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Roughan & O'Donovan

M50/M11/N11 Corridor Study
Final Report

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Final Report

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Executive Summary

This report considers the transport demand pressures arising along the M50/M11/N11 route corridor between Sandyford in Dun Laoghaire-Rathdown and Fassaroe in north County Wicklow. It seeks to devise a suitable strategy to manage the strategic function of the M50/M11/N11 in the context of planned developments of the adjoining lands.

There are two main contributors to current peak hour traffic flows on the M50/M11/N11 between Sandyford and Fassaroe.

- Long distance commuter traffic from east Wicklow and north Wexford accessing the Dublin area and in particular the various employment centres in the southern part of Dublin; and
- Local east-west traffic, moving between residential and employment areas such as Bray, Dun Laoghaire, Sandyford, Cherrywood, Kilternan/Glenamuck and Tallaght, using the M50/M11/N11 for relatively short, local journeys between interchanges or using the various interchanges to cross the motorway owing to the lack of alternative regional or local roads of a reasonable standard.

As a consequence the M50/M11/N11 in Dun Laoghaire Rathdown County Council (DLRCC) struggles to deliver its primary function of providing strategic connectivity between urban areas and key import/export markets. Future development proposals in close proximity to the various interchanges along the corridor threaten to further undermine the ability of the M50/M11/N11 to serve the needs of strategic traffic.

All of the major development areas share a common approach aimed at achieving a reduced modal share for the private car. This approach is based on additional local roads, enhanced public transport and planning policy (for example mixed land use and limits on parking). Future development assumptions are based on work undertaken by RPS on behalf of Dun Laoghaire-Rathdown County Council utilising the National Transport Authorities' Transport Model.

Based on information available and following on from studies undertaken to date, comprehensive traffic modelling has been undertaken to identify a long term strategy that will protect the role of the M50/M11/N11 in providing strategic connectivity between urban areas and key import/export markets. The implementation of the proposed strategy will be sequential in approach, starting with enhancements to the local road network and public transport network / services to remove existing and future short distance local and commuting traffic from the corridor as well as the implementation of some M11/N11 traffic management measures. Beyond this, sections of the M50/M11/N11 will need to be widened by the addition of either a third lane or an additional auxiliary lane.

The modelling that has informed the above strategy is based on the assumption that a car mode share of 45% will be achieved for future developments. However, based on progress to date and a review of the current public transport proposals it is considered that more ambitious interventions are likely to be required to provide the additional public transport capacity and to encourage the behavioural change necessary if the reduced level of car use is to be achieved. Without this the development quanta envisaged by DLRCC could not be constructed without compromising the strategic role of the M50/M11/N11 in the future.

M50/M11/N11 Traffic Management Study

Final Report

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Chapter 1 Introduction

1.1 Context

This study has been undertaken by the NRA to assess the future needs of the M50/M11/N11 National Roads in the Dun Laoghaire Rathdown area between Sandyford and Bray. The need for the study was identified due to the existing congestion which can occur along the M50/M11/N11 Corridor and the high proportion of short hop trips on the corridor. The study has been undertaken in conjunction with Dun Laoghaire Rathdown County Council (DLRCC) and in consultation with the National Transport Authority (NTA). This report outlines the results of a detailed traffic modelling and appraisal process which was undertaken to ascertain the future road needs in the area taking cognisance of public transport, cycling, walking and other modes. It follows on from initial work which was undertaken in 2010. A separate report[1] was prepared for the N11 Corridor in County Wicklow and was issued to Dun Laoghaire Rathdown and Wicklow County Councils in April 2010. The extent of the current study area is shown in Figure 1.1 below.

Figure 1.1 – Study Area

[1] Roughan O'Donovan AECOM N11 Corridor Review Summary, September 2009

1.2 National Roads and Travel Demand

At a national level, vehicle kilometres increased by approximately 40% between 2000 and 2008. Table 1-1 sets out the trend in car and goods traffic volumes on a national basis over this period, and shows that total car and goods vehicle kilometres grew at an average rate of approximately 4.8 per cent per annum over the period 2000-2007. Goods vehicle kilometres were particularly strong with an average annual growth rate of 10 per cent over the same period. The data highlights a break in the trend in 2008, with reduced rate of growth of 1.8 per cent. This is largely due to a reduction in goods vehicle kilometres.

Table 1.1 - Trends in Transport Demand (million vehicle kilometres)

Year	Cars (mvkm)	% Change	Goods (mvkm)	% Change	Total (mvkm)	% Change
2000	23,532		4,075		27,607	
2001	24,664	4.81	4,577	12.32	29,241	5.92
2002	25,142	1.94	5,048	10.29	30,190	3.25
2003	26,036	3.56	5,562	10.18	31,598	4.66
2004	26,913	3.37	6,116	9.96	33,029	4.53
2005	27,972	3.93	6,670	9.06	34,642	4.88
2006	29,015	3.73	7,409	11.08	36,424	5.14
2007	30,349	4.60	7,891	6.51	38,240	4.99
2008	31,173	2.72	7,745	-1.85	38,918	1.77

Source: CSO

Conventional forecasts of national traffic volumes (in vehicle kilometres) can be made by using the forecasts of vehicle numbers combined with assumptions about average annual use levels. Notwithstanding this, Smarter Travel[2] has set a target that "*the total kilometres travelled by the car fleet in 2020 will not increase significantly from current (2009) levels*." The exact mechanics of delivering on that objective remain to be developed but it is likely that a significant portion of that target will be attributable to mode transfer in the urban areas.

Figures 1.2 and 1.3 below show the historical flows along the tolled section of the M50 and the N11 at Fassaroe. The traffic flows show that between 2008 and 2011 average flows on the M50 have increased from circa 85,000 AADT to nearly 110,000 AADT in August 2011. Average flows on the N11 at Fassaroe have remained relatively static with a slight overall reduction from 66,000 to 63,000 AADT.

[2] *Smarter Travel: A Sustainable Transport Future,* Department of Transport, 2009

Figure 1.2 – Historical Flows on the M50 – 2008 - 2011

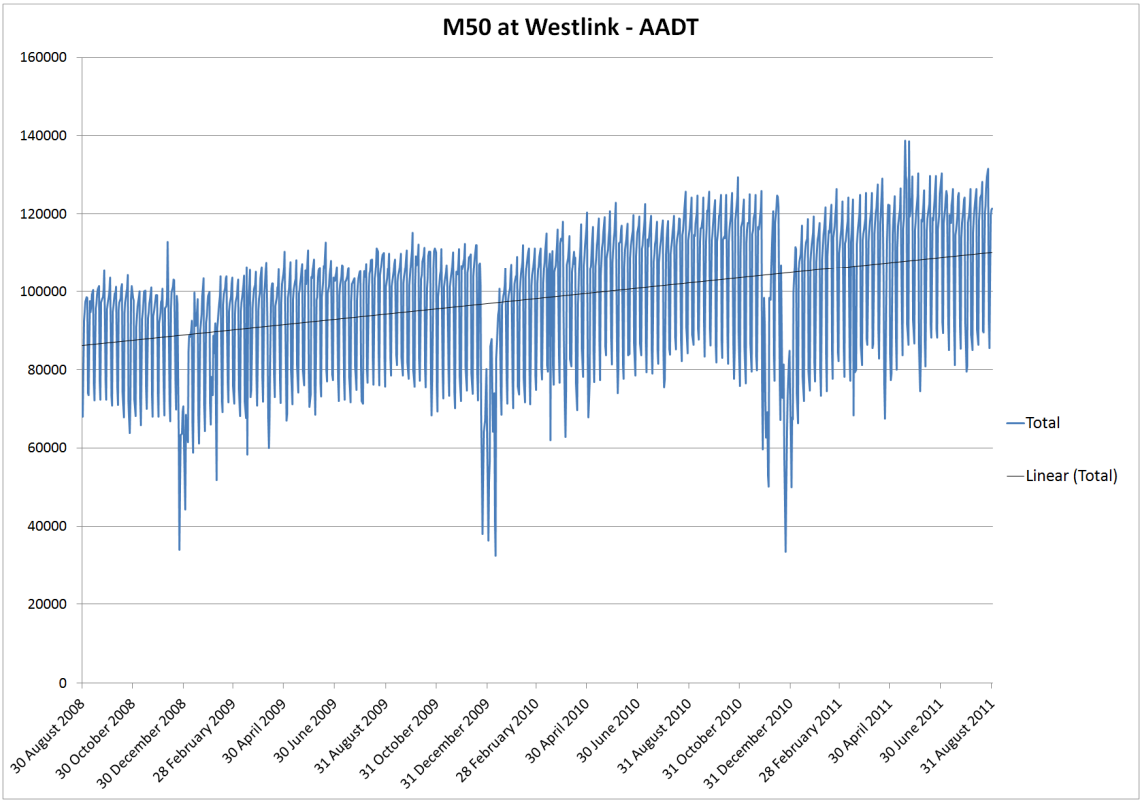
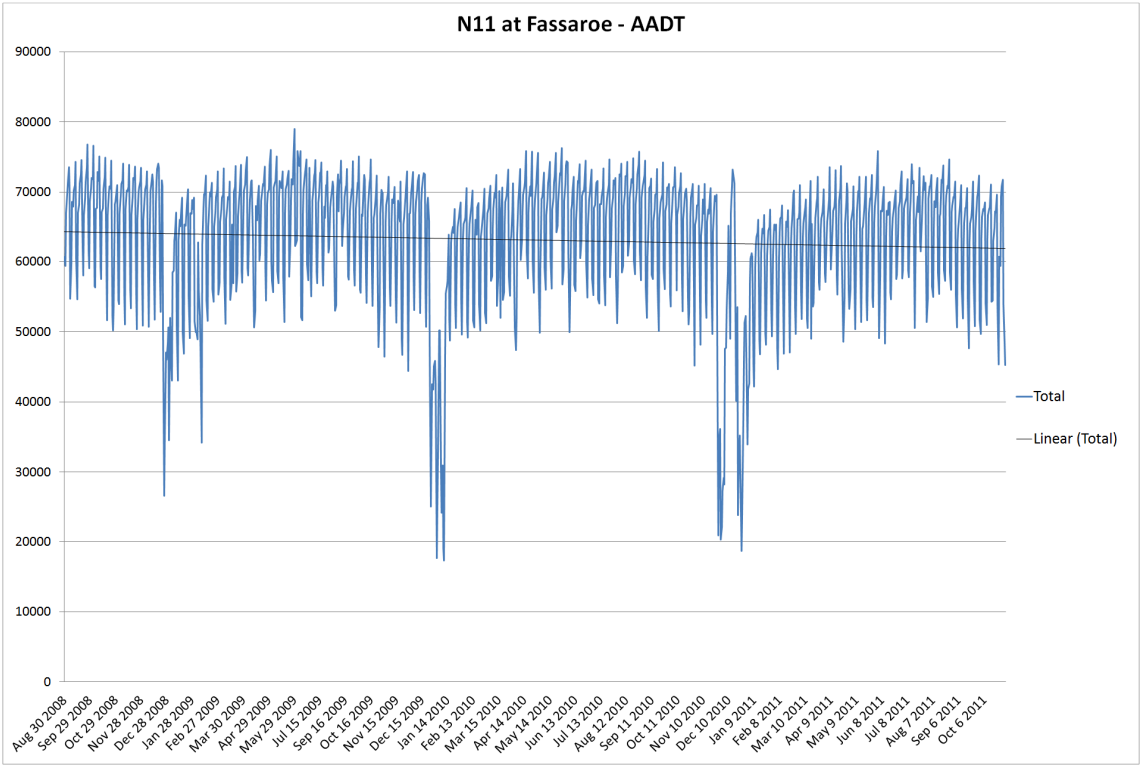


Figure 1.3 – Historical Flows on the N11 – 2008 - 2011



1.3 Role of the M50/M11/N11 Corridor

The M50, M11 and N11 are highly important road links through the study area. The M11/N11 provides the dominant means of access to the south east of the country, in addition to providing access to international markets for freight and tourist traffic through Rosslare Euro-port. The M50 provides onward connection from the M11 to other radial routes. The difficulty in developing alternative orbital connections from the M11 and N81 further south only increases the reliance on the M50 Southern Cross Route. This was recognised in earlier Feasibility Studies for the Leinster Orbital.

