:

- London and the South East
- The Midlands (East and West)
- The South west (mainly focused on the Bristol and South Wales areas)
- The North East
- The North West
- Central Scotland

5.10 Rail intermodal operations under current pricing regimes are generally considered to be commercially viable at distances in excess of 100 miles.

5.11 Of the regional distribution clusters identified at 5.9 the J15 SRFI is likely to serve the North East, North West and Central Scotland plus possibly the South West. The West Midlands and emerging East Midlands terminals are below the 100 mile threshold identified at 5.10 and hence are unlikely to be commercially viable as rail operations. London and the South East is expected to be served by connectivity to London Gateway.

5.12 The J15 SRFI will have both south and north facing connections into Network Rail's Northampton Loop. The Northampton Loop branches off the West Coast Main Line at Hanslope Junction to the south and rejoins the main line at Hilmorton Junction immediately to the south of Rugby.

5.13 The Northampton Loop principally serves Northampton and at the north end of the loop DIRFT.

5.14 Both the West Coast Main Line and the Northampton Loop are electrified at 25kv a.c. overhead line equipment. As such there is the opportunity for the J15 SRFI to be served by both electric and diesel hauled services.

5.15 The West Coast Main Line is one of three north – south rail trunk routes within the UK and serves London (Euston for passenger Willesden for freight) Watford, Bletchley, Milton Keynes, Northampton, Rugby, Birmingham and the West Midlands, Stafford, Crewe, Manchester, Liverpool, Preston, Carlisle, Glasgow and Central Scotland. There are also routes from the West Coast Main Line that serve mid Wales, North Wales, Blackpool and West Cumbria.

5.16 The West Coast Main Line is regarded as a classic mixed traffic rail route with passenger services being typically a mix of LDHS (125mph) and inter urban (100mph) operations. Freight, as nationally, operates at 60 mph for the heavier Class 6 aggregate and bulk commodity services and 75mph for Class 4 intermodal traffic. Rapid rail freight operations are lightweight operations in passenger type vehicles adapted for freight use and are therefore able to operate at passenger line speeds.

5.17 The West Coast Main Line is an intensively used trunk route for both passenger and freight operations with heaviest passenger service volumes being concentrated on the south end of the route (Rugby – London) during the morning and evening peak hours. Outside of these times the route accommodates a mix of freight and passenger operations as set out at 5.16.

5.18 Network Rail's freight and Passenger Market Studies forecast significant potential growth in both sectors through to 2043. Left unaddressed this forecast growth has the potential to result in significant capacity constraint issues on key rail routes such as the West Coast Main Line going forward.

5.19 The first phase of HS2 construction will be from London (Euston) to the West Midlands with subsequent phases of construction extending HS2 to the North West, East Midlands and the North East.

5.20 It is expected that HS2, when operational, will allow the transfer of LDHS services away from routes such as the West Coast Main Line. This, in turn, is expected to release additional capacity on the West Coast Main Line to accommodate growth in other, slower traffic. The precise level of capacity that would be released following construction of HS2 phase 1 is still being evaluated. However current indications are that once operational HS2 could release capacity on the West Coast Main Line for up to 25 additional freight trains/day. This potential growth in capacity for freight traffic is important as it has the [potential to match, in timing terms, the growth profile of traffic from the J15 SRFI (Section 6).

5.21 The fact that the J15 SRFI does not propose direct connectivity into the West Coast Main Line is considered an additional benefit as generally Network Rail is unsupportive of slow speed at grade connections into high speed passenger routes for pathing/capacity reasons.

5.22 In overall therefore the J15 SRFI has excellent rail connection capability to support the movement of intermodal traffic by rail across all key areas of intermodal logistics operations and associated mode shift from road to rail. This is reinforced by the location of the J15 SRFI within the so called "Golden Triangle" for UK logistics and distribution.

6. HGV Trip Generation from the Main Intermodal Terminal and Direct Rail Served Warehousing

6.1 For each container that passes through an intermodal terminal (loaded or empty), the following combinations of HGV trip are possible:

Table 1 HGV trip combinations at intermodal terminals

Containers per HGV trip *(note only one length of container carried per trip)*	**20' length container**	**30' length container**	**40' length container**	**45' length container**
Inbound trip to terminal	0 – 2	0 - 1	0 - 1	0 – 1
Outbound trip from terminal	0 – 2	0 - 1	0 - 1	0 – 1

6.2 So, in simple terms, each HGV will arrive or depart empty, or carry up to 2 x 20' containers or 1 x 30' / 40' / 45' container in either or both directions.

6.3 Given the potential complexity of each HGV trip, it is proposed to use observed data as used to inform previous SRFI scheme proposals, from the following sources:

- The Howbury Park scheme Traffic Assessment (WSP for Prologis) referenced a traffic survey undertaken at DIRFT in 2006, which compared the number of containers handled by the intermodal terminal on a weekday in 2006 against the number of HGVs arriving at the In-Gate;
- As part of the Department of Transport's Freight Best Practice programme[1], a survey was carried out by AECOM at Hams Hall in 2010 for which showed the pattern of HGV arrival at the In-Gate across a week.

6.4 Table 2 below assembles the results from the separate surveys and associated information to provide an indication of the relationship between container throughput and HGV trip generation.

6.5 The results show that, for a broadly similar level of rail traffic through each intermodal terminal, an average ratio of 1.34 HGV trips per container handled is achieved. It is considered that this provides a robust basis for estimating HGV trip generation from both the intermodal terminal and the direct served warehousing at the J15 SRFI.

[1] Efficient Intermodal Terminals Deliver Supply Chain Benefits: AECOM for Department for Transport December 2010

Table 2 Comparison of survey data at DIRFT and Hams Hall

Intermodal terminal **Year**	**DIRFT** **2006**	**Hams Hall** **2010**
Observed intermodal trains per day each way[2]		
Deep sea	2	6
Domestic	4	1
Channel Tunnel	1	1
Total per day	**7**	**8**
Estimated containers per train each way[3]		
Deep sea	26	33
Domestic	20	30
Channel Tunnel	30	30
Total per day (total of both directions)	**324**	**516**
Observed HGV movements per day[4]		
HGVs arriving at site gatehouse per day	209	360
Total 2-way HGV trips per day (total arrivals and departures)	418	720
Ratio of HGV trips to containers handled	**1.29**	**1.40**

6.6 The above assessment of road operations is based on current trends at existing SRFI. A move to inter regional distribution by rail would undoubtedly improve this position. However this potential has not been factored into this note both as the timescales of any migration from road to rail are unclear and as this allows the HGV trip generation to be indicated as a worst case scenario.

6.7 Typically containers arriving at an SRFI by rail will be processed on the rail terminal in the following ways:

a) Train - HGV for direct transshipment to final destination with no added value operation being undertaken on the J15 site. It is envisaged that this type of operation would always take place on the main terminal as opposed to being undertaken at a direct rail served warehouse unit.

[2] Train information sourced from Working Timetable data via Freightmaster publications
[3] Container information sourced from Freight Operating Company(s) and/or lineside observation
[4] HGV traffic data sourced from gatehouse records

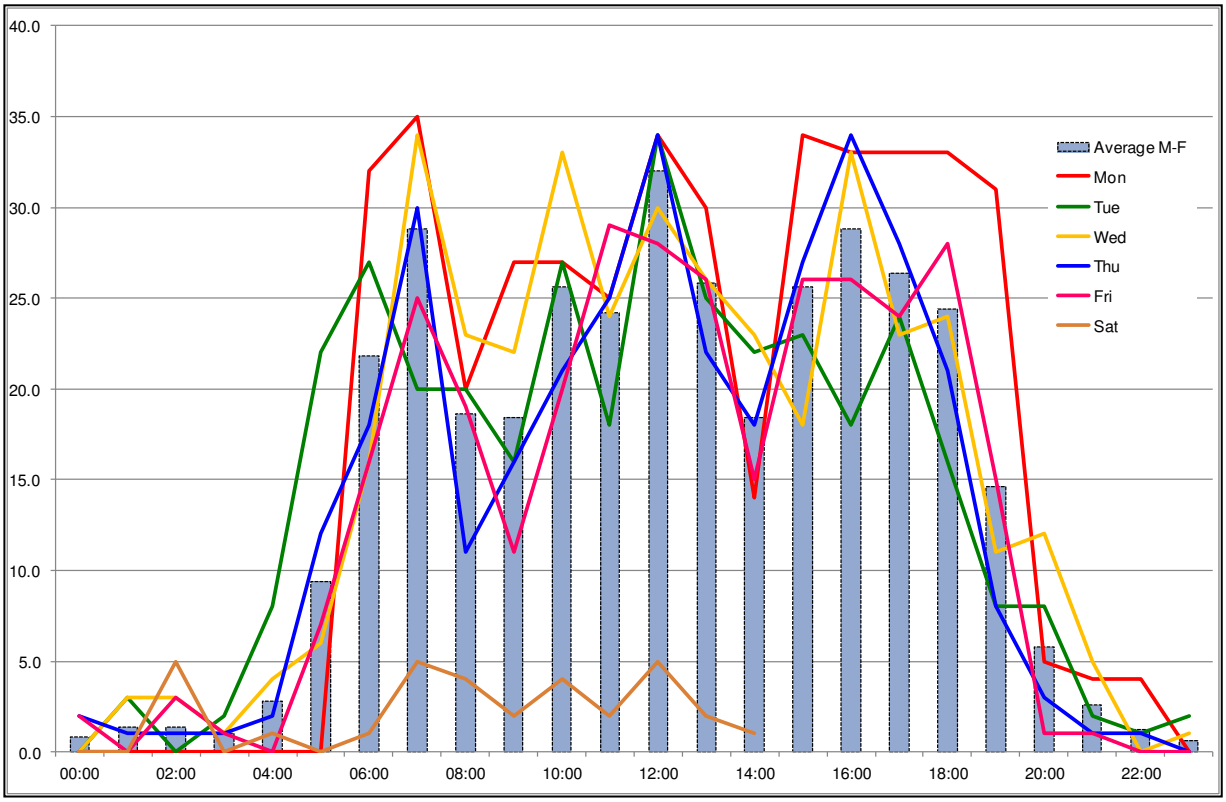
b) Train - warehouse for breaking down, warehousing and then onward transshipment to either final destination (typically currently road based) or onward distribution to regional distribution centres which to date has traditionally been road based but which more recently is showing clear indications of a migration to rail (Tesco Daventry – Central Scotland). This operation has the potential to take place either on the main terminal where a warehouse occupier does not require a dedicated rail terminal alongside the warehouse or at a direct rail served warehouse terminal if/where required.