Notwithstanding this, there has been significant development in the towns served by the M11/N11 corridor, most notably in Bray, Greystones, southeast Wicklow and north Wexford which have only become possible as a result of the gradual improvements to the capacity of the M11/N11 which now provides Type 1 Dual Carriageway to south of Wicklow Town. The corresponding improvement to public transport has been weak, with only limited enhancement of rail services, and sporadic introduction of bus routes which have relied mostly on the response of private operators to a partially regulated market.

The current function of the M11/N11 is, however, fundamentally different to other National Primary Routes which connect into the Dublin Area. The M11/N11 acts more as a commuter route into the City, and supports one of the highest car mode shares for trips to work in the Dublin Area. The daily proportion of HGV's on the M11 at Fassaroe stood at 4.3% in 2008. This compares to the M7 at Naas which comprises in excess of 9.2% HGV's. As a further indicator, the M11 carries some 11% of its daily traffic during the AM Peak Period, compared with the M7 where the figure is 7.8%. As such, the M11/N11 operates predominantly as a commuter route, with limited function as a strategic route catering for freight and business activity between the Dublin Area and the Southeast. The M50 between Bray and Sandyford is effectively an extension of the M11 into South Dublin, and operates on a similar basis.

It has long been acknowledged that the provision of additional road capacity can lead to growth in traffic demand that exceeds background expectations. This arises from subsequent land use changes and population increases and also from the induced traffic effects of such infrastructure. Induced traffic occurs as a result of modal switch to car travel as a result of reduced journey times, changes in travel times and long term changes in travel patterns as a result of moving residence/place of work. Examining the M50 over the period from 2008 to 2011 shows that there has been constant and consistent growth in monthly traffic volumes, with increases of over 25% recorded over a 3 year period. This is in contrast to traffic volumes across much of the rural road network, where reductions of up to 20% have been recorded in individual areas since 2008. This conclusion suggests that the additional road capacity on strategically important routes remains under threat despite the economic slowdown, and that such growth will likely continue as the economy returns to growth.

1.4 Existing Conditions

There are stop-start flow conditions on the N11/M11 southbound carriageway between the Wilford Junction at Bray North and Kilmacanogue in the afternoon and evening peak periods. Significant safety concerns arise because of the high-speed motorway approach from the M50, where traffic can suddenly arrive at static queues. In response to this problem there can be illegal and unsafe

weaving movements at the Shankill motorway merge junction with vehicles cutting across the hatched ghost islands prematurely. Similar, but perhaps less severe, flow problems occur on the northbound carriageway in the morning peak from the Glen of the Downs through Kilmacanogue Village to as far north as the Fassaroe Junction. Traffic management measures have been developed to address these concerns in the short term[3].

On the N11 dual carriageway south of Fassaroe Junction and through the Bray area there are a number of existing deficiencies along the route corridor in terms of road layout and access control, which give rise to operational difficulties or may form safety hazards. Examples are reduced standard junction layouts, inadequate weaving lengths between merges and diverges and a proliferation of accesses. A large number of local trips use the N11 for short hops along this section because of several significant gaps in the local and regional road network. These local traffic movements add considerably to junction weaving difficulties and associated capacity and safety concerns. A separate report was prepared which addressed the issues on the N11 in the Wicklow area.[4]

1.5 Potential Future Issues

Further congestion and delay is likely to result on the M11/N11 due to ongoing development along the route corridor, which will further stifle the ability of the M11/N11 to act as a strategic link to the Southeast. This would serve to isolate that part of the country from national and international markets. Careful planning is therefore required to ensure that development along the M11/N11 corridor does not subvert the strategic function of the route. Excessive reliance on this route for local trips and for car-based commuting to Dublin should be avoided, and complementary investments are required for both local and regional road improvements as alternative routes, and in public transport services.

In order to support the continuing growth in this region of the Greater Dublin Area, a series of transport proposals are being developed by Dun Laoghaire Rathdown County Council, Bray Town Council and Wicklow County Council. These are at various stages of development and it is considered essential that an area wide model is developed to assess the impact of the future development, as well as assessing the effectiveness of various transport proposals both in terms of catering for local traffic and protecting the strategic function of the M50/M11.

[3] Roughan O'Donovan AECOM, M11 Southbound Traffic Management Measures Part 8 Report, 2010
[4] Roughan O'Donovan AECOM, N11 Corridor Review Study, 2009

Chapter 2 Study Objective and Policy

2.1 Key Objective

To identify how best to manage the strategic function of the M50/M11/N11 national route between Sandyford and Kilmacanogue.

The broad issues and deficiencies identified in Chapter 1 have, to some extent, been recognised by the relevant local authorities. They have sought to address these by promoting a number of road and public transport improvements. These proposals still focus on the M50- M50/M11/N11 corridor as a primary means of movement, with some consideration of the needs for local movement between the relevant settlements along the corridor.

In order to address the traffic demand from the various land use and transportation proposals contained in the published plans by the County Councils, a series of potential road schemes were identified for further consideration. This report will utilise the latest traffic modelling tools to test the effectiveness of these schemes in addressing the current, and future, traffic issues.

2.2 Current NRA policy

General NRA policy relating to the safety, efficiency and capacity of the National Roads network is set out in the Department of Environment document entitled "Spatial Planning and National Roads" (January 2012). In essence this seeks to ensure that local authorities adopt policies that avoid the undermining of the strategic transport function of National Roads by promoting local transport infrastructure measures intended to cater for the roads needs of local traffic and local development related traffic.

The definition of strategic and local traffic has always been a subject of debate. Commonly local traffic is considered to be that travelling between local areas of population, embracing trips of no more than 60km but typically represented by trips of around 30km or less. This would include the majority of work-related commuting trips, although some of this traffic could be regarded as strategic. A more robust means to differentiating between strategic and local traffic is by comparing the broader strategic benefit to the economy of the trip. Strategic traffic predominantly comprises business travel and freight, i.e. high value of time trips, which facilitate and support economic growth in the Hubs and Gateways, as outlined in the National Spatial Strategy. High volumes of commuter traffic which contribute to localised congestion on national roads therefore inhibit the ability of those roads to fulfil this strategic function.

Strategic traffic, in the context of national roads, primarily comprises major interurban and inter-regional traffic, whether HGV, car, public transport bus services or other public service vehicles, which contributes to socio-economic development, the transportation of goods and products, especially traffic to/from the main ports and airports, both freight and passenger related.

Chapter 3 Data Collection

3.1 Introduction

In order to develop a Traffic Model, a significant level of traffic data is required to ensure that the model can replicate existing traffic patterns and volumes. This section of the report describes the collation of traffic data for the construction of the Base Year Traffic Model.

3.2 National Transport Model

The starting point for the base year M50/M11/N11 traffic model is the 2010 base National Transport Model (NTpM), which was developed by the National Roads Authority (NRA).

The NTpM is strategic (macroscopic) traffic model developed using the transportation modelling software VISUM. The model covers the entire national and regional road network and is used by the NRA as a tool in the appraisal of potential road schemes, land-use and policy changes. The NTPM provides demand data for Light (Car & LGV) and Heavy (OGV1, OGV2 &, PSV) vehicles for the following time periods:

- Average AM Peak Hour (07:00 – 09:00); and
- Average Inter Peak Hour (12:00 – 14:00).

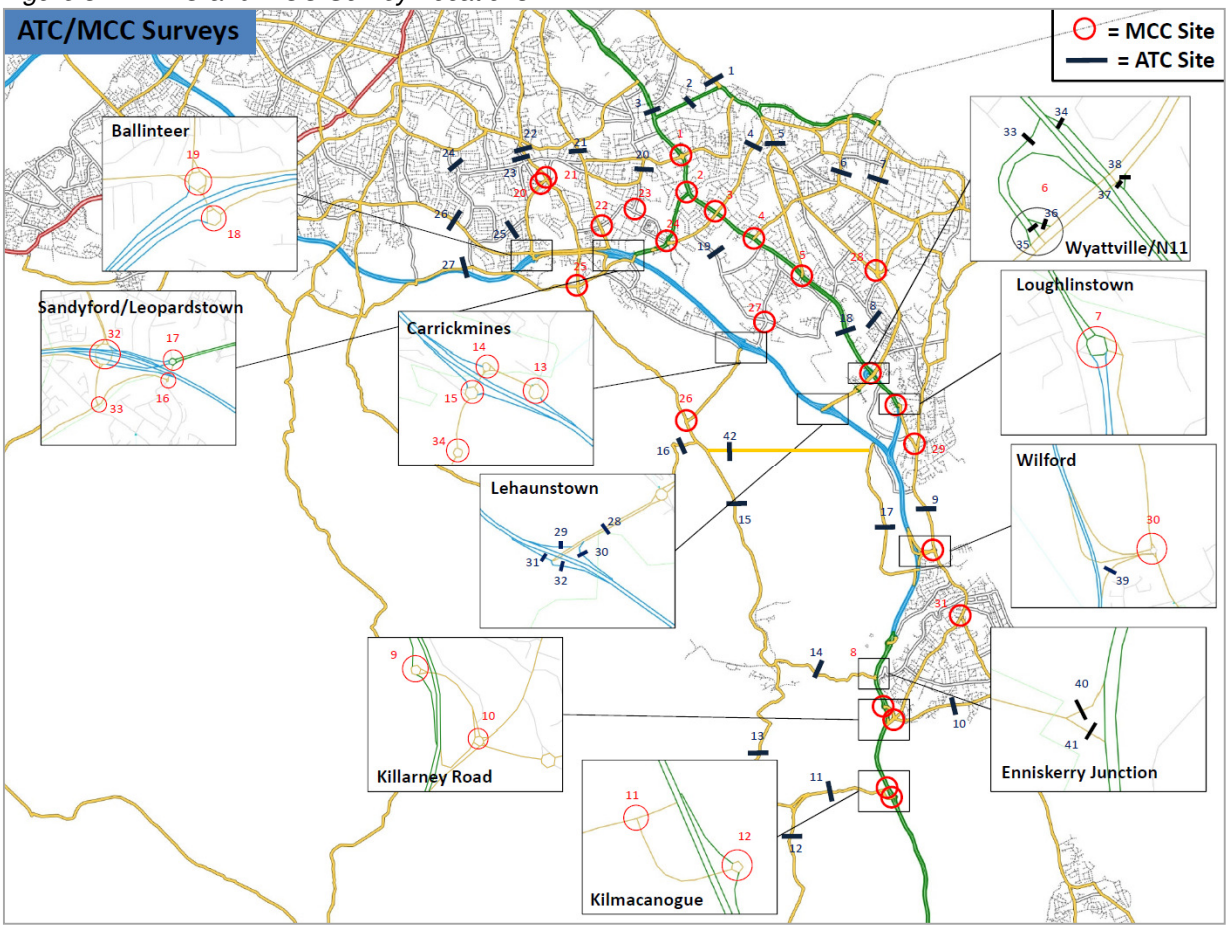
The NTPM model also provides the basic road network for use in the M50/M11/N11 model.

3.3 Traffic Surveys

In order to develop the Base Year Model, substantial existing traffic survey data taken from previous traffic studies in the study area was made available by DLRCC and the NRA. In addition, SCATS information was supplied by Dublin City Council for a number of signalised junctions within the study area. In addition to the existing data a further 41 link count surveys and 19 junction count surveys were commissioned in May 2011. Further Origin – Destination surveys were also commissioned to establish traffic patterns on national roads within the study area.

A summary of this traffic survey data is described below.

Figure 3.1 – ATC and MCC Survey Locations



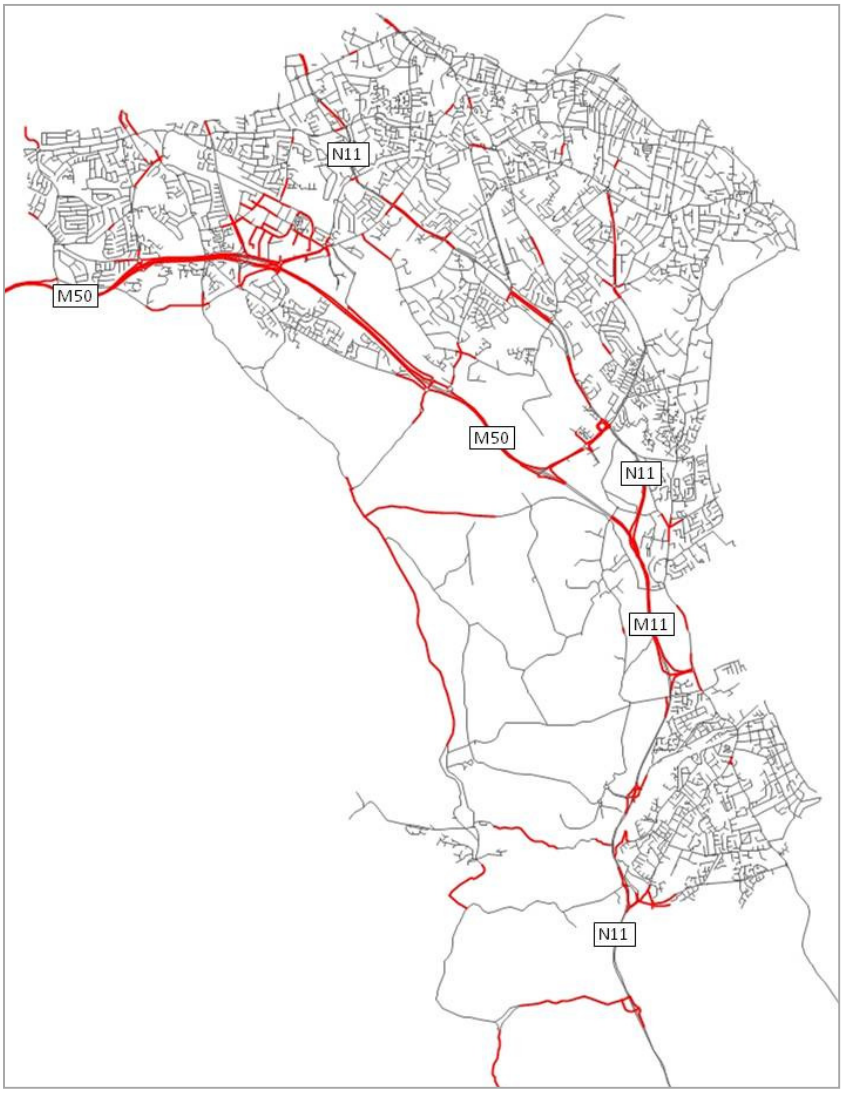
3.3.1 ATC Surveys

A total of 40 ATC, or link count, surveys were undertaken May 2011. The ATC data is presented in Appendix B of this report.

3.3.2 Manual Classified Counts (MCC)

A number of MCC's were undertaken over the period from 23rd to 29th May 2011. The following classifications were used; Cyclists, Motorcycles, Cars, LGV, HGV and Passenger Service Vehicles (PSV). Figure 3.2 below shows the locations of all traffic count data used as part of the development of traffic model collated from various locations.

Figure 3.2 – Locations of Traffic Survey Data



3.3.3 Origin-Destination Surveys

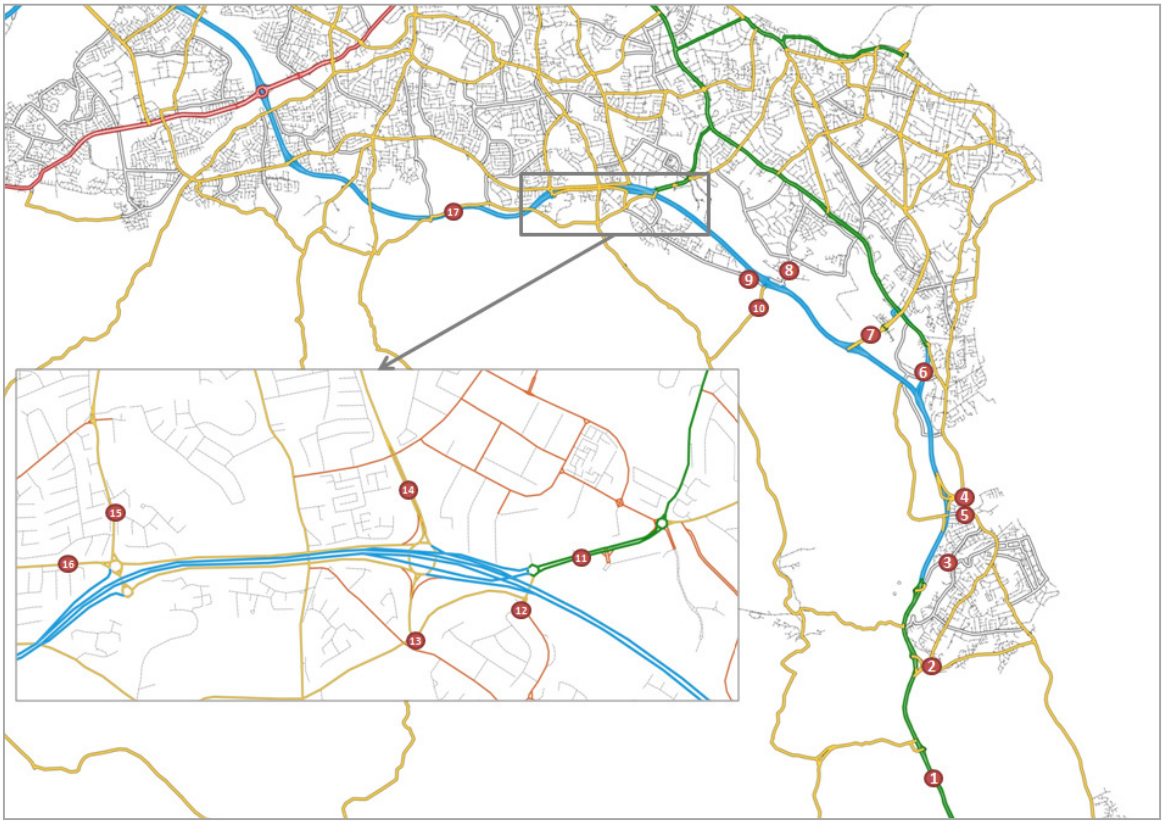
In order to develop forecast traffic levels, it is first required to develop a robust representation of current traffic patterns. Origin-Destination (O-D) Surveys were undertaken using a bluetooth vehicle tracking system which recorded individual Bluetooth ID's at cordon points. The surveys were undertaken all day (24hrs) from June 30th to July 5th 2011.

O-D Matrices can be output for a number of different types as outlined below;

- 'Next' – Outputs origin as first time a vehicle is captured and Destination as NEXT time a car is captured;
- 'First Seen, Last Seen' - Outputs origin as first time a vehicle is captured and Destination as LAST time a car is captured;
- 'Final Destination' – Adds a trip to every O-D a car passes through, i.e. a trip from A-D will be captured as A to D, B to D, C to D and D to D.

The location of the 17 cordon points utilised as part of the O-D surveys are shown in Figure 3.3 below. These locations were chosen to ensure a closed cordon is used to establish traffic pattern information in the area.

Figure 3.3 - O-D Survey Cordon Points



For the purpose of this note the "First Seen, Last Seen" dataset has been utilised. A summary of the O-D Surveys is given in matrix format in Table 3.1 below and shows average 24 hour weekday flows.

Table 3.1 - Average weekday flows (24hr period)

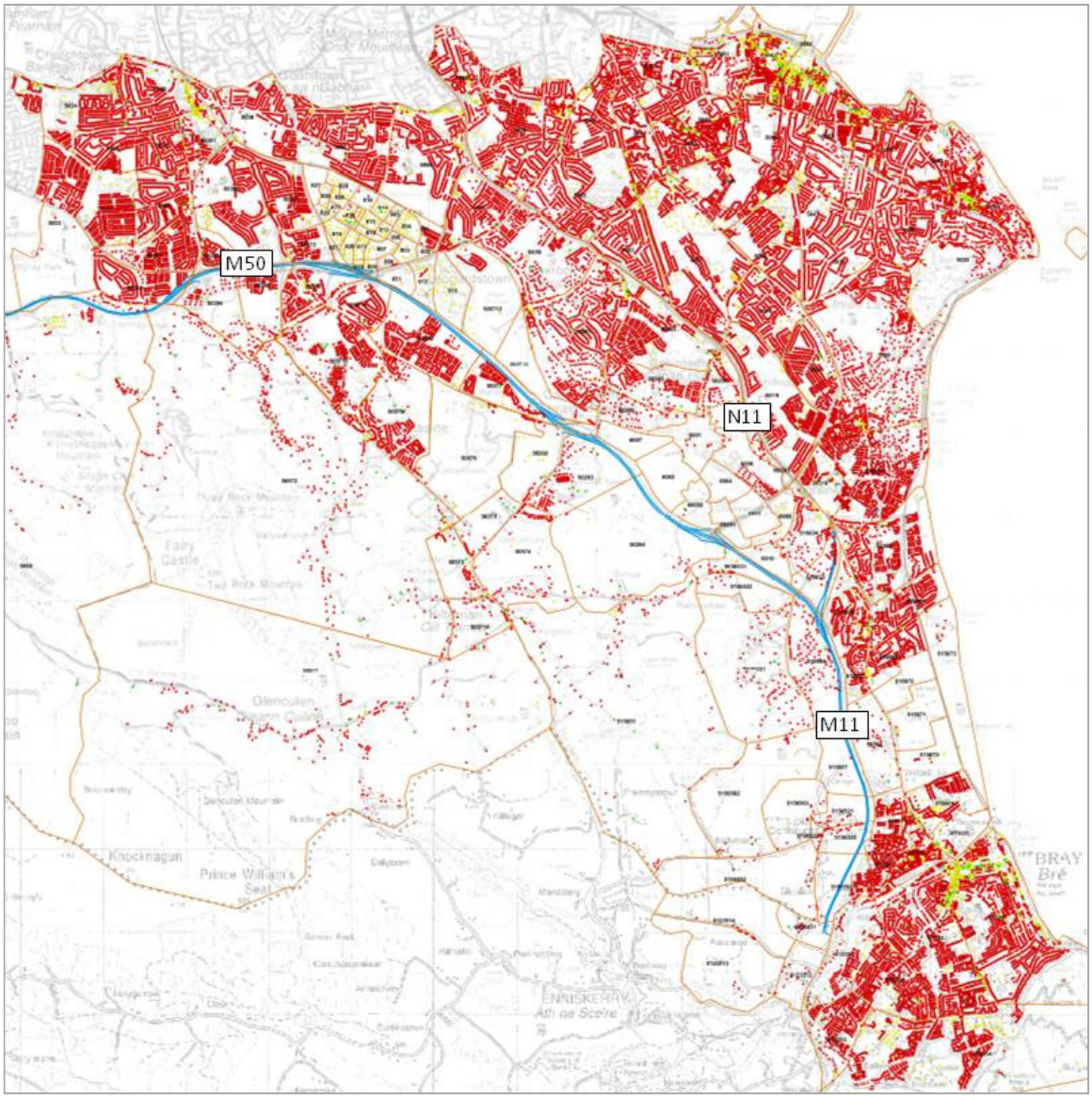
From \ To	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
1	967	1449	268	94	205	4037	797	130	77	175	195	44	72	1215	382	181	5053	**15341**
2	1803	1103	228	144	182	1964	369	85	62	118	93	23	52	534	218	91	1685	**8754**
3	440	313	237	60	38	294	73	12	13	21	19	3	6	45	32	6	222	**1833**
4	603	367	125	233	131	1358	211	53	38	64	67	17	27	339	119	60	1186	**4997**
5	99	72	38	137	219	156	30	11	4	6	5	3	4	24	13	11	94	**927**
6	4674	1532	256	1567	166	810	146	36	12	35	46	7	12	79	22	11	284	**9694**
7	395	135	24	115	18	61	690	113	216	418	117	40	136	697	455	234	4309	**8174**
8	267	103	17	102	7	37	154	496	453	931	96	28	37	159	171	115	1364	**4535**
9	159	73	15	65	7	16	305	485	227	427	117	64	28	85	59	23	348	**2502**
10	228	136	18	93	18	25	423	981	453	567	157	40	28	360	105	71	974	**4679**
11	187	74	10	56	10	23	106	82	71	170	871	2070	149	183	220	137	7742	**12161**
12	31	16	1	11	2	5	22	23	38	33	1580	224	60	102	51	34	398	**2632**
13	188	74	10	64	3	7	248	70	48	53	320	144	176	1012	216	169	1509	**4310**
14	1284	449	44	362	33	58	794	222	72	336	168	107	556	706	196	266	4263	**9913**
15	592	204	18	167	17	34	497	159	31	116	141	43	153	345	366	349	5247	**8479**
16	351	98	8	129	11	18	352	140	22	81	185	51	129	705	478	222	1092	**4072**
17	7341	1710	241	1648	119	294	4806	1346	229	819	8901	735	322	4614	5758	1066	3886	**43835**
TOTAL	**19612**	**7908**	**1559**	**5047**	**1186**	**9195**	**10021**	**4442**	**2064**	**4371**	**13078**	**3642**	**1948**	**11204**	**8860**	**3047**	**39655**	

Figure 3.2 shown above highlights O-D movements with high demand over the 24hr period. As the above represents a 24hour period a number of tidal relationships are evident where vehicles travel to work in the AM period and return home in the PM period. The dominance of movements to and from the M11/N11 and M50 is also evident with significant trips travelling to/from the Sandyford, Ballinteer and Rathmichael areas.