c) Train to stack on the main terminal pad or a designated container storage area within the SRFI park and from stack to final destination either by road or rail (inland port operations). Again it is assumed that this type of operation would be totally focused on the main terminal.

6.8 DIRFT is considered to provide a useful barometer of likely trends at the J15 SRFI both in view of the relative proximity of the two terminals, the location of the J15 site within the Golden Triangle and as DIRFT is the only fully functional SRFI in terms of its relationship with the occupiers on site. It is possible to establish the following based on analysis of available information from DIRFT in respect of the operations at 4.7 a) and b):

Origin / Destination	Trains each way per weekday	Operator / customer	Relationship to DIRFT
Southampton	0.6	Freightliner	Most products distributed to/from surrounding area
Tilbury	1.0	Freightliner	Most products distributed to/from surrounding area
Novara	1.0	Norfolk Line	Most products distributed to/from surrounding area
Coatbridge	1.0	Russell Group	Most products distributed to/from surrounding area
Purfleet	2.0	Russell Group	Most products distributed to/from surrounding area
Evian	2.0	Malcolm Group	Most products handled through warehouses at DIRFT
Grangemouth	1.0	Malcolm Group	Most products handled through warehouses at DIRFT
Mossend	1.0	Malcolm Group	Most products handled through warehouses at DIRFT
Mossend	1.0	Tesco / Stobart	Most products handled through warehouses at DIRFT
Wentloog	1.0	Tesco / Stobart	Most products handled through warehouses at DIRFT
Tilbury	1.0	Tesco / Stobart	Most products handled through warehouses at DIRFT
Total	**12.6**		
of which	5.6	44%	Most products distributed to/from surrounding area
	7.0	56%	Most products handled through warehouses at DIRFT

Figure 4 Hams Hall inbound HGV trip distribution by day / time



Hour	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Total
Average M-F	0.8	1.4	1.4	1.0	2.8	9.4	21.8	28.8	18.6	18.4	25.6	24.2	32.0	25.8	18.4	25.6	28.8	26.4	24.4	14.6	5.8	2.6	1.2	0.6	360

6.9 Profile of HGV trip arrivals per day / week

6.9.1 The pattern of HGV trip arrivals will vary by time of day and week, driven mainly by train arrival and departure times, where peak levels of HGV arrivals will tend to occur. Figure 1 above (source AECOM / DfT) shows the distribution of daily HGV arrivals by hour at Hams Hall in 2010, which, like most inland terminals, currently operates from Monday morning through to Saturday lunchtime.

6.10 Rail traffic growth through intermodal terminals

6.10.1 In terms of traffic growth since opening, Table 3 below shows the current relative positions of the four most developed inland SRFI constructed since privatisation, at BIFT (Tamworth), DIRFT (Rugby), Hams Hall (Coleshill) and Widnes (Merseyside):

Table 3 Intermodal trains per day each way through selected SRFI, 2012

	BIFT	DIRFT	Hams Hall	Widnes
Deep sea	4.0	2.0	4.8	5.5
Domestic	0.0	7.0	0.2	0.0
European	0.0	0.4	0.7	0.6
Total	**4.0**	**9.4**	**5.7**	**6.1**

6.10.2 BIFT has been open since 2006, whilst the other three sites have been open for around 19 years. Services at DIRFT are currently operating at around 12 trains/day.

6.10.3 Train capacity has increased significantly over the last 5 years, with average freight train payload increasing by 30% across all sectors. In the intermodal sector, train capacity has also increased markedly due to:

- Increased availability of rail routes cleared to the taller W10 loading gauge, avoiding the need to move 9'6" high containers on less-efficient low-platform wagons;
- Increases in permitted train length, in some cases due to more powerful locomotives being available.

6.10.4 As an example of the impact of these developments, train lengths out of the deep sea ports of Southampton, London Gateway and Felixstowe are now regularly operating at 600m – 650m in length where 9 years ago train lengths from the ports of Southampton and Felixstowe were 540m (18%), with container carrying capacity increasing from 64 to 81 TEU[5] (26%). A report published by ABP[6] forecast average train payload increasing from 33 containers per train each way in 2011 to 44 by 2028 as a result of various rail network enhancements and increased haulage capability. In point of fact container trains from the ports of Felixstowe and London Gateway are now routinely conveying 40 – 50 containers/train.

[5] Twenty-Foot Equivalent Unit, a measure of container throughput / capacity
[6] Environmental Statement for Port of Southampton: Berth 201/202 Works (http://www.southamptonvts.co.uk/Port_Information/Development_Projects/)

6.11 Estimating train and HGV traffic from the Intermodal Terminal and Direct Rail Served Warehousing

6.11.1 Intermodal rail services carrying non-bulk traffic can be characterised by the nature of the traffic and/or route into 3 broad categories:

- Deep sea – movement of mainly ISO-standard shipping containers (20', 30' and 40' length units) to/from major deep-sea ports, which account for the majority of non-bulk intermodal rail services in Great Britain;
- Domestic – movement of mainly CEN-standard containers and swap bodies (mainly 40-45' length units) between inland rail freight interchanges, the second-largest group of services;
- European - movement of mainly CEN-standard containers and swap bodies (mainly 40-45' length units) between inland rail freight interchanges in Great Britain and mainland Europe;

6.11.2 The capacity of each type of train in the above categories varies due to the type of units carried. Looking at each category in turn:

- Deep sea – currently loading at between 40-50 containers per train (20' / 30'/ 40' length) per 650m length train. This is anticipated to increase to 750m length trains, using higher-capacity wagons. It is assumed that this further increase in train lengths would increase the level of containers/train to 50-55 based on trends over the last 10 years.
- Domestic – currently loading at up to 34 containers per train (mainly 45' length), the total permitted on most inland routes at present. With longer 750m length trains and higher-capacity wagons, trains are anticipated to carry up to 40 containers per train in the medium to long term;
- European – current and future train loads expected to be as per domestic services above.

6.11.3 For a new SRFI development in the Midlands, it is reasonable to expect the growth and pattern of intermodal services to follow those of more established SRFI in the surrounding area. Taking an average across the 4 sites in Table 3 above in terms of relative split of trains by type (60:30:10 respectively) and growth per annum (around 0.5 trains per annum after opening), as well as assumed increase in train capacity, estimates can then be made based on an initial 1 train per day up to the notional maximum capacity of the J15 terminal (12 trains per 24 hours) and direct rail served warehousing (4 trains per 24 hours). Table 4 shows the results of this analysis:

Table 4 Estimates for intermodal rail and HGV traffic through J15 SRFI

	2021	2026	2031	2036	2041	2046	2051
Trains / day each way							
Deep-sea	0.6	1.5	3.0	4.5	6.0	7.2	7.2
Domestic	0.3	0.8	1.5	2.3	3.0	3.6	3.6
European	0.1	0.3	0.5	0.8	1.0	1.2	1.2
Direct rail served w/housing	1.0	1.0	2.0	2.0	3.0	3.0	4
Total	**2.0**	**3.6**	**7.0**	**9.6**	**13.0**	**15.0**	**16.0**
Containers / train each way							
Deep-sea	40	45	50	55	55	55	55
Domestic	34	36	38	40	40	40	40
European	34	36	38	40	40	40	40
Direct rail served w/housing	32*	36	40	44	48	52	52
Containers per day through J15 Site							
Deep-sea	48	135	300	495	660	792	792
Domestic	20	54	114	180	240	288	288
European	7	18	38	60	80	96	96
Direct rail served w/housing	32	36	80	88	144	156	208
Total	**107**	**243**	**532**	**823**	**1124**	**1332**	**1384**
HGV traffic per day through J15 Site							
HGV 2-way trips	**143**	**326**	**713**	**1103**	**1506**	**1785**	**1855**

Assumptions for Intermodal Trains Serving the Direct Rail Served Warehouse Units

- At 520m trailing length (capped length for direct warehouse operations) the trains are 80% of the payload length of an existing intermodal train and will therefore load proportionally
- Trailing length cannot exceed 520m due to terminal length constraints. Therefore this will act as an overall cap to loadings.
- Loading/train is assumed to be +4 containers/train at 5 yearly increments.
- J15 will start with one rail served warehouse unit with additional units being rail served at 1 every ten years up to the maximum of 4 rail served units by 2051.
- From 2046 it is assumed that every train will load fully with the combination of 20' and 40' containers indicated on the table note. This represents a worst case assessment of associated HGV movements.
- HGV movements are, for the direct rail served warehouse operations, assumed to be as per the main intermodal terminal.