3.4 An Post Geocoding Information

An Post supply a geocoded dataset which shows the location of each residence and commercial property in Ireland. The dataset was utilised to assist in the zone splitting process. Figure 3.4 below shows the location of every residence (shown as a red dot) and commercial property (shown as a yellow dot) within the study area.

Figure 3.4 – An Post Dataset



Chapter 4 Base Model Development

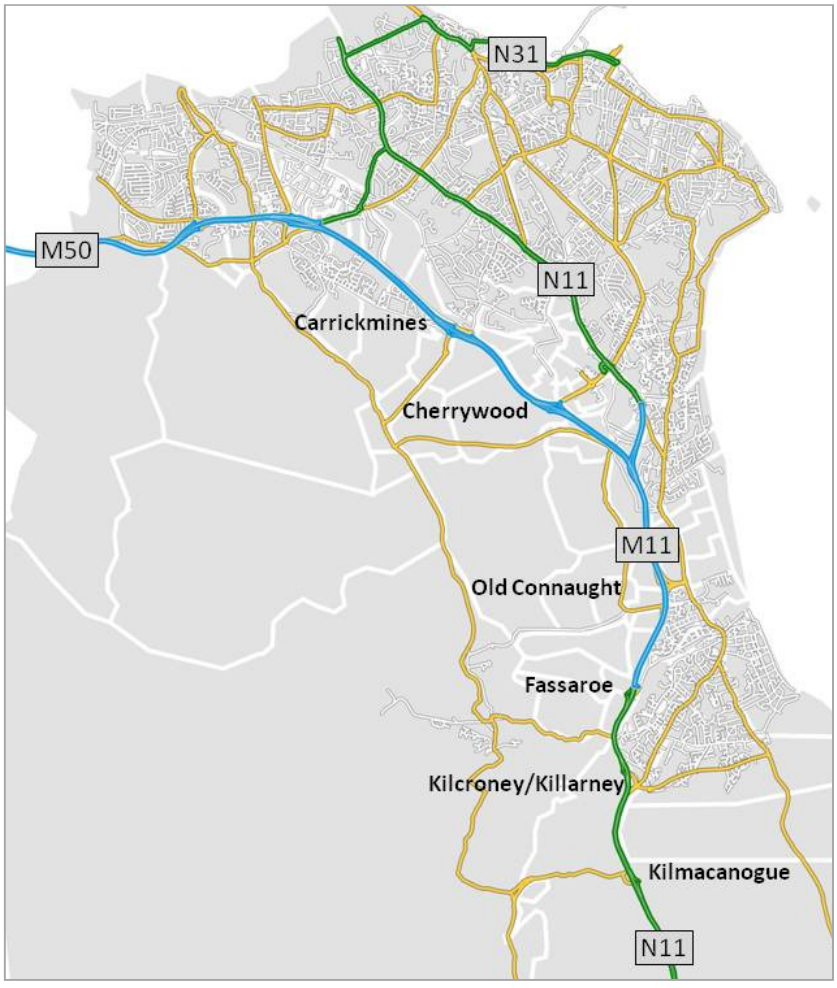
4.1 Overview

In order to develop forecast traffic levels it is first required to develop a robust representation of current traffic patterns. This section of the report describes the development, calibration and validation of the 2011 Base Year Local Area Models (LAM) for the AM and Interpeak Period.

4.2 Base Network Development

The National Transport Model (NTpM) was used as a starting point for developing the LAM as it incorporates existing traffic count and RSI information. Once the study area was identified and agreed with the study team this section of the model was 'cordoned' from the NTpM. Fig 4.1 illustrates the LAM network.

Figure 4.1 – M50/M11/N11 LAM



4.2.1 Refinement of LAM Road Network

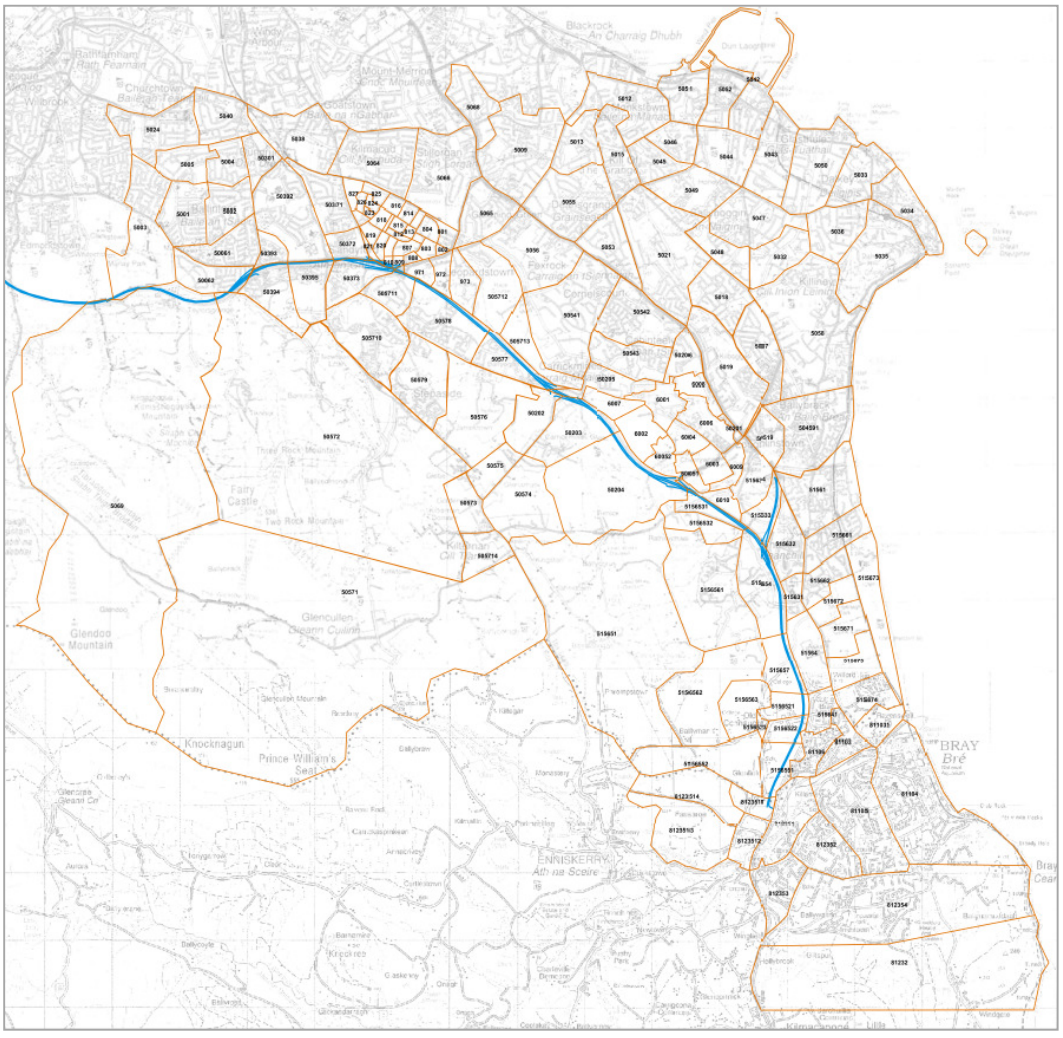
Following the cordoning, the road network was further refined to ensure speed limits, banned turns, junction types etc were reflective of the 2011 road network. This information was collated through site observations and using available drawings for recently completed schemes.

4.2.2 Refinement of LAM Zoning System

In order to obtain suitable detail within the M50/M11/N11 LAM, a more detailed zoning system than used in the National Transport Model (NTpM) was required. The zoning system in NTM is based on the aggregation of Electoral Divisions (ED's), which is suitable for most zones in the LAM however areas where significant future development is proposed have been divided into sub zones based on boundaries defined by the local authority plans e.g. Sandyford, Cherrywood, Fassaroe, Woodbrook/Shanganagh, Old Connaught, Glenamuck etc.

The zone splitting process was undertaken using An Post address point information as discussed above and outputs from various traffic models prepared as part of previous studies (Sandyford Masterplan, Cherrywood STZ and Bray LUTS). This data formed the basis for allocation of the trip ends for the original zones into the relevant subzones. The revised zone plan is shown below in Figure 4.2.

Figure 4.2 – LAM Zone Plan



4.3 Matrix Development

The following time periods are modelled in the M50/M11/N11 LAM:

- Average hour in the morning peak from 07:00 – 09:00 (AM Peak Period);
- Average hour in the inter peak period from 12:00 - 14:00 (Inter Peak Period);

The 'prior' AM and Inter Peak matrices were developed through cordons from the NTM with the relevant zones disaggregated as outlined above.

4.4 Link Travel Times

The total travel time of a trip from origin to destination is a function of both link travel time and junction delay. Link travel times in the network are determined by a predefined volume-delay function (VDF) in VISUM, which describes the relationship between current traffic volumes (q) and the capacity of the link (q_{max}). The VDF used in this model is based on the Bureau of Public Roads (BPR) function:

$$tCur = t0 * (1 + a * satb)$$

where: *t0 = free flow travel time (based on link length (km) and free flow speed (v0))*

*sat = q/(qmax * c)*

a = 0.1, b = 2, c = 1

The VDF function is globally applied to all links in the network as the capacity (q) and free flow speed (v0) of each link (input during network development) feed directly into the VDF.

4.5 Assignment Model

The model assigns demand for travel, represented by the trip matrices, to the supply, in the form of the road network. The route choice is based on the 'generalised time' of each route option, represented by a combination of time and distance.

The 'generalised time' is calculated using the following parameters, which reflect those in the National Traffic Model:

- Car Generalised Cost = 86.9 * time (in secs) + 0.73 * length (in metres); + 100 * Toll (in cent); and
- HGV Generalised Cost = 100 * time (in secs) + 100 * Toll

The Route Choice Algorithm selected is based on Equilibrium Lohse (All or Nothing). The assignment terminates when a stable solution is calculated.

4.6 Model Calibration

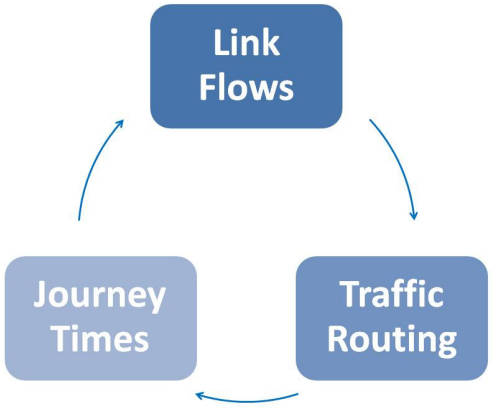
The purpose of model calibration is to ensure that the model assignments reflect observations. Calibration is an iterative process, whereby the model is continually revised to ensure that the most accurate replications of the base year conditions are represented.

Further model refinement was undertaken based on knowledge of the local area, site visits, mapping etc. The following parameters were refined as part of the calibration process to ensure

the model best reflected existing conditions; junction type, no. arms at junction, no. lanes on each arm, link travel speed, link capacity, turn capacity etc.

The model calibration process is outlined in Figure 4.3 below.