7. Rapid Rail Freight - HGV Trip Generation

7.1 Rapid or Express Freight is less a new concept and more a mode of lightweight freight operation that has the potential to be reinvigorated to meet 21st century freight needs.

7.2 Up to the 1980s parcels and other light goods were routinely carried by rail in the luggage compartments or specific vans either as part of the consist of a passenger service or specific van load trains.

7.3 From the inception of railways in the 19th century up to the late 1980s parcels, newspapers and other lightweight freight items were delivered to and collected from a significant number of passenger stations on the UK rail network.

7.4 From the late 1960s to the late 1980s parcels were increasingly handled in specialist caged trolleys. Known as BRUTEs these were the fore runner of the modern roll cage.

Fig 5 BRUTE loading of a rail vehicle

7.5 From the late 1980s traditional parcels traffic dwindled as road competition grew. Very often courier operations could offer rapid door to door, same day delivery for single parcels or small volumes particularly in lightweight/medium weight van operations.

7.6 For rail through the early years of the 21st century rapid freight operations became condensed to Royal Mail operations between the Princess Royal Distribution Centre in North London to Warrington and Central Scotland using dedicated 100 mph lightweight class 325 electric multiple units.

Fig 6 Royal Mail Class 325 Unit

7.7 During that period traditional heavy freight rail operations have seen a significant resurgence. Intermodal, particularly the deep sea sector, continues to be a strong rail freight sector with significant forecast growth through to 2043. These operations currently continue to provide the prime justification for the development of Strategic Rail Freight Interchanges.

7.8 However such movements are classified as heavy rail operations with trains restricted to 75 mph. Whilst this is a commendable speed when these trains are operated on routes that accommodate LDHS passenger services at up to 125 mph the 50 mph speed differential can have a significant impact on pathing on the network.

7.9 This differential in speed also results in traditional intermodal trains being banned from busy sections of the Network Rail network particularly at peak hours. This in turn can impact on the ability of an SRFI terminal to achieve a steady consistent throughput.

7.10 Lightweight or express freight operations are currently typified by Royal Mail operations within the UK and La Poste operations in France. There is however a significant emerging interest in this type of operation from major retailers and logistics providers particularly for the movement of high volume lightweight goods within the UK.

7.11 Unlike traditional intermodal operations the rapid rail freight concept relies on cross dock movement of goods in roll cages between an HGV and the rail vehicle.

7.12 Data supporting HGV movements for rapid rail freight operations is extremely scarce. However the following parameters appear to be generally accepted currently when considering this type of operation. These therefore provide a useful basis from which to assess HGV movements linked to a rapid rail freight operation:

- Maximum train consist would be 12 vehicles
- A rail vehicle will typically accommodate a load equivalent to 1.5 HGV loads
- A 12 vehicle rapid rail freight train would therefore equate to c18 HGV loads
- For each rail vehicle load it is assumed that some will emanate from the J15 site and will not therefore require an HGV movement and some will emanate from local sources out with the J15 site. For this reason the same load factor of 1.34 that was applied to the main terminal and direct rail served warehouse units has been applied to HGV movements associated with the rapid freight terminal.
- As the RRF facility is, insofar as SRFI operations are concerned, a new and untried concept it has been assumed HGV trip generation associated with this operation will be in line with HGV trip generation for the main terminal i.e. a ratio of 1.34 HGV trips/load.
- It is currently estimated that each train will require 2 hours on the rapid freight terminal to load/unload. As the J15 proposed rapid freight facility is a single road terminal it therefore follows, based on this assumption, that the rapid freight terminal will have a maximum capacity of 12 trains/day

7.13 Due to the lack of current data on growth profiles for this type of traffic it has been assumed that the J15 rapid freight terminal operation would grow progressively from 1 train/day at start up to 12 trains/day at full maturity. Table 5 below sets out the forecast growth of traffic on this facility and the associated HGV movements/day.

Table 5 Estimates for rapid rail freight and assocaited HGV traffic through J15 rapid freight terminal

	2021	**2026**	**2031**	**2036**	**2041**	**2046**	**2051**
Trains / day each way							
Total	**1.0**	**2.5**	**5.0**	**7.5**	**10.0**	**12.0**	**12.0**
HGV traffic per day through rapid freight terminal							
HGV Equivalent loads	**18**	**45**	**90**	**135**	**180**	**216**	**216**
HGV Movements/day	**24**	**60**	**121**	**181**	**241**	**289**	**289**

7.14 As rapid freight services operate at the equivalent of passenger train speeds integration of these operations onto the Network Rail network is likely to be less time critical than for a traditional intermodal train operation. Based on pathing availability and rapid freight terminal capacity it is therefore assumed that for the high end volumes the spread of rail and hence HGV movements will be consistent through a 24 hour period. This assumption also reflects the anticipated increase by major retailers in this type of operation.

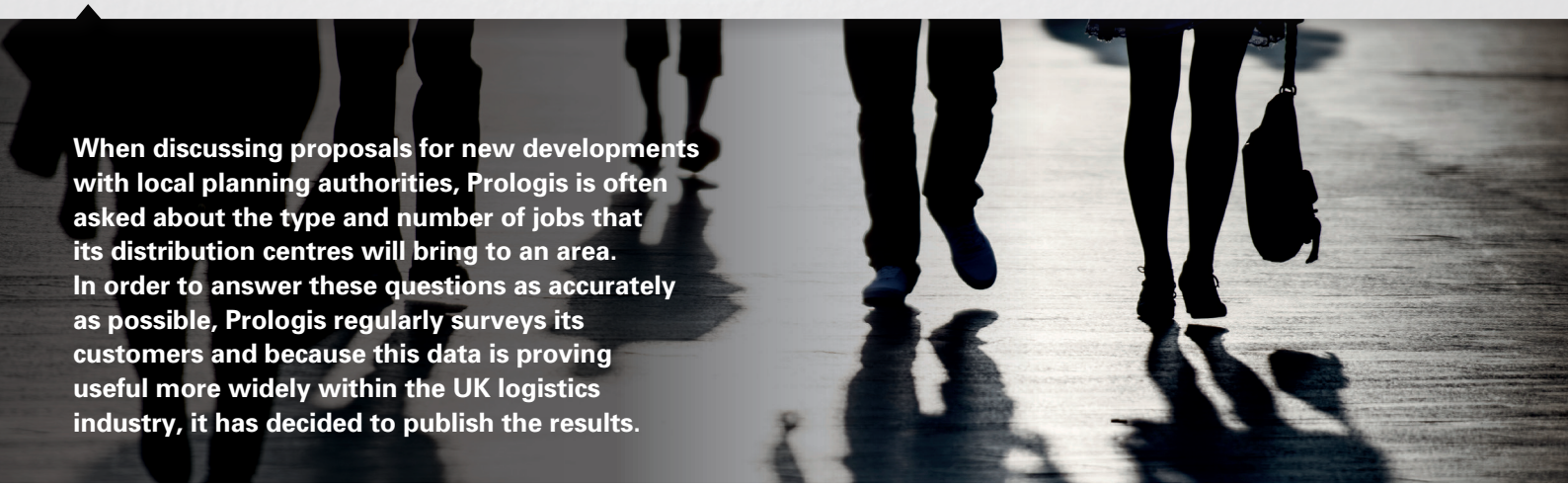
7.15 However for early years low volume start up operations it is likely that these will be more geared to overnight ecommerce and chilled goods to city centre store operations and as such weighting of HGV movements is considered likely to be more focused to the period 22.00 - 04.00 for these operations.

7.16 Also unclear at this stage is the degree to which HGV movements might be to/from warehouse units on the J15 site and therefore totally self contained from the public highway. An assessment may therefore need to be made as to the proportion of HGV movements that will be self contained within the J15 site i.e. warehouse to rapid freight terminal and those emanating from local facilities out with the J15 site.

APPENDIX C

PROLOGIS TECHNICAL INSIGHT- JOBS

DISTRIBUTION WAREHOUSES DELIVER MORE JOBS



When discussing proposals for new developments with local planning authorities, Prologis is often asked about the type and number of jobs that its distribution centres will bring to an area. In order to answer these questions as accurately as possible, Prologis regularly surveys its customers and because this data is proving useful more widely within the UK logistics industry, it has decided to publish the results.

The first survey was carried out in 2006[1]. Prologis repeated the exercise in 2010[2] and again in 2014. In 2010, customers provided employment statistics for 28 distribution centres across the country. This survey represented 6,800 employees working in 5.65 million sq ft By 2014, the survey data had increased to 8,187 employees and to over 6 million sq ft.

The 2014 survey asked:

- **How many people do you employ?**
- **How many employees are full time and how many are part time?**
- **Can you split the jobs your employees carry out into these five areas:**
  - **Office**
  - **Warehouse**
  - **Drivers**
  - **Managerial**
  - **Other?**

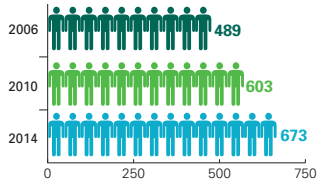
Using the data provided by the three surveys, Prologis found that job numbers are rising and that the nature of employment within distribution warehouses is changing.

NUMBERS OF JOBS

In 2006, Prologis calculated that on average, its customers employed one person for every 95m² of floor space within its logistics facilities. By 2010, this ratio had increased to one person for every 77m² and by 2014 it had risen again to one person for every 69m². The 2014 survey also shows an increase in full time jobs from 88% in 2010 to 89% in 2014 and a corresponding decrease in part time employment from 12% to 11%.

Number of Employees

Based on a 500,000 sq ft building (46,450 sq m)



TYPES OF JOBS

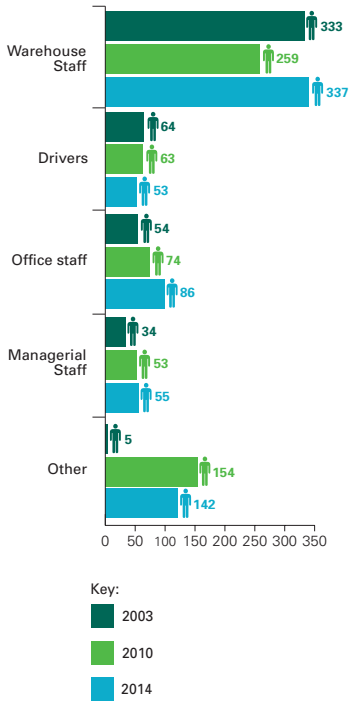
Research carried out by Cranfield University shows that in 2003 68% of logistics workers were staff who work on the warehouse floor. Of the remaining employees 13% were drivers; 11% were administrative or support staff; 7% were managerial and the remaining 1% were categorised as 'other'.[3]

By 2010, the employment picture was more complex. The proportion of people who worked in the warehouse was 43%, while the number of drivers was down to 10%. The proportion of administrative and support staff, however, was 12% and while the number of employees at a managerial level had increased to 9%. Those employed in 'other' categories had jumped to 25% and subsequent discussions with customers indicated that these jobs included IT and customer services along with sales and marketing.

By 2014, the pattern had changed once again. The number of people working in the warehouse itself was 50%, while the proportion of drivers was 8%. The numbers of office-based jobs continued its steady rise to 13%, while the proportion of people working in managerial roles decreased slightly to 8%. The 'other' category dropped back to 21%.

Absolute Number of Employees

Based on a 500,000 sq ft building (46,450 sq m)



[1] Prologis, Not Just Stacking Shelves, Spring 2006

[2] Prologis, Do Distribution Warehouses Deliver Jobs? September 2010

[3] Cranfield University School of Management, Bedford and King Sturge, Future Trends in the Demand for Warehouse Property, April 2003

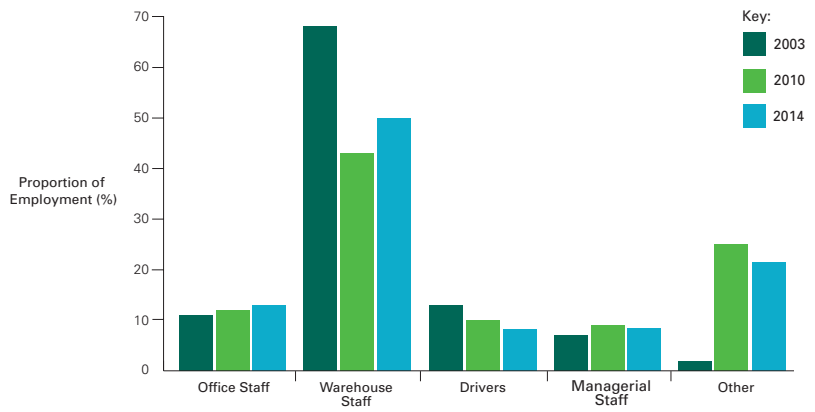
DISTRIBUTION WAREHOUSES DELIVER MORE JOBS

CUSTOMER EMPLOYMENT SURVEY 2014

Building Area* (Sq ft)	Office	Warehouse	Drivers	Managerial	Other	Full time	Part time	Total
370,000	42	166	32	10	0	250	0	250
65,000	30	50	25	15	2	120	2	122
90,000	10	25	0	1	0	36	0	36
85,000	149	71	0	106	0	295	31	326
305,000	82	459	7	69	649	1266	0	1266
310,000	50	400	100	100	25	650	25	675
185,000	6	38	15	8	1	67	1	68
325,000	128	202	0	20	0	350	0	350
165,000	8	42	5	0	12	45	22	67
385,000	30	60	10	10	0	110	0	110
95,000	15	31	9	4	1	60	0	60
175,000	33	129	141	42	0	345	0	345
530,000	10	515	0	30	20	300	275	575
240,000	10	114	0	8	8	89	51	140
70,000	10	43	45	25	377	500	0	500
400,000	136	64	8	0	65	133	140	273
45,000	10	28	0	5	0	43	0	43
55,000	16	8	0	14	7	44	1	45
195,000	49	43	53	18	0	157	6	163
230,000	25	110	70	17	3	225	0	225
85,000	3	27	2	0	30	49	13	62
140,000	57	207	24	1	2	291	0	291
185,000	15	7	0	20	224	264	2	266
545,000	22	613	41	107	0	763	20	783
130,000	0	115	1	5	0	121	0	121
250,000	6	102	24	12	0	136	8	144
260,000	54	220	19	17	200	310	200	510
135,000	41	218	12	0	100	301	70	371
Total(s)	**6,050,000**	**1,047**	**4,107**	**643**	**664**	**1,726**	**7,320**	**867**	**8,187**
% of Total		**12.79%**	**50.17%**	**7.86%**	**8.12%**	**21.09%**	**89.4%**	**10.6%**	**100%**

Note: *Building areas have been rounded to protect confidentiality. Total(s) and analysis is based on actual numbers.

Changing nature of employment within the logistics sector 2003-2014



SUMMARY

The first three Prologis customer employment surveys, which were carried out at four year intervals in 2006, 2010 and 2014, indicated that the logistics industry can offer an increasing number of jobs. The data shows that the majority of these jobs are full time and that opportunities for full time employment are growing. A comparison between the 2003 Cranfield University research and both the 2010 and 2014 customer employment surveys demonstrates that logistics offers an increasingly diverse range of jobs. This is a dynamic employment sector and as the data shows, it continues to make a significant contribution to the UK economy.