Figure 4.3 - Model Calibration Process



4.6.1 Link Flow Calibration Criteria

The NRA Project Appraisal Guidelines specify the acceptable values for modelled and observed flow comparisons and suggests how calibration should relate to the magnitude of the values being compared. A summary of these targets is shown in Table 4.1 below:

Table 4.1 - Model Calibration Criteria: Individual Flows

Criteria and Measure	**Guideline**
Assigned Hourly Flows (e.g. links or turning movements) vs. Observed Flows:	
Individual flows within 15% for flows 700 – 2700 vph Individual flows within 100 vph for flows <700 vph Individual flows within 400 vph for flows > 2700 Total screenline flows (normally >5 links to be within 5%)	> 85% of cases

The standard method used to compare modelled values against observations on a link involves the calculation of the Geoff Havers (GEH) statistic (Chi-squared statistic), incorporating both relative and absolute errors. The GEH statistic is a measure of comparability that takes account of not only the difference between the observed and modelled flows, but also the significance of this difference with respect to the size of the observed flow. The GEH statistic is calculated as follows:

$$GEH = \sqrt{\frac{(M-O)^2}{0.5(M+O)}}$$

Where M = Modelled Flow and O = Observed Flow.

Guidance in the Project Appraisal Guidelines sets out the following criteria:

Table 4.2 - Model Calibration Criteria: GEH Values

Criteria and Measures		Requirement
GEH statistic	Individual flows: GEH < 5	> 85% of cases
GEH statistic	Screenline totals: GEH < 4	All (or nearly all) screenlines

4.6.2 Link Flow Calibration Results

The results of the calibration exercise are outlined below in Tables 4.3 and 4.4. The detailed summary tables are included in Appendix C.

Table 4.3 - Calibration Results: Individual Flows

Time Periods	% of Calibration Sites Meeting the flow criteria that: ▪ Individual Flows within 15% for flows 700 – 2700 vph ▪ Individual flows within 100 vph for flows < 700 vph ▪ Individual flows within 400 vph for flows > 2700 vph			
	Total Traffic	**Lights**	**Heavies**	**Required**
AM Peak	94%	94%	100%	>85%
Inter Peak	94%	94%	100%	>85%

Table 4.4 - Calibration Results: GEH Values

Time Periods	% of Calibration Sites with GEH < 5			
	Total Traffic	**Lights**	**Heavies**	**Required**
AM peak	92%	92%	100%	>85%
Inter Peak	94%	94%	99%	>85%

The comparison of modelled and observed flows has identified that the AM and Inter Peak period models match the flow criteria for all user classes. Likewise, the GEH results show that the AM and Inter Peak periods models also match the criteria for all user classes. The results therefore confirm that the models have been calibrated to a standard compliant with the PAG criteria for all user classes and all time periods.

4.6.3 Traffic Routing Calibration

As part of the calibration process, the routing of traffic though the study area was checked against the results from the O-D surveys as outlined in Section 3.3.3 above. The routing was calibrated on both a local and strategic level to ensure the model accurately replicates the existing routing decisions of vehicles in the study area. The patterns were compared based on the % split of destinations from each survey location based on the locations shown in Figure 3.3 above. Whilst no guidelines exist on calibration targets, a target of +/- 15% was used as a target deviation limit. Figures 4.4 and 4.5 below show that the AM and Interpeak model met this target with no O-D pair having a difference in excess of +/- 15%.

Figure 4.4 – Comparison of AM Period Traffic Patterns

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12+13	Site 14	Site 15+16	Site 17
Site 1	0%	-7%	1%	2%	2%	-5%	-3%	1%	0%	0%	2%	8%	0%	6%	-7%
Site 2	-1%	0%	1%	-1%	-1%	4%	11%	7%	-1%	0%	-1%	-4%	-8%	-3%	-4%
Site 3	0%	2%	0%	-10%	-2%	14%	-2%	2%	-1%	-1%	-1%	-2%	1%	1%	0%
Site 4	3%	-5%	-1%	0%	1%	2%	4%	3%	-1%	0%	0%	0%	-1%	4%	-8%
Site 5	-2%	0%	-2%	-10%	0%	-10%	0%	0%	-1%	0%	0%	0%	10%	1%	15%
Site 6	10%	3%	2%	-6%	4%	0%	-6%	-2%	0%	0%	-2%	0%	-1%	0%	-1%
Site 7	1%	1%	0%	0%	0%	-1%	0%	1%	0%	3%	-2%	-3%	-7%	-4%	12%
Site 8	1%	-2%	0%	0%	0%	-1%	9%	0%	-6%	2%	-1%	-1%	1%	0%	-2%
Site 9	-3%	-4%	0%	-2%	0%	0%	-8%	-3%	0%	-4%	1%	0%	9%	7%	7%
Site 10	0%	-3%	-1%	-1%	0%	0%	8%	11%	-10%	0%	-1%	-1%	5%	-1%	-7%
Site 11	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%	8%	-3%	0%	-3%
Site 12+13	3%	-1%	0%	0%	0%	0%	-3%	-1%	-1%	0%	15%	0%	0%	1%	-12%
Site 14	3%	-2%	1%	-2%	0%	0%	-8%	1%	1%	1%	-2%	2%	0%	-3%	7%
Site 15+16	-4%	-2%	0%	-2%	0%	0%	10%	5%	0%	-1%	0%	0%	6%	0%	-13%
Site 17	-4%	-1%	1%	0%	1%	0%	-4%	-1%	0%	0%	1%	1%	-1%	8%	0%

Figure 4.5 – Comparison of Interpeak Period Traffic Patterns

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12+13	Site 14	Site 15+16	Site 17
Site 1	0%	-1%	1%	0%	0%	3%	0%	0%	0%	0%	0%	-1%	-2%	0%	0%
Site 2	7%	0%	0%	-2%	-1%	6%	1%	0%	0%	0%	0%	0%	-3%	0%	-8%
Site 3	11%	3%	0%	-8%	-2%	0%	0%	-1%	1%	-1%	0%	0%	0%	0%	-3%
Site 4	-8%	-12%	-5%	0%	-4%	14%	6%	2%	3%	1%	0%	0%	1%	1%	0%
Site 5	-4%	5%	-4%	-14%	0%	-3%	-2%	2%	6%	1%	0%	0%	3%	4%	5%
Site 6	5%	0%	2%	-5%	5%	0%	-3%	-1%	0%	0%	-1%	0%	-1%	0%	0%
Site 7	0%	0%	0%	-1%	0%	-3%	0%	0%	-1%	9%	-1%	0%	7%	2%	-12%
Site 8	1%	1%	0%	2%	1%	-2%	1%	0%	-11%	14%	-3%	0%	4%	3%	-12%
Site 9	-1%	-1%	0%	0%	1%	0%	1%	1%	0%	-11%	-3%	-11%	11%	13%	-1%
Site 10	-1%	-1%	0%	-1%	0%	0%	6%	15%	-9%	0%	-1%	-2%	-1%	-1%	-4%
Site 11	0%	0%	0%	0%	0%	-1%	-1%	-1%	-1%	-1%	0%	14%	-3%	0%	-6%
Site 12+13	-1%	-1%	0%	0%	0%	0%	1%	0%	-5%	-2%	14%	0%	-6%	-2%	2%
Site 14	0%	-2%	0%	-2%	0%	0%	3%	3%	2%	0%	-2%	2%	0%	4%	-9%
Site 15+16	-3%	-2%	0%	-1%	0%	0%	-1%	1%	2%	-1%	0%	7%	1%	0%	-2%
Site 17	-2%	-1%	0%	-2%	1%	0%	-2%	-1%	0%	1%	2%	1%	-1%	6%	0%

The use of O-D surveys in the calibration leads to substantial additional work in the area of matrix refinement however it will allow future flows on short local links to be more accurately forecast.

4.7 Model Validation

Model validation comprises the comparison of calibrated flows against an independent data set which was not used as part of the calibration process. Validation checks included:

- Matrix validation checks; and
- Overall model validation (i.e. journey times).

4.7.1 Validation of Traffic Flows

The observed and modelled flows were compared in accordance with the criteria above. The permissible difference was calculated for each value (based on the observed figure) and compared with that which had been modelled. Validation results are included in Appendix D and are summarised in Tables 4.5 and 4.6 below:

Table 4.5 - Validation Results: Individual Flows

Time Periods	**% of Calibration Sites Meeting the flow criteria that:** ▪ **Individual Flows within 15% for flows 700 – 2700 vph** ▪ **Individual flows within 100 vph for flows < 700 vph** ▪ **Individual flows within 400 vph for flows > 2700 vph**			
	Total Traffic	**Lights**	**Heavies**	**Required**
AM Peak	90%	92%	100%	>85%
Inter Peak	90%	90%	100%	>85%

Table 4.6 - Validation Results: GEH Values

Time Periods	% of Calibration Sites with GEH < 5			
	Total Traffic	Lights	Heavies	Required
AM peak	88%	86%	100%	>85%
Inter Peak	88%	86%	100%	>85%

A comparison against the validation counts shows that the AM and Inter period models clearly exceed the PAG requirements for the validation of traffic flow on links. Likewise, all models meet the GEH criteria of 85%. The results therefore demonstrate that the validation criteria as set out by the NRA are successfully met.

4.7.2 Validation of Journey Times

The journey time comparison is required to show that the model is reflecting base year network conditions, in terms of network speed and delay. The Project Appraisal guidelines sets out validation criteria as set out in Table 4.7 below.

Table 4.7 – PAG Validation Criteria: Journey Times

Criteria and Measure	Guideline
Modelled Journey Time to be within 15% (or 1 minute if higher than 15%)	> 85% of cases

The model is a generalised time based assignment only; therefore the delay is generated by the speed flow relationship assumed in the model. Journey Time results are outlined in Table 4.8 below.

Table 4.8 - Journey Time Survey Results

Site Location		Journey Time Comparison [sec]						PAG Criteria
		AM			Interpeak			
From	To	Observed	Modelled	Diff (%)	Observed	Modelled	Diff (%)	
N11 South	M50 North	608	629	3%	642	605	-6%	✓
N11 South	N11 North of M50	350	315	-10%	327	297	-9%	✓
M50 North	N11 South	590	633	7%	659	639	-3%	✓
N11 North of M50	N11 South	317	300	-5%	331	327	-1%	✓
M50 North	Leop Road	157	177	13%	139	135	-3%	✓
M50 North	Drummartin	242	173	-29%	196	164	-17%	✓
M50 North	Carrickmines	249	268	8%	279	274	-2%	✓
Carrickmines	M50 North	293	300	2%	315	305	-3%	✓
Old Connaught	N11 North of M50	162	121	-25%	167	125	-25%	✓
N11 North of M50	Old Connaught	145	110	-24%	153	113	-26%	✓

Most of the results show only minimal differences between modelled and observed journey times, with no difference greater than 15%. Only journey times between sites 4 and 6 and from site 17 to 14 are greater than 15% but the overall difference is less than 60 seconds. As such the base year model is validated to the requirements of the NRA's PAG.

4.7.3 Trip Length Distribution

Trip Length Distribution (TLD) graphs for the AM and Inter Peak models, both before and after calibration, are illustrated below. Overall the TLD is constant between the pre and post calibration models in both the AM and Inter Peak which shows that the matrix estimation process did not significantly alter traffic patterns in the area.

Figure 4.6 - AM Peak Trip Length Distribution

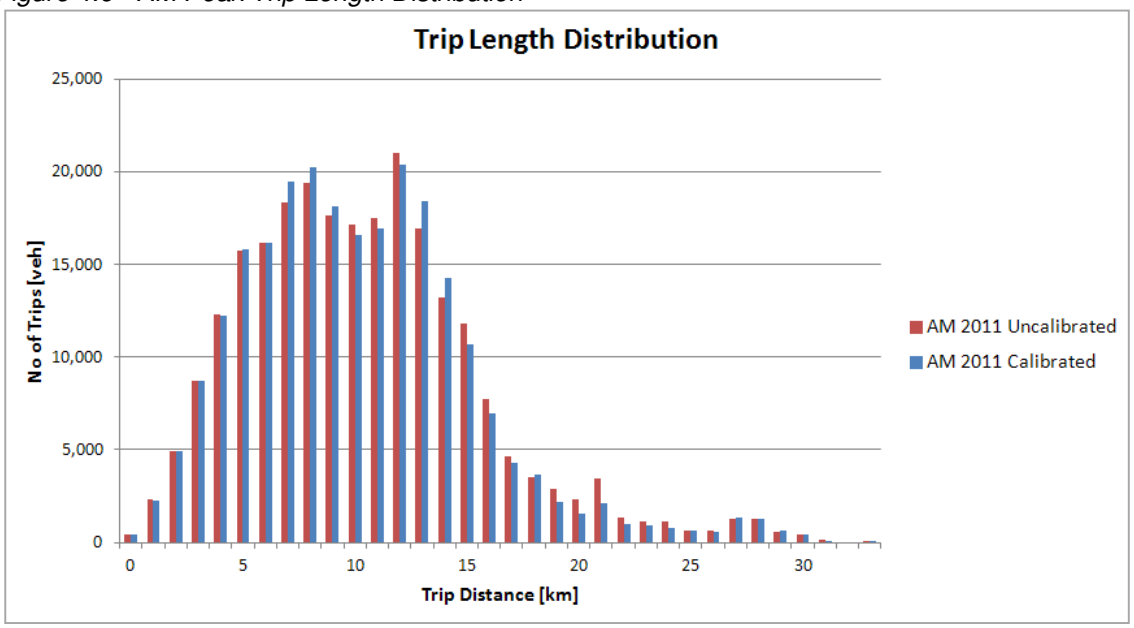
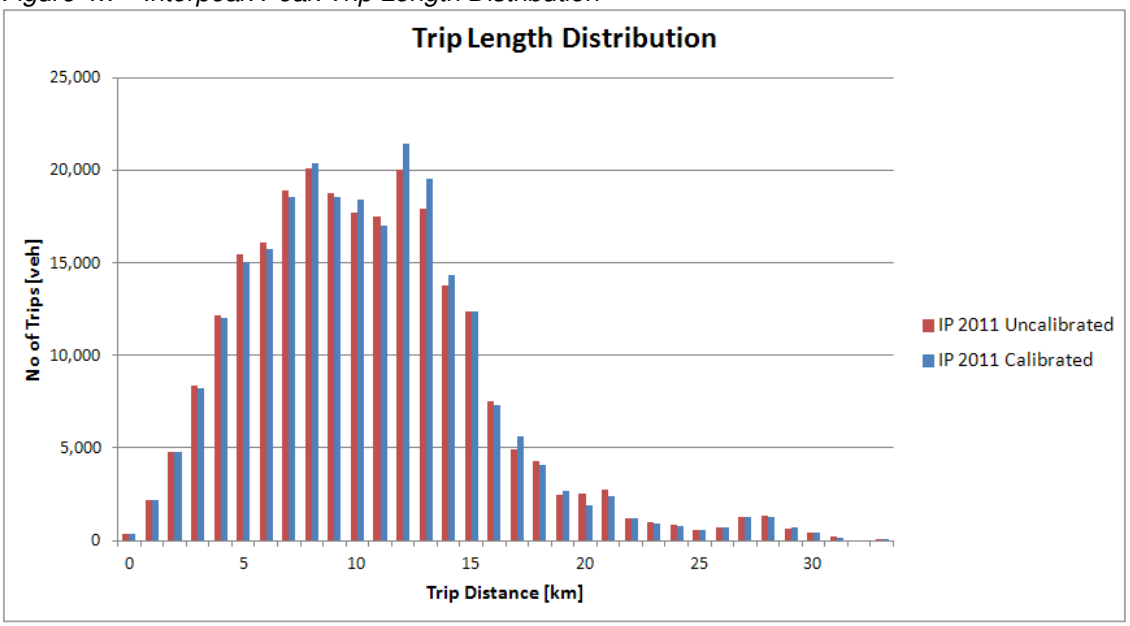


Figure 4.7 - Interpeak Peak Trip Length Distribution



4.8 Estimation of Annual Average Daily Traffic (AADT)

To estimate Annual Average Daily Traffic (AADT) a relationship was developed based on regression analysis of local area traffic data to allow the AM peak period flows to be converted into AADT values. The local traffic data that was used to develop this formula was taken from 41 Automatic Traffic Counters (ATC) sites as outlined in Section 3.3.1 above. Counters with AM flows of over 500 vehicles were selected to ensure the AADT factor was appropriate for use in forecasting flows on national roads. Regression was used to establish the AADT expansion factor for converting AM peak period flows into AADT.

*(15.5685 * AM Peak Period Flow) = AADT*

A check of the regression process was undertaken by comparing actual surveyed AADT against AADT calculated using formula above. The results of this check are outlined in Table 4.9 below.

Table 4.9 – Regression process check

AM Flow	AADT from counts	AADT Regression	% Diff
2497	43,171	38,871	-10%
2375	36,395	36,981	2%
1910	30,403	29,742	-2%
1890	21,706	29,423	36%
1029	20,405	16,016	-22%
1217	18,915	18,941	0%
980	18,216	15,263	-16%
1157	17,589	18,006	2%
789	16,214	12,287	-24%
969	15,360	15,086	-2%
756	15,119	11,769	-22%
633	13,856	9,853	-29%
608	13,109	9,470	-28%
916	12,908	14,265	11%
709	12,716	11,039	-13%
520	10,935	8,097	-26%
980	10,924	15,251	40%
641	10,801	9,977	-8%
807	10,232	12,568	23%
541	9,597	8,423	-12%
318	8,088	4,955	-39%
513	7,431	7,983	7%
TOTAL	**374,090**	**354,266**	**5%**

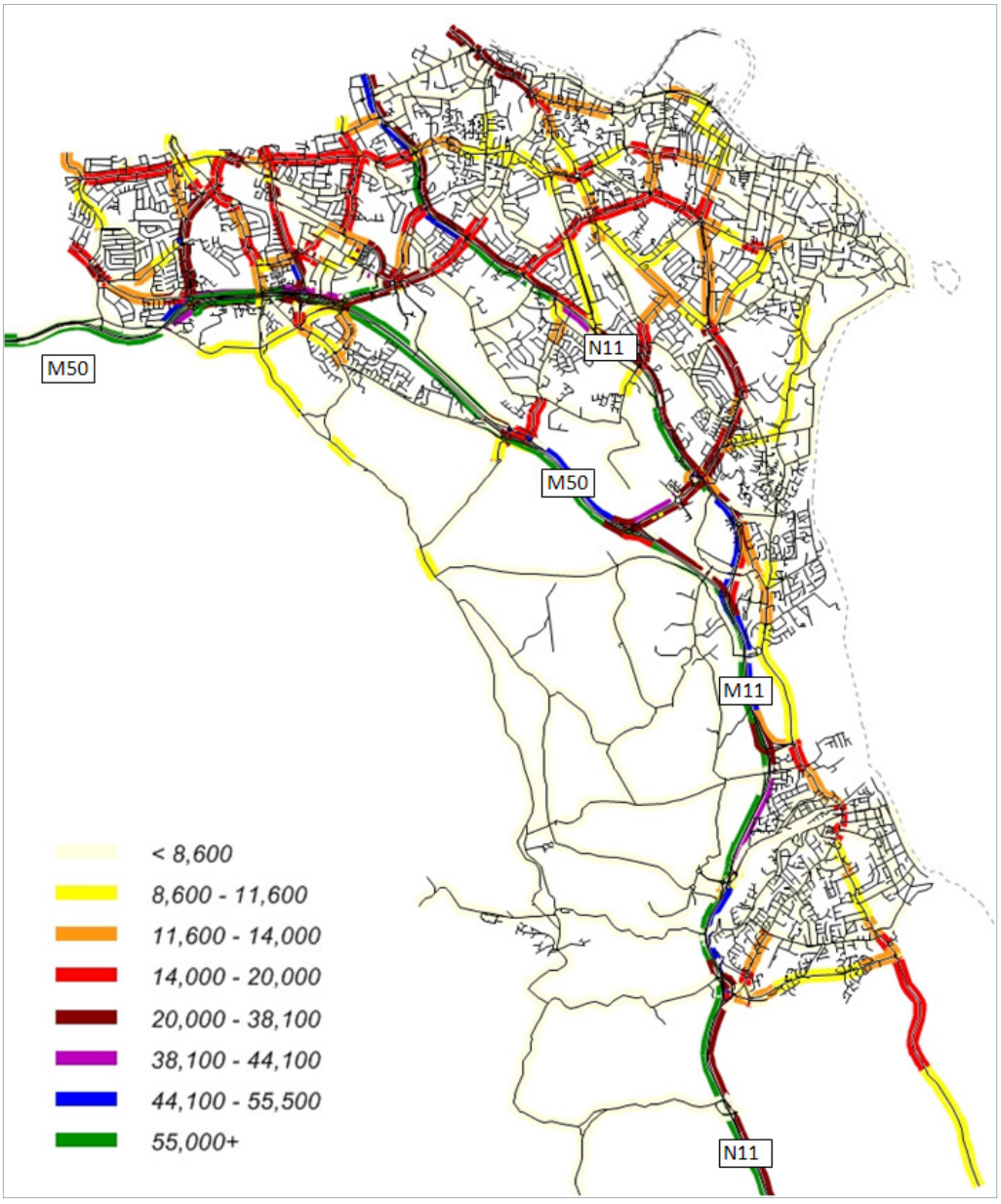
Whilst the application of the AADT factor gives differences of up to 40% it is considered sufficiently robust for the purposes of this report. Key deficiencies in the network and the impact of each road scheme have been assessed in the AM peak period only. AADT flows have been presented to give an indicative forecast of traffic flow on links. This report seeks to identify the impacts of various future road proposals on the M50–M11 corridor leading to a preferred future road network to cater for future traffic demand at a high level. In this regard the application of the AADT factor is acceptable. Further traffic forecasting calculations would be required at the design stage to ascertain accurate future flows for preliminary and detailed design.

The M11/M50 model is based on the zone system set out in the RPS Cherrywood Report which was undertaken on behalf of Dun Laoghaire Rathdown County Council utilising the National Transport Authority (NTA) model. Future demand forecasts have been taken from the RPS Report to ensure forecasts are in line with NTA forecasts. Interpeak forecasts were not undertaken by RPS as part of this study, therefore this task is based on the AM peak period model only.

4.9 Calibrated Base Model Outputs

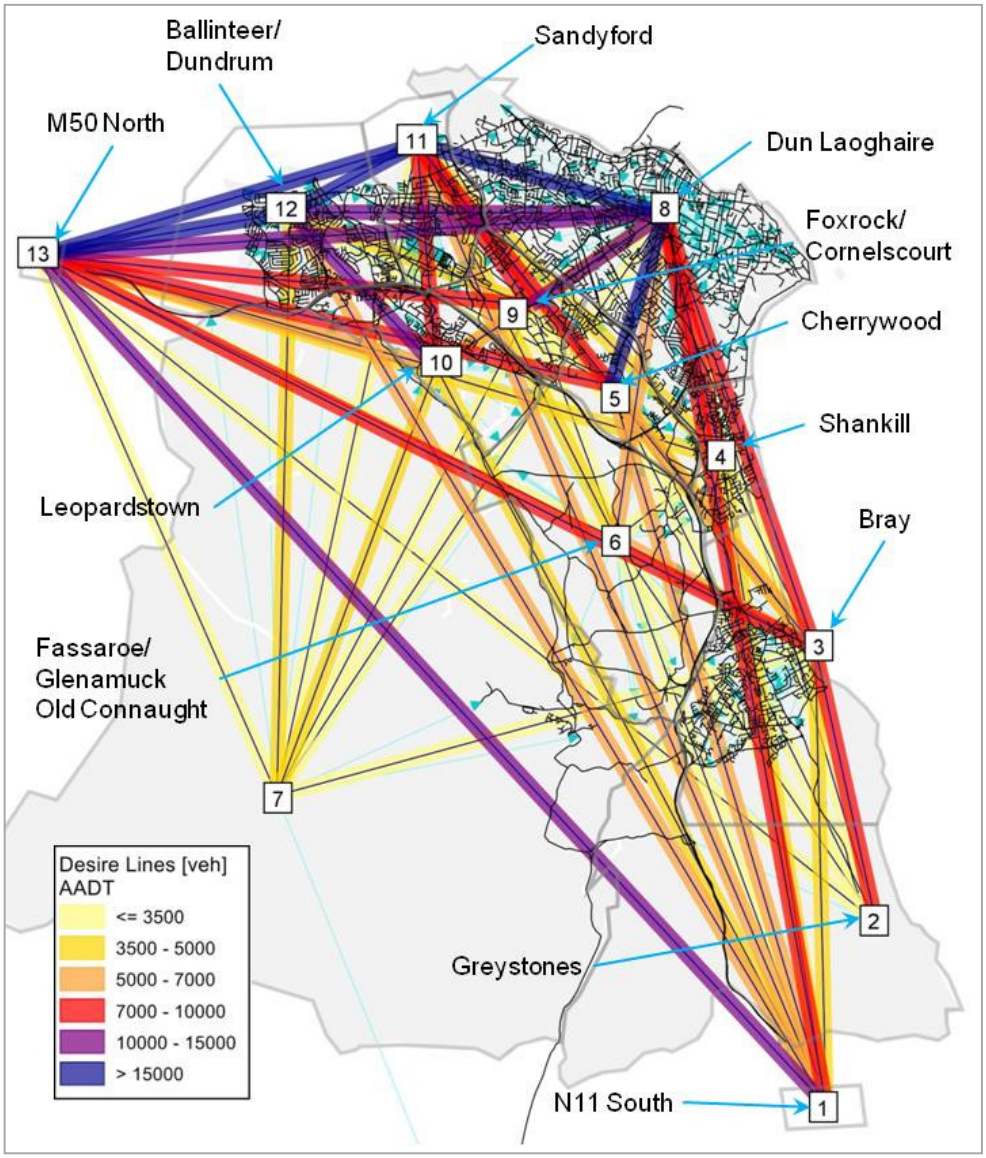
The base model has been calibrated in line with the 2011 NRA Project Appraisal Guidelines as outlined above. The resultant AADT peak period flows on the main links within the study area are shown below in Figure 4.8.