APPENDIX D

SWAN VALLEY TRAFFIC COUNT DATA

SWAN VALLEY

NORTHAMPTON

PROPOSED MASTERPLAN

SWAN VALLEY

AVIVA INVESTORS

ISIS LAND

RPS

SITE 100

UNIT	TYPE	SITE AREA	DEVELOPMENT AREA
100	HOTEL, LEISURE, RETAIL AND OFFICES	12.6 Acres	9.0 Acres
150	MIXED USE DEVELOPMENT	14.4 Acres	11.0 Acres

SITE 300

UNIT	TYPE	GIA	SITE AREA	DEVELOPMENT AREA
THE BIG SWAN	B8	301,000 sq ft	11.8 Acres	10.1 Acres
310	B1 Offices	60,500 sq ft (max)	5.7 Acres	2.2 Acres
TOTAL		361,500 sq ft	25.1 Acres	18.3 Acres

SITE 400

UNIT	TYPE	GIA	SITE AREA	DEVELOPMENT AREA
420	B8	46,310 sq ft	4.14 Acres	3.35 Acres
460	B8	40,000 sq ft	3.37 Acres	2.74 Acres
TOTAL		86,310 sq ft	8.51 Acres	6.09 Acres

'OFFICE QUARTER'

UNIT	TYPE	GIA	SITE AREA	DEVELOPMENT AREA
MIX	B1 Offices	1 X 6,200 sq ft 4 X 7,750 sq ft 2 X 12,400 sq ft 2 X 13,000 sq ft		
TOTAL		86,000 sq ft	7.1 Acres	5.9 Acres

N

Pineham, Northampton Cross Valley Link Road

Hector Way

Cub Drive

420

460

THE OUTDOOR GROUP

W.M. MORRISON

ROYAL MAIL

CARLSBERG

Tithe Barn Way

LEVIS

Bakery Lane

Swan Valley Way

SWAN VALLEY OFFICE VILLAGE

SWAN VALLEY OFFICE QUARTER

W.M. MORRISON

THE BIG SWAN (PLOT 300)

310

100

150

FUTURE MIXED USE DEVELOPMENT

A43 NORTHAMPTON

north

M1 MOTORWAY

south

M1 JUNCTION 15A

CAPITA SYMONDS

Job Title: Swan Valley

Site Name and Number: Swan Valley Way

Job Number: CS26558/F33

Client: Lawrence Walker

Date: 4th October 2007

CAPITA SYMONDS	Job Number:	CS26558/F33
Swan Valley	Client:	Lawrence Walker
Swan Valley Way	Date:	4th October 2007

N

CAPITA SYMONDS

Job Number: CS26558/F33

Swan Valley

Client: Lawrence Walker

Swan Valley Way

Date: 4th October 2007

			Movement A ENTERING SITE						Movement B LEAVING SITE					
			Total Traffic		Pineham		Swan Valley		Total Traffic		Pineham		Swan Valley	
Times			Cars	HGV's	Cars	HGV's	Cars	HGV's	Cars	HGV's	Cars	HGV's	Cars	HGV's
00:00	-	00:15	8	1	0	0	8	1	1	3	0	0	1	3
00:15	-	00:30	2	2	0	0	2	2	1	2	0	0	1	2
00:30	-	00:45	1	3	0	0	1	3	5	7	0	0	5	7
00:45	-	01:00	3	3	0	0	3	3	3	3	0	0	3	3
Hourly Total			14	9	0	0	14	9	10	15	0	0	10	15
01:00	-	01:15	1	2	0	0	1	2	0	2	0	0	0	2
01:15	-	01:30	2	2	0	0	2	2	1	6	0	0	1	6
01:30	-	01:45	2	4	0	0	2	4	1	3	0	0	1	3
01:45	-	02:00	4	7	0	0	4	7	1	4	0	0	1	4
Hourly Total			9	15	0	0	9	15	3	15	0	0	3	15
02:00	-	02:15	1	4	0	0	1	4	5	1	-1	0	4	1
02:15	-	02:30	2	2	0	0	2	2	7	5	-3	0	4	5
02:30	-	02:45	1	5	0	0	1	5	8	4	0	0	8	4
02:45	-	03:00	2	5	0	0	2	5	7	6	0	0	7	6
Hourly Total			6	16	0	0	6	16	27	16	-4	0	23	16
03:00	-	03:15	2	1	0	0	2	1	4	2	0	0	4	2
03:15	-	03:30	2	2	0	0	2	2	2	4	0	0	2	4
03:30	-	03:45	1	2	0	0	1	2	4	6	0	0	4	6
03:45	-	04:00	5	6	0	0	5	6	4	5	-1	0	3	5
Hourly Total			10	11	0	0	10	11	14	17	-1	0	13	17
04:00	-	04:15	6	4	0	0	6	4	4	1	0	0	4	1
04:15	-	04:30	8	3	0	0	8	3	5	1	0	0	5	1
04:30	-	04:45	10	6	0	0	10	6	4	3	0	0	4	3
04:45	-	05:00	8	2	0	0	8	2	2	5	0	0	2	5
Hourly Total			32	15	0	0	32	15	15	10	0	0	15	10
05:00	-	05:15	6	3	0	0	6	3	7	0	0	0	7	0
05:15	-	05:30	22	8	0	0	22	8	6	2	0	0	6	2
05:30	-	05:45	87	7	-2	0	85	7	78	7	0	0	78	7
05:45	-	06:00	117	5	-6	0	111	5	17	5	0	0	17	5
Hourly Total			232	23	-8	0	224	23	108	14	0	0	108	14
06:00	-	06:15	14	5	-4	0	10	5	37	2	0	0	37	2
06:15	-	06:30	25	6	-6	0	19	6	24	3	-2	-3	22	0
06:30	-	06:45	47	7	-20	-2	27	5	10	4	0	0	10	4
06:45	-	07:00	91	8	-40	-1	51	7	11	4	-1	0	10	4
Hourly Total			177	26	-70	-3	107	23	82	13	-3	-3	79	10
07:00	-	07:15	53	12	-34	-6	19	6	19	10	-3	-2	16	8
07:15	-	07:30	85	7	-47	-2	38	5	7	8	0	-3	7	5
07:30	-	07:45	70	13	-42	-8	28	5	10	8	-2	-3	8	5
07:45	-	08:00	76	10	-38	-5	38	5	12	12	-4	-2	8	10
Hourly Total			284	42	-161	-21	123	21	48	38	-9	-10	39	28
08:00	-	08:15	79	12	-45	-1	34	11	8	5	-3	-1	5	4
08:15	-	08:30	69	7	-34	-6	35	1	10	10	-7	-6	3	4
08:30	-	08:45	69	3	-19	-2	50	1	8	7	-3	-4	5	3
08:45	-	09:00	60	7	-12	-3	48	4	13	15	-8	-5	5	10
Hourly Total			277	29	-110	-12	167	17	39	37	-21	-16	18	21
09:00	-	09:15	30	11	-12	-4	18	7	17	10	-13	-4	4	6
09:15	-	09:30	29	7	-9	-3	20	4	14	16	-6	-8	8	8
09:30	-	09:45	29	9	-9	-2	20	7	9	5	-4	-3	5	2
09:45	-	10:00	33	10	-11	-6	22	4	14	7	-6	-3	8	4
Hourly Total			121	37	-41	-15	80	22	54	38	-29	-18	25	20
10:00	-	10:15	27	11	-11	-4	16	7	18	6	-10	0	8	6
10:15	-	10:30	28	13	-11	-4	17	9	19	12	-7	-3	12	9
10:30	-	10:45	23	10	-8	-8	15	2	16	10	-7	-4	9	6
10:45	-	11:00	25	11	-11	-4	14	7	19	11	-10	-5	9	6
Hourly Total			103	45	-41	-20	62	25	72	39	-34	-12	38	27
11:00	-	11:15	14	14	-7	-2	7	12	18	11	-11	-6	7	5
11:15	-	11:30	15	11	-9	-5	6	6	16	11	-7	-2	9	9
11:30	-	11:45	36	10	-9	-7	27	3	13	9	-9	-2	4	7
11:45	-	12:00	21	11	-14	-10	7	1	22	7	-7	-7	15	0
Hourly Total			86	46	-39	-24	47	22	69	38	-34	-17	35	21
12:00	-	12:15	25	10	-5	-2	20	8	25	11	-7	-6	18	5
12:15	-	12:30	27	12	-7	-4	20	8	30	10	-12	-3	18	7
12:30	-	12:45	26	8	-11	-7	15	1	32	3	-5	-3	27	0
12:45	-	13:00	23	6	-10	-6	13	0	19	7	-6	-4	13	3
Hourly Total			101	36	-33	-19	68	17	106	31	-30	-16	76	15
13:00	-	13:15	25	11	-5	-3	20	8	34	6	-11	-4	23	2
13:15	-	13:30	39	8	-11	-5	28	3	31	10	-13	-1	18	9
13:30	-	13:45	51	8	-15	-5	36	3	30	8	-11	-4	19	4
13:45	-	14:00	39	3	-12	-3	27	0	29	10	-9	-2	20	8
Hourly Total			154	30	-43	-16	111	14	124	34	-44	-11	80	23
14:00	-	14:15	30	11	-15	-8	15	3	64	4	-6	-3	58	1
14:15	-	14:30	11	9	-10	-2	1	7	43	16	-17	-6	26	10
14:30	-	14:45	27	6	-6	0	21	6	28	11	-9	-3	19	8
14:45	-	15:00	25	5	-8	-4	17	1	31	8	-12	0	19	8
Hourly Total			93	31	-39	-14	54	17	166	39	-44	-12	122	27
15:00	-	15:15	17	7	-9	-8	8	-1	58	6	-18	-4	40	2
15:15	-	15:30	12	4	-5	-2	7	2	50	13	-20	-2	30	11
15:30	-	15:45	18	3	-9	-1	9	2	76	7	-19	-3	57	4
15:45	-	16:00	9	9	-2	-1	7	8	50	5	-23	-1	27	4
Hourly Total			56	23	-25	-12	31	11	234	31	-80	-10	154	21
16:00	-	16:15	20	6	-3	0	17	6	66	4	-25	-3	41	1
16:15	-	16:30	15	9	-3	0	12	9	69	3	-25	-1	44	2
16:30	-	16:45	16	5	-2	0	14	5	103	9	-22	-1	81	8
16:45	-	17:00	14	3	-2	0	12	3	46	3	-20	0	26	3
Hourly Total			65	23	-10	0	55	23	284	19	-92	-5	192	14
17:00	-	17:15	4	4	-2	0	2	4	58	9	-18	-1	40	8
17:15	-	17:30	9	4	-1	0	8	4	55	2	-25	-1	30	1
17:30	-	17:45	21	6	-5	0	16	6	68	8	-16	0	52	8
17:45	-	18:00	14	4	0	0	14	4	76	6	-49	-1	27	5
Hourly Total			48	18	-8	0	40	18	257	25	-108	-3	149	22
18:00	-	18:15	18	5	-3	0	15	5	86	5	-31	-1	55	4
18:15	-	18:30	27	6	-3	0	24	6	29	4	-7	-1	22	3
18:30	-	18:45	38	7	-1	0	37	7	27	5	-7	0	20	5
18:45	-	19:00	49	5	-2	-1	47	4	37	7	-12	0	25	7
Hourly Total			132	23	-9	-1	123	22	179	21	-57	-2	122	19
19:00	-	19:15	8	4	-1	0	7	4	31	5	-7	0	24	5
19:15	-	19:30	1	5	0	0	1	5	11	1	-3	0	8	1
19:30	-	19:45	5	6	0	0	5	6	6	3	-1	0	5	3
19:45	-	20:00	5	4	0	0	5	4	11	4	-2	0	9	4
Hourly Total			19	19	-1	0	18	19	59	13	-13	0	46	13
20:00	-	20:15	8	5	0	0	8	5	2	0	0	0	2	0
20:15	-	20:30	6	9	0	0	6	9	8	5	-2	0	6	5
20:30	-	20:45	2	4	0	0	2	4	14	6	-2	0	12	6
20:45	-	21:00	5	3	0	0	5	3	7	6	-3	0	4	6
Hourly Total			21	21	0	0	21	21	31	17	-7	0	24	17
21:00	-	21:15	4	1	0	0	4	1	7	4	-4	0	3	4
21:15	-	21:30	11	4	0	-1	11	3	4	4	0	0	4	4
21:30	-	21:45	16	4	0	0	16	4	4	9	0	0	4	9
21:45	-	22:00	17	5	0	0	17	5	7	2	0	0	7	2
Hourly Total			48	14	0	-1	48	13	22	19	-4	0	18	19
22:00	-	22:15	2	3	0	0	2	3	21	6	0	0	21	6
22:15	-	22:30	1	5	0	0	1	5	11	6	0	0	11	6
22:30	-	22:45	0	4	0	0	0	4	2	1	0	0	2	1
22:45	-	23:00	1	0	0	0	1	0	0	2	0	0	0	2
Hourly Total			4	12	0	0	4	12	34	15	0	0	34	15
23:00	-	23:15	1	5	0	0	1	5	2	4	0	0	2	4
23:15	-	23:30	1	2	0	0	1	2	6	8	0	0	6	8
23:30	-	23:45	1	3	0	0	1	3	0	0	0	0	0	0
23:45	-	00:00	0	5	0	0	0	5	3	4	0	0	3	4
Hourly Total			3	15	0	0	3	15	11	16	0	0	11	16

Total Inbound	1457	421
Total Outbound	1434	435
Total Two-Way	2891	856

CAPITA SYMONDS	Job Number:	CS26558/F33
Swan Valley	Client:	Lawrence Walker
Swan Valley Way	Date:	4th October 2007

	Movement A ENTERING SITE							Movement B LEAVING SITE						
Times	Cars	LGV	OGV1	OGV2	PSV	M/cycles	Cycles	Cars	LGV	OGV1	OGV2	PSV	M/cycles	Cycles
00:00 - 00:15	6	2		1				1			3			
00:15 - 00:30	2			2				1			2			
00:30 - 00:45	1			3				2		3	7			
00:45 - 01:00	2		1	3				3			3			
Hourly Total	**11**	**2**	**1**	**9**				**7**		**3**	**15**			
01:00 - 01:15	1			2							2			
01:15 - 01:30	2			2					1		6			
01:30 - 01:45	2			4				1			3			
01:45 - 02:00	1	1	2	7						1	4			
Hourly Total	**6**	**1**	**2**	**15**				**1**	**1**	**1**	**15**			
02:00 - 02:15			1	4				5			1			
02:15 - 02:30	1	1		2				6		1	5			
02:30 - 02:45	1			5				6		2	4			
02:45 - 03:00	1		1	5				6	1		6			
Hourly Total	**3**	**1**	**2**	**16**				**23**	**1**	**3**	**16**			
03:00 - 03:15	2			1				4			2			
03:15 - 03:30	1		1	2				2			4			
03:30 - 03:45	1			2				3		1	6			
03:45 - 04:00	5			6		1		4			5			
Hourly Total	**9**		**1**	**11**		**1**		**13**		**1**	**17**			
04:00 - 04:15	5		1	4				4			1			
04:15 - 04:30	8			3				4		1	1			
04:30 - 04:45	9		1	6				3		1	3			
04:45 - 05:00	8			2				1	1		5			
Hourly Total	**30**		**2**	**15**				**12**	**1**	**2**	**10**			
05:00 - 05:15	5		1	3				1	1	5				
05:15 - 05:30	21		1	8				2		4	2			
05:30 - 05:45	85	2		7		1		74	1	3	7			
05:45 - 06:00	110	5	2	5				14	1	2	5			
Hourly Total	**221**	**7**	**4**	**23**		**1**		**91**	**3**	**14**	**14**			
06:00 - 06:15	12	1	1	5				37			2		1	
06:15 - 06:30	23	2		6		1		18	3	3	3		1	
06:30 - 06:45	32	15		7				10			4			
06:45 - 07:00	70	16	5	8		1		8	1	2	4			
Hourly Total	**137**	**34**	**6**	**26**		**2**		**73**	**4**	**5**	**13**		**2**	
07:00 - 07:15	27	21	5	15		2		14	2	3	10			
07:15 - 07:30	44	31	10	7				4	1	2	8			
07:30 - 07:45	43	23	4	13				6	1	3	8			
07:45 - 08:00	50	21	5	12		1		2	4	6	12			
Hourly Total	**164**	**96**	**24**	**47**		**3**		**26**	**8**	**14**	**38**			
08:00 - 08:15	56	16	7	7				4	3	1	5			
08:15 - 08:30	55	12	2	7				4	3	3	10			
08:30 - 08:45	56	8	5	3				3	4	1	7			
08:45 - 09:00	53	6	1	7				6	3	4	15			
Hourly Total	**220**	**42**	**15**	**24**				**17**	**13**	**9**	**37**			
09:00 - 09:15	20	5	5	11				8	6	3	10			
09:15 - 09:30	24	2	3	7				7	4	3	16			
09:30 - 09:45	21	4	4	9				4	2	3	5			
09:45 - 10:00	24	6	3	10				12	1	1	7			
Hourly Total	**89**	**17**	**15**	**37**				**31**	**13**	**10**	**38**			
10:00 - 10:15	15	6	6	11				10	8		6			
10:15 - 10:30	15	7	6	13				6	6	7	12			
10:30 - 10:45	16	5	2	10		2		13	2	1	10		1	
10:45 - 11:00	16	6	3	11		1		7	7	5	11			
Hourly Total	**62**	**24**	**17**	**45**		**3**		**36**	**23**	**13**	**39**		**1**	
11:00 - 11:15	5	6	3	14				10	3	5	14			
11:15 - 11:30	4	7	4	11				8	5	3	14			
11:30 - 11:45	16	13	7	28				10	2	1	12			
11:45 - 12:00	9	8	4	17				11	8	3	11			
Hourly Total	**34**	**34**	**18**	**70**				**39**	**18**	**12**	**51**			

CAPITA SYMONDS	Job Number:	CS26558/F33
Swan Valley	Client:	Lawrence Walker
Swan Valley Way	Date:	4th October 2007