Figure 4.8 – 2011 Base Year AADT Flows



In addition to above flows the base year traffic patterns are shown by desire lines in the figure below. The figure highlights the levels of short hop trips between Sandyford and Cherrywood and the high volumes of traffic travelling to/from the Wicklow area.

Figure 4.9 - 2011 AADT Desire Lines



In addition to the above some high level statistics were extracted from the models to show the overall performance of the road network.

Table 4.10 – Model Network Statistics

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2011 Base	37,796	292,134	6,158	1,249	47.44

Chapter 5 Future Model Development

This section of the report sets out the development of the future year traffic models. These were developed on the basis of full build out of all the development areas included in various local authority development plans. For the purposes of forecasting background traffic growth it was agreed with DLRCC and the NRA that 2030 would be taken as a reasonable horizon for this full build out.

The forecasting has been split into three parts;

1. Zones where significant future development has been identified as part of Council Plans. Forecasting in these zones will be based on actual planning forecasts supplied by local authorities.
2. Zones where no significant development is planned. Forecasting in these zones will be based on the NRA zone based growth rates.
3. External zones representing trips from outside the area will be based on growth forecasted in the NRA models for 2025 and 2040.

The above have been benchmarked against NRA overall growth and confirmed that the overall growth is reasonably in line with regional growth forecasts.

5.1 Traffic Growth

Future matrices for the future year (2030) model were developed based on the NRA Project Appraisal Guidelines (PAG) forecasts and utilising local authority development forecasts. Each task associated with the development of future forecasts is set out below.

5.1.1 Zones with Significant Future Development

Future land development forecasts were obtained from DLRCC and Wicklow CC for a number of development areas within the study area, the forecast additional population is outlined in Table 5.1 below.

Table 5.1 – Future Forecasts for Key Developments in Study Area

Development Area	Population	Employment Persons
	Persons	
Cherrywood	32,628	10,045
Sandyford	1,823	5,055
Fassaroe	6,966	16,197
Bray Golf Club	1,068	240
Glenamuck	11,015	9,362
Woodbrook	2,800	5,867
Old Connaught	6,875	0

The above forecasts were converted into vehicle trips based on the below conversion factors and trip rates developed by the NTA specifically for each area as part of the development of their transport model.

Table 5.2 – Conversion Factors for Land Use

Land Use	Conversion Factor
Offices	1 employee per 25m^2
Education	25 students per classroom
Residential	2.5 persons per unit
Services/Warehouse	1 employee per 100m^2
Retail (net floorspace)	1 employee per 50m^2

Utilising the above conversion rates and NTA trip rates the below AM peak period total future forecasts were derived.

Table 5.3 – AM Peak Period Future Demand Totals

Development Area	Origin	Destination
	Veh Trips (HGV and Car)	
Cherrywood	3,777	4,024
Sandyford	2,177	7,015
Fassaroe	1,229	3,325
Bray Golf Club	646	518
Glenamuck	2,420	2,375
Woodbrook	939	1,117
Old Connaught	927	163
TOTAL	**12,114**	**18,538**

5.1.2 Zones with No Significant Future Development

PAG Unit 5.4 sets out zonal growth rates for trip ends based on low, medium and high growth scenarios. The PAG high growth rates, which have been disaggregated to a zonal level, were applied directly to the zones within the M50/M11/N11 model for which no significant specific development is proposed. High growth was utilised as the NRA high growth forecasts correlated with the level of development proposed by local authorities outlined in Section 5.1.1. The resulting growth in trips within the models is outlined in Table 5.4 below.

Table 5.4 – NRA Growth Rate used for Future Model Development

	2011-2030 Growth Factor			
	Origin		Destination	
	HGV	Cars	HGV	Cars
Average Growth Rate	1.2342	1.2417	1.2405	1.3024
Maximum Growth Rate	1.2601	1.4553	1.2703	1.4391

5.1.3 External Zones

Growth for external zones was extracted from the National Traffic Model through a cordoning process. The 2006, 2025 and 2040 High Growth models were cordoned and growth on the external zones (links) calculated from link flows. The resulting annual growth rates are outlined below in Table 5.5.

Table 5.5 – Annual External Growth Rates

Location	Zone No.	Lights				Heavies			
		2006-2025		2026-2040		2006-2025		2026-2040	
		O	D	O	D	O	D	O	D
Stepaside	121609235	1.0288	1.0160	1.0383	1.0037	1.0140	1.0137	1.0039	1.0442
N11 North	121611881	1.0115	1.0115	1.0085	1.0051	1.0177	1.0323	1.0061	1.0037
Dundrum	121615905	1.0168	1.0157	1.0078	1.0061	1.0289	1.0012	1.0035	1.0091
Kilmacud	121621276	1.0113	1.0092	1.0085	1.0081	1.0275	1.0367	1.0009	1.0021
Marley	121622827	1.0265	1.0178	1.0098	1.0018	1.0276	1.0106	1.0000	1.0015
Mt Merrion	121626642	1.0265	1.0383	1.0079	1.0131	1.0319	1.0171	1.0435	1.0015
Whitehall	121629249	1.0190	1.0324	1.0089	1.0087	1.0157	1.0130	1.0155	1.0055
Harolds Grange	121634807	1.0620	1.0229	1.0137	1.0319	1.0554	1.0396	1.0000	1.0360
Nutgrove	121636492	1.0144	1.0329	1.0183	1.0114	1.0121	1.0241	1.0049	1.0094
Greystones	121892375	1.0195	1.0285	1.0081	1.0127	1.0153	1.0875	1.0000	1.0256
Roundwood	121897273	1.0355	1.0225	1.0000	1.0118	1.0941	1.0140	1.0153	1.3678
M50	121897274	1.0194	1.0144	1.0073	1.0079	1.0125	1.0186	1.0000	1.0003
N11 South	121897275	1.0112	1.0176	1.0044	1.0108	1.0144	1.0151	1.0020	1.0028
Mt Merrion	121897276	1.0105	1.0080	1.0062	1.0025	1.0133	1.0015	1.0033	1.0000
	AVERAGE	**1.0224**	**1.0206**	**1.0105**	**1.0097**	**1.0272**	**1.0232**	**1.0071**	**1.0364**

5.1.4 Overall Growth

The overall growth taking into account the forecasting outlined above is shown in Table 5.6 below. The study area is forecast to experience substantial growth in the future with vehicle volumes in the area increasing by over 50%. It should be remembered that this is based on an assumed modal share of 45% car use for large future developments and thus represents the lowest increase that will occur if all development takes place.

Table 5.6 – Annual External Growth Rates

Model	2011		2030		% Increase		
	HGV	Car	HGV	Car	HGV	Car	Total
M11/M50 Model	1020	36776	1987	54967	95%	49%	51%

In order to ensure the forecasts are realistic and in keeping with planning forecasts a comparison of forecast populations, employment and demand against NRA forecasts was undertaken as set out below.

Table 5.7 – Comparison of Forecasts

Model	2030 Demand	2030 Population	2030 Employment	2030 Pop to Jobs Ratio
	Vehicles	Persons		
M11/M50 Model*	56,954	323,489	148,028	0.458
NRA High Growth NTpM	51,603	310,478	118,818	0.38
Difference (%)	+10.4%	+4.2%	+24.6%	

**Based on RPS Growth Forecasts which were developed using NTA and DLRCC forecasts*

The comparison shows that whilst traffic demand volumes are comparable with the M50/M11/N11 having an additional 5,000 vehs in the network the forecast growth in employment is significantly higher than the NRA forecasts. The reason why traffic demand is only 10% higher when employment forecasts are 24% higher is mostly due to the M50/M11/N11 model assuming a car mode share of only 45% for new developments as set out in the Smarter Travel objectives.

5.2 Future Model Outputs

The key outputs from the 2030 model are presented in this section. No road upgrades have been included as part of the development of the future year (2030) Do Minimum model. The figure below shows the large increases in traffic with flows on the M50 reaching up to 160,000 AADT west of Sandyford and flows of up to 120,000 AADT on the M11. To put this in context, the busiest section of the M50 between the N4 and N3 currently experiences traffic flows of approximately 120,000 AADT. Again, it should be noted that these flows are based on a modal share of 45% for new developments and therefore the results represent the 'best case' scenario that would occur if all development takes place.

Figure 5.1 - 2030 AADT Link Volumes – Do Minimum

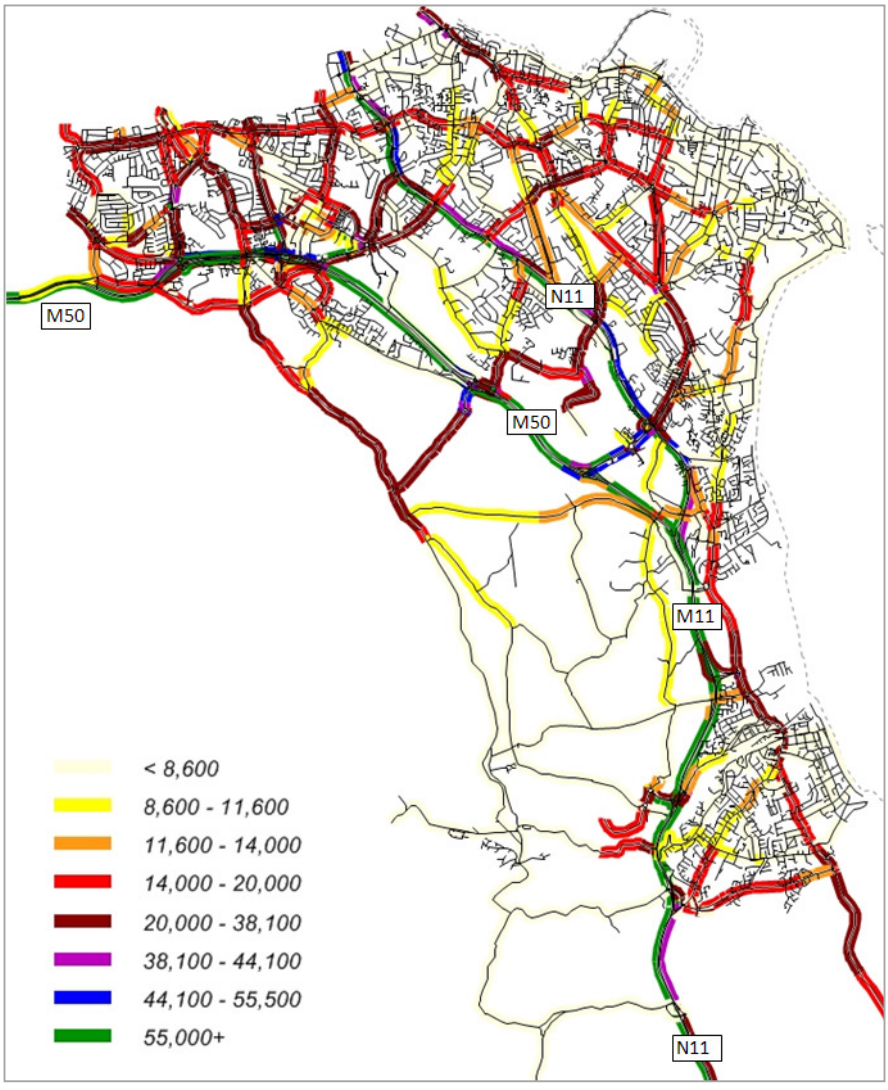


Figure 5.2 below shows the future desire lines for the study area. A significant increase in short trips between zones in the study area can be seen when compared to Figure 4.9 above.