	Movement A ENTERING SITE							Movement B LEAVING SITE						
Times	Cars	LGV	OGV1	OGV2	PSV	M/cycles	Cycles	Cars	LGV	OGV1	OGV2	PSV	M/cycles	Cycles
12:00 - 12:15	11	4	10					11	4	10	11			
12:15 - 12:30								19	4	7	10			
12:30 - 12:45								21	7	4	3			
12:45 - 13:00	10	6	7	6		1		11	1	7	7			
Hourly Total	**21**	**10**	**17**	**6**		**1**		**62**	**16**	**28**	**31**			
13:00 - 13:15	16	5	4	11				16	11	7	6			
13:15 - 13:30	23	4	12	8		1		20	6	5	10			
13:30 - 13:45	35	7	9	8		1		19	3	8	8			
13:45 - 14:00	23	10	6	3				18	9	2	10			
Hourly Total	**97**	**26**	**31**	**30**		**2**		**73**	**29**	**22**	**34**			
14:00 - 14:15	17	5	8	11				54	5	5	4		1	1
14:15 - 14:30	5	4	2	9				30	4	9	16			
14:30 - 14:45	11	7	9	6				24	3	1	11			
14:45 - 15:00	10	5	10	5				21	5	5	8			
Hourly Total	**43**	**21**	**29**	**31**				**129**	**17**	**20**	**39**		**1**	
15:00 - 15:15	8	3	6	7				37	13	8	6			
15:15 - 15:30	5	4	3	4				30	16	4	13			
15:30 - 15:45	9	6	3	3				51	20	5	7			
15:45 - 16:00	6		3	3				24	20	6	5		1	
Hourly Total	**28**	**13**	**15**	**17**				**142**	**69**	**23**	**31**		**1**	
16:00 - 16:15	12	6	2	6				48	12	6	4			
16:15 - 16:30	15			9				51	15	3	3		1	
16:30 - 16:45	13	2	1	5				88	13	2	9			
16:45 - 17:00	12	2		3				36	7	3	3		1	
Hourly Total	**52**	**10**	**3**	**23**				**223**	**47**	**14**	**19**		**2**	
17:00 - 17:15	3		1	4				48	9	1	9			
17:15 - 17:30	6	1	2	4				41	12	2	2			
17:30 - 17:45	20		1	6		1		64	4		8		1	
17:45 - 18:00	14			4				59	13	4	6			
Hourly Total	**43**	**1**	**4**	**18**		**1**		**212**	**38**	**7**	**25**		**1**	
18:00 - 18:15	15	2	1	5				72	13	1	5			
18:15 - 18:30	24	3		6		1		22	7		4		1	
18:30 - 18:45	33	4	1	7		1		22	5		5		1	
18:45 - 19:00	44	3	2	5		1		27	9	1	7			
Hourly Total	**116**	**12**		**23**		**3**		**143**	**34**	**2**	**21**		**2**	
19:00 - 19:15	7		1	4				29	1	1	5			
19:15 - 19:30	1			5				11			1			
19:30 - 19:45	5			6				6			3			
19:45 - 20:00	5			4				11			4			
Hourly Total	**18**		**1**	**19**				**57**	**1**	**1**	**13**			
20:00 - 20:15	7	1		5				2					1	
20:15 - 20:30	6			9				8			5			
20:30 - 20:45	2			4				13	1		6			
20:45 - 21:00	4	1		3				7			6			
Hourly Total	**19**	**2**		**21**				**30**	**1**		**17**		**1**	
21:00 - 21:15	4			1				7			4			
21:15 - 21:30	11			4				3	1		4			
21:30 - 21:45	16			4				3		1	9		1	
21:45 - 22:00	17			5				6	1		2			
Hourly Total	**48**			**14**				**19**	**2**	**1**	**19**		**1**	
22:00 - 22:15	1	1		3		1		21			6			
22:15 - 22:30	1			5				11			6		3	
22:30 - 22:45				4				2			1			
22:45 - 23:00	1				3						2			
Hourly Total	**3**	**1**		**12**	**3**	**1**		**34**			**15**		**3**	
23:00 - 23:15	1			5				2			4			
23:15 - 23:30	1			2				5		1	8			
23:30 - 23:45	1			3										
23:45 - 00:00				5				3			4			
Hourly Total	**3**			**15**				**10**		**1**	**16**			

CAPITA SYMONDS		Job Number:	CS26558/F33
Swan Valley		Client:	Lawrence Walker
Swan Valley Way	Construction Site	Date:	4th October 2007

	Movement C ENTERING SITE							Movement D LEAVING SITE						
Times	Cars	LGV	OGV1	OGV2	PSV	M/cycles	Cycles	Cars	LGV	OGV1	OGV2	PSV	M/cycles	Cycles
00:00 - 00:15														
00:15 - 00:30														
00:30 - 00:45														
00:45 - 01:00														
Hourly Total														
01:00 - 01:15														
01:15 - 01:30														
01:30 - 01:45														
01:45 - 02:00														
Hourly Total														
02:00 - 02:15									1					
02:15 - 02:30								3						
02:30 - 02:45														
02:45 - 03:00														
Hourly Total								**3**	**1**					
03:00 - 03:15														
03:15 - 03:30														
03:30 - 03:45														
03:45 - 04:00									1					
Hourly Total									**1**					
04:00 - 04:15														
04:15 - 04:30														
04:30 - 04:45														
04:45 - 05:00														
Hourly Total														
05:00 - 05:15														
05:15 - 05:30														
05:30 - 05:45	1		1											
05:45 - 06:00	5	1												
Hourly Total	**6**	**1**	**1**											
06:00 - 06:15	4													
06:15 - 06:30	5	1							1	1	3			
06:30 - 06:45	6	12	2	2										
06:45 - 07:00	18	22		1						1				
Hourly Total	**33**	**35**	**2**	**3**					**1**	**2**	**3**			
07:00 - 07:15	14	18	2	6				2	1		2			
07:15 - 07:30	19	26	2	2							3			
07:30 - 07:45	18	21	3	8				1	1		3			
07:45 - 08:00	18	17	3	5					2	2	2			
Hourly Total	**69**	**82**	**10**	**21**				**3**	**4**	**2**	**10**			
08:00 - 08:15	21	21	3	1				1	1	1	1			
08:15 - 08:30	18	12	4	6				2	4	1	6			
08:30 - 08:45	7	9	3	2				2		1	4			
08:45 - 09:00	7	4	1	3				2	2	4	5			
Hourly Total	**53**	**46**	**11**	**12**				**7**	**7**	**7**	**16**			
09:00 - 09:15	4	6	2	4				2	8	3	4			
09:15 - 09:30	5	3	1	3					4	2	8			
09:30 - 09:45	3	4	2	2				1	3		3			
09:45 - 10:00	4	5	2	6				4	1	1	3			
Hourly Total	**16**	**18**	**7**	**15**				**7**	**16**	**6**	**18**			
10:00 - 10:15	3	6	2	4				2	7	1				
10:15 - 10:30	2	9		4					6	1	3			
10:30 - 10:45	3	5		8				4	3		4			
10:45 - 11:00	6	4	1	4				2	5	3	5			
Hourly Total	**14**	**24**	**3**	**20**				**8**	**21**	**5**	**12**			
11:00 - 11:15		4	3	2				3	5	3	6			
11:15 - 11:30	3	4	2	5				3	4		2			
11:30 - 11:45	4	3	2	7				5	2	2	2			
11:45 - 12:00	3	9	2	10				3	3	1	7			
Hourly Total	**10**	**20**	**9**	**24**				**14**	**14**	**6**	**17**			

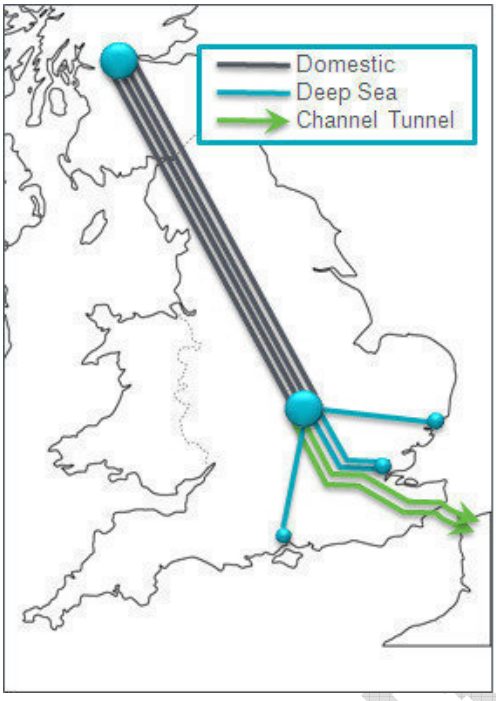
CAPITA SYMONDS		Job Number:	CS26558/F33
Swan Valley		Client:	Lawrence Walker
Swan Valley Way	Construction Site	Date:	4th October 2007

	Movement C ENTERING SITE							Movement D LEAVING SITE						
Times	Cars	LGV	OGV1	OGV2	PSV	M/cycles	Cycles	Cars	LGV	OGV1	OGV2	PSV	M/cycles	Cycles
12:00 - 12:15	2	2	1	2				1	5	1	12			
12:15 - 12:30	4	2	1	4				7	3	2	6			
12:30 - 12:45	7	2	2	7				2	2	1	3			
12:45 - 13:00	4	5	1	6					6		8			
Hourly Total	**17**	**11**	**5**	**19**				**10**	**16**	**4**	**29**			
13:00 - 13:15	1	2	2	3				2	7	2	4			
13:15 - 13:30	1	9	1	5				4	5	4	1			
13:30 - 13:45	7	7	1	5				4	5	2	4			
13:45 - 14:00	4	7	1	3				3	5	1	2			
Hourly Total	**13**	**25**	**5**	**16**				**13**	**22**	**9**	**11**			
14:00 - 14:15	3	9	3	8				3	2	1	3			
14:15 - 14:30	5	4	1	2				5	7	5	6			
14:30 - 14:45		5	1						8	1	3			
14:45 - 15:00	1	7		4				5	6	1				
Hourly Total	**9**	**25**	**5**	**14**				**13**	**23**	**8**	**12**			
15:00 - 15:15	3	5	1	8				6	10	2	4			
15:15 - 15:30	1	4		2				6	13	1	2			
15:30 - 15:45	1	8		1				7	12		3			
15:45 - 16:00	1	1		1				7	13	3	1			
Hourly Total	**6**	**18**	**1**	**12**				**26**	**48**	**6**	**10**			
16:00 - 16:15	1	2						13	9	3	3			
16:15 - 16:30	3							10	14	1	1			
16:30 - 16:45	1	1						13	8	1	1			
16:45 - 17:00	1	1						9	11					
Hourly Total	**6**	**4**						**45**	**42**	**5**	**5**			
17:00 - 17:15	1		1					10	7	1	1			
17:15 - 17:30	1							13	11	1	1			
17:30 - 17:45	5							12	4					
17:45 - 18:00								28	20	1	1			
Hourly Total	**7**		**1**					**63**	**42**	**3**	**3**			
18:00 - 18:15	2	1						17	13	1	1			
18:15 - 18:30	1	2						3	3	1	1			
18:30 - 18:45		1						5	2					
18:45 - 19:00	2			1				6	6					
Hourly Total	**5**	**4**		**1**				**31**	**24**	**2**	**2**			
19:00 - 19:15	1							3	4					
19:15 - 19:30								2	1					
19:30 - 19:45								1						
19:45 - 20:00								2						
Hourly Total	**1**							**8**	**5**					
20:00 - 20:15														
20:15 - 20:30								2						
20:30 - 20:45									2					
20:45 - 21:00								3						
Hourly Total								**5**	**2**					
21:00 - 21:15								1	3					
21:15 - 21:30				1										
21:30 - 21:45														
21:45 - 22:00														
Hourly Total				**1**				**1**	**3**					
22:00 - 22:15														
22:15 - 22:30														
22:30 - 22:45														
22:45 - 23:00														
Hourly Total														
23:00 - 23:15														
23:15 - 23:30														
23:30 - 23:45														
23:45 - 00:00														
Hourly Total														

APPENDIX E

EXTRACT OF DIRFT III EXPANSION: NEED REPORT, JANUARY 2012

Tesco distribution centres on DIRFT and it has now transferred to a new facility on DIRFT II.



5.74 While operators try to run full trains of containers, variations in demand mean that often there are empty spaces on container trains. Assuming that the Tesco train is 80% loaded with containers in both directions, then it is carrying an estimated 10,400 movements per year. Therefore the current volume of rail freight using DIRFT I or Rugby is as follows:

- 71,531 intermodal movements through DIRFT I (inbound plus outbound)
- 16,733 (equivalent) lorry movements via the Channel Tunnel water train (mainly inbound but 20% outbound carrying empty pallets)
- 10,400 intermodal movements using the Rugby terminal (inbound plus outbound)
- A total of 98,664 movements per annum (inbound plus outbound).

What Is The Catchment Area of DIRFT I?

5.75 A survey of HGVs entering and leaving the DIRFT rail facility over a week in February 2010 found that 31% of vehicles were starting from or destined for other locations within the DIRFT estate. This illustrates a strong link between businesses on the estate and the rail facility.

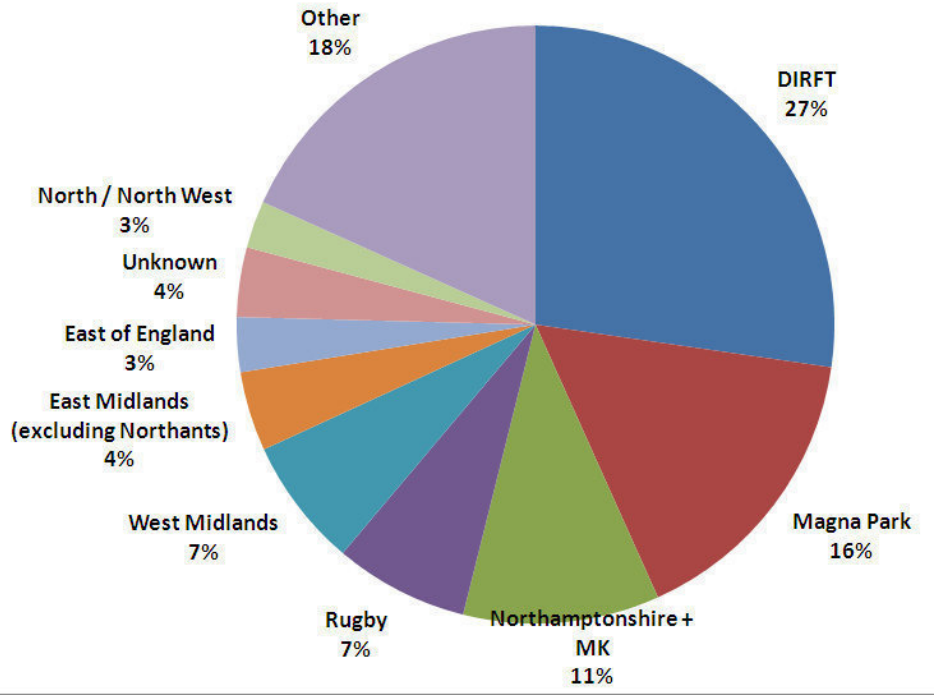
Table 5.3 Results of February 2010 Interview Survey. The survey identified the origin of lorries entering the intermodal terminal or the destination of lorries leaving

	To DIRFT	Total	DIRFT %
Outbound			
Full	77	405	19%
Empty	126	339	37%
Total	**203**	**744**	**27%**
	From DIRFT	**Total**	**DIRFT %**
Inbound			
Full	119	405	29%
Empty	150	353	42%
Total	**269**	**758**	**35%**
	To/From DIRF	**Total**	**DIRFT %**
All Traffic	**472**	**1502**	**31%**

5.76 Furthermore, all of the water train movements are transferred direct to and from a facility in DIRFT, while an estimated 70% of the Tesco train's containers are to or from locations within DIRFT.

5.77 As illustrated in the pie chart below (covering outbound lorries as an example) , a large proportion of the remaining HGVs in the survey were travelling the relatively short distances to or from either Magna Park or Northampton and Milton Keynes.

Figure 5.4 Summary of destinations of lorries leaving DIRFT. February 2010 Survey



5.78 The survey illustrates the role that DIRFT plays in serving the UK cluster of large National Distribution Centres around Northamptonshire, DIRFT itself, and Magna Park.

Summary of Rail Freight Demand for DIRFT

5.79 In summary, DIRFT I is playing a central role in each of the three key service sectors that DIRFT III will be targeting:

- DIRFT I is a major location for handling **deep sea** containers to and from the Midlands
- DIRFT I is the central player in the **domestic** intermodal market
- DIRFT I is the chosen terminal for one of the new generation of international intermodal services via the **Channel Tunnel**.

5.80 The key drivers of demand in these three sectors has been:

- **Deep Sea**: growth in trade and container volumes; development of distribution centres at well located inland freight interchanges
- **Domestic:** Changes in supply chain management; green agenda; development of distribution centres at Rail Freight Interchanges
- **Channel Tunnel:** A degree of suppressed demand due to historic problems; reduced prices and open access for rail haulage; the development of distribution centres at Rail Freight Interchanges.

Forecast Demand for Freight Transport

Introduction

5.81 Before considering specific demand forecasts for rail, it is worthwhile looking at the limited range of forecasts available for freight as a whole. Good quality forecasts are available for international traffic, whereas domestic freight forecasts are more problematic as road traffic forecasts already take into account forecast growth of rail freight.

5.82 In line with the trends summarised in section 5.80, Deep Sea volumes are forecast to grow strongly for the foreseeable future. In July 2007, DfT issued an Update of UK Port Demand Forecasts to 2030, which predicted growth in the number of containers of 3.8% per annum from 2005 to 2030. However, from 2010 to 2030 the growth rate was forecast to be 3.3% per annum. In fact 2009 volumes were little higher than 2005 volumes due to the impact of the global recession. Nonetheless, annual growth of between 3.3% and 3.8% can be expected in the long term as global trade growth is expected to return to trend levels.

5.83 The same forecasts predicted RoRo freight volume to grow by 2.8% throughout the period 2005 to 2030. This figure is relevant for Channel Tunnel rail freight demand because the Channel Tunnel rail freight business competes for goods which would otherwise tend to move across the Channel on RoRo ferries.