Figure 5.2 - 2030 AADT Desire Lines

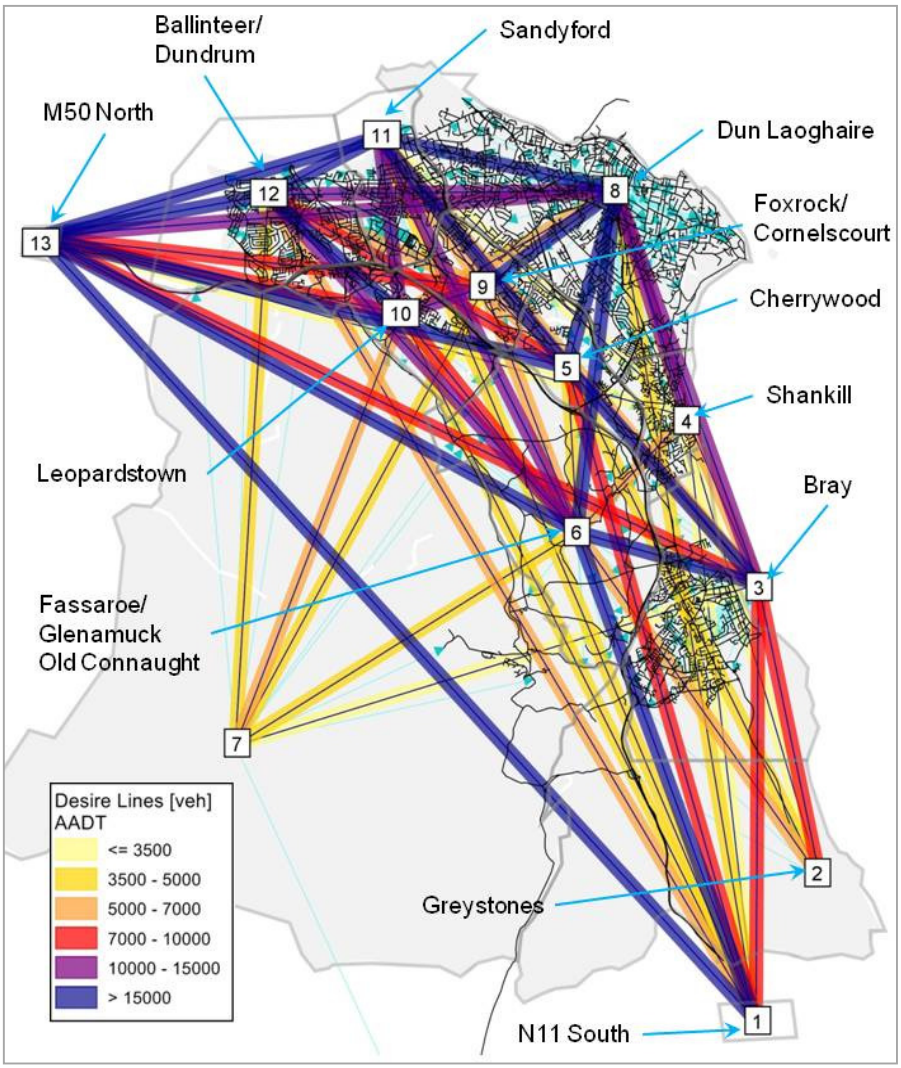
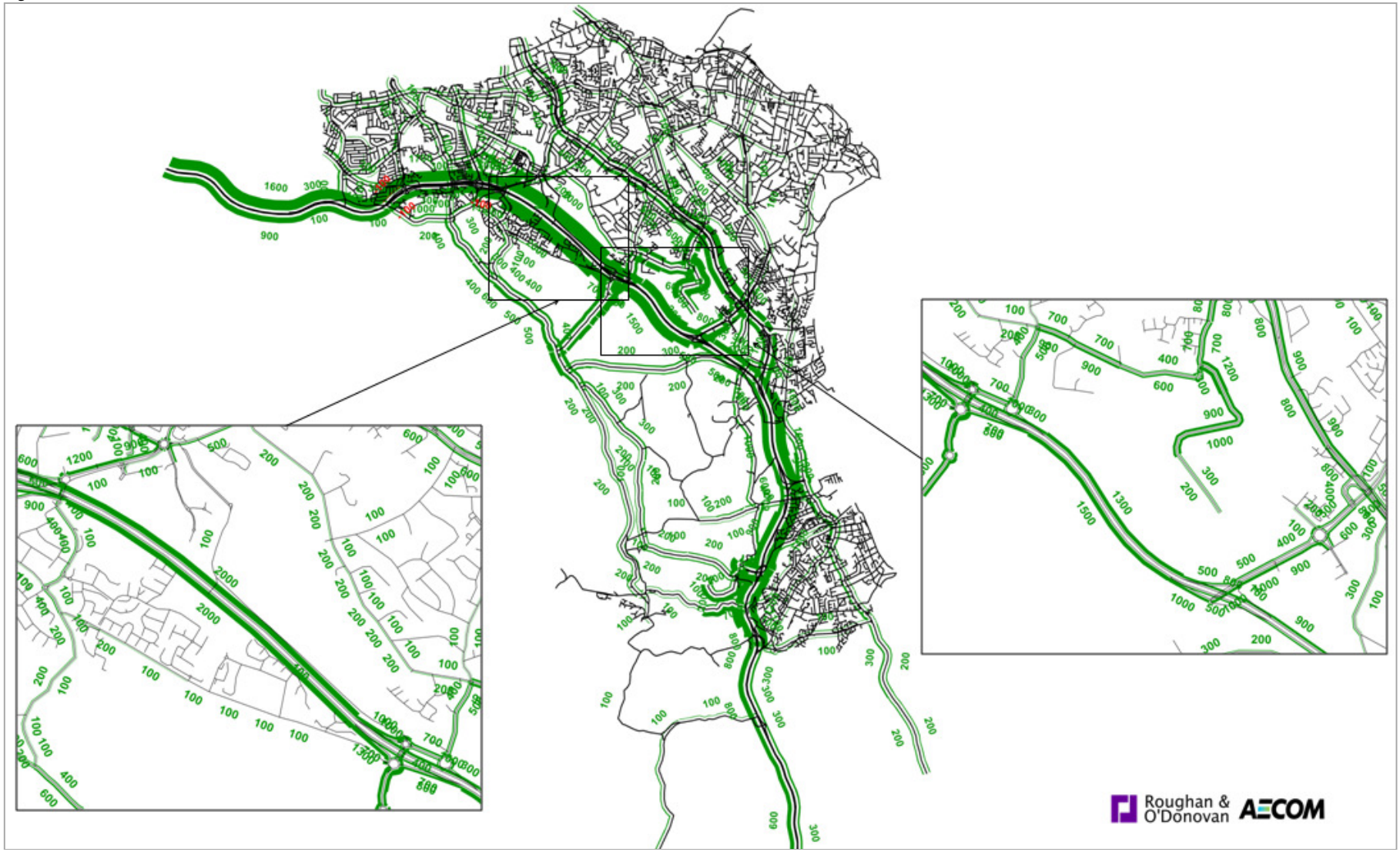


Table 5.8 – Model Network Statistics

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2011 Base	37,796	292,134	6,158	1,249	47.44
2030 Do-Minimum	56,953	439,940	10,653	3,356	41.30

In addition to the above outputs a difference plot, showing the difference in traffic flow in the AM peak period between 2011 and 2030, was prepared as shown in Figure 5.3 below. The difference shows an increase of over 4,000 (80% increase) vehicles on the M50 and nearly 2,000 (60% increase) on the N11 in the AM peak period.

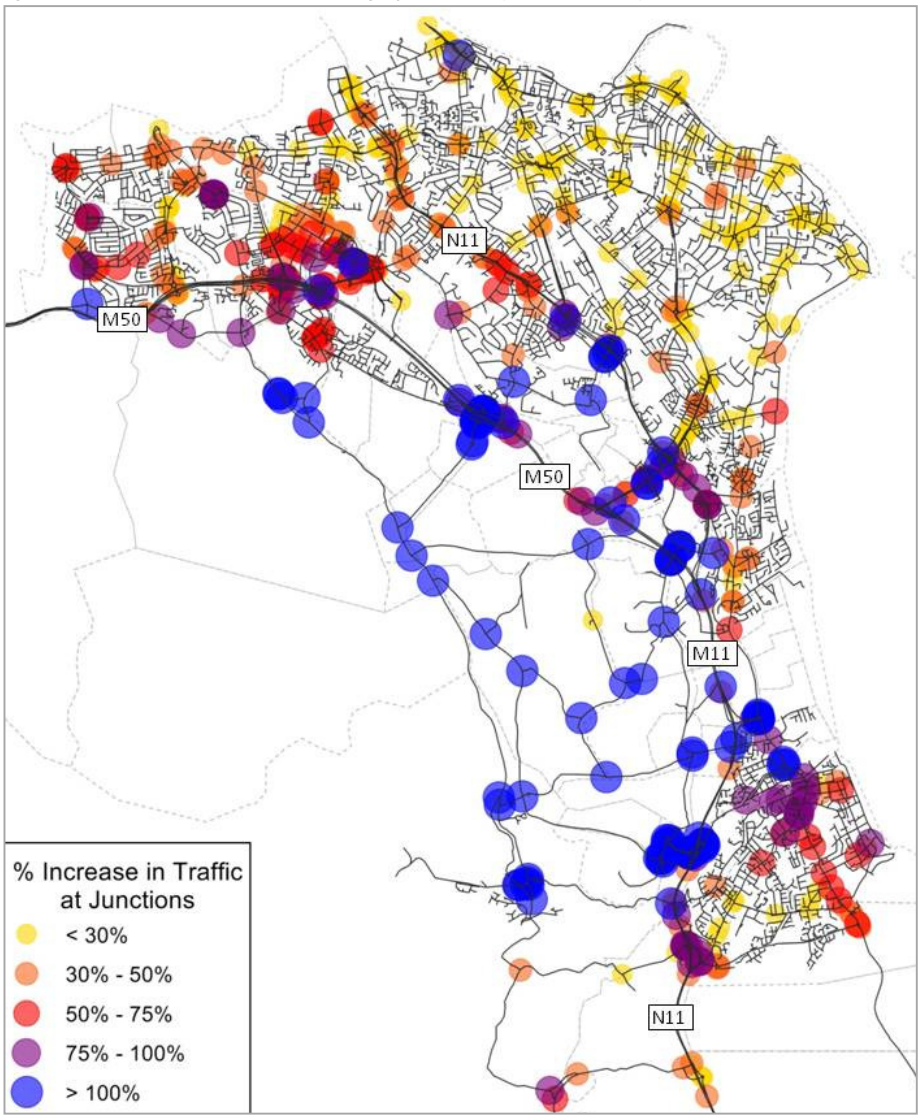
Figure 5.3 – AM Peak Period Difference Plot between 2011 and 2030



The increase in vehicle volumes in the future also impacts upon the operation of junctions in the area. As can be seen in Figure 5.4 below there are substantial (>100%) increases in traffic flows through a number of already congested junctions including numerous junctions along the N11, the Enniskerry Road, the Wyattville Link Road, the Dublin Road through Bray and Brennanstown Road amongst others. It is evident from current conditions that these junctions do not have the spare capacity to cater for such large increases.

It should be reiterated that traffic flows utilised in Figure 5.4 below assume a high PT mode share in the area and significant smarter travel measures. The figure highlights that even with these assumptions there will be a major issue with regard to local roads/junctions not having sufficient capacity to cope with future traffic volumes leading to significant congestion. The next section of the report highlights capacity constraints on and adjacent to the M50/M11/N11 Corridor. There are many local issues identified below which are outside the M11/M50 corridor and hence the scope of this report. These issues will need to be addressed by DLRCC/WCC in tandem with future development in addition to the proposed public transport and smarter travel measures required to meet these mode share targets.

Figure 5.4 – Increase in flows through junctions (2011 – 2030)



**Junctions with total traffic flows < 1000 vehicles have been omitted from above figure*

Chapter 6 Scenario Testing

6.1 Overview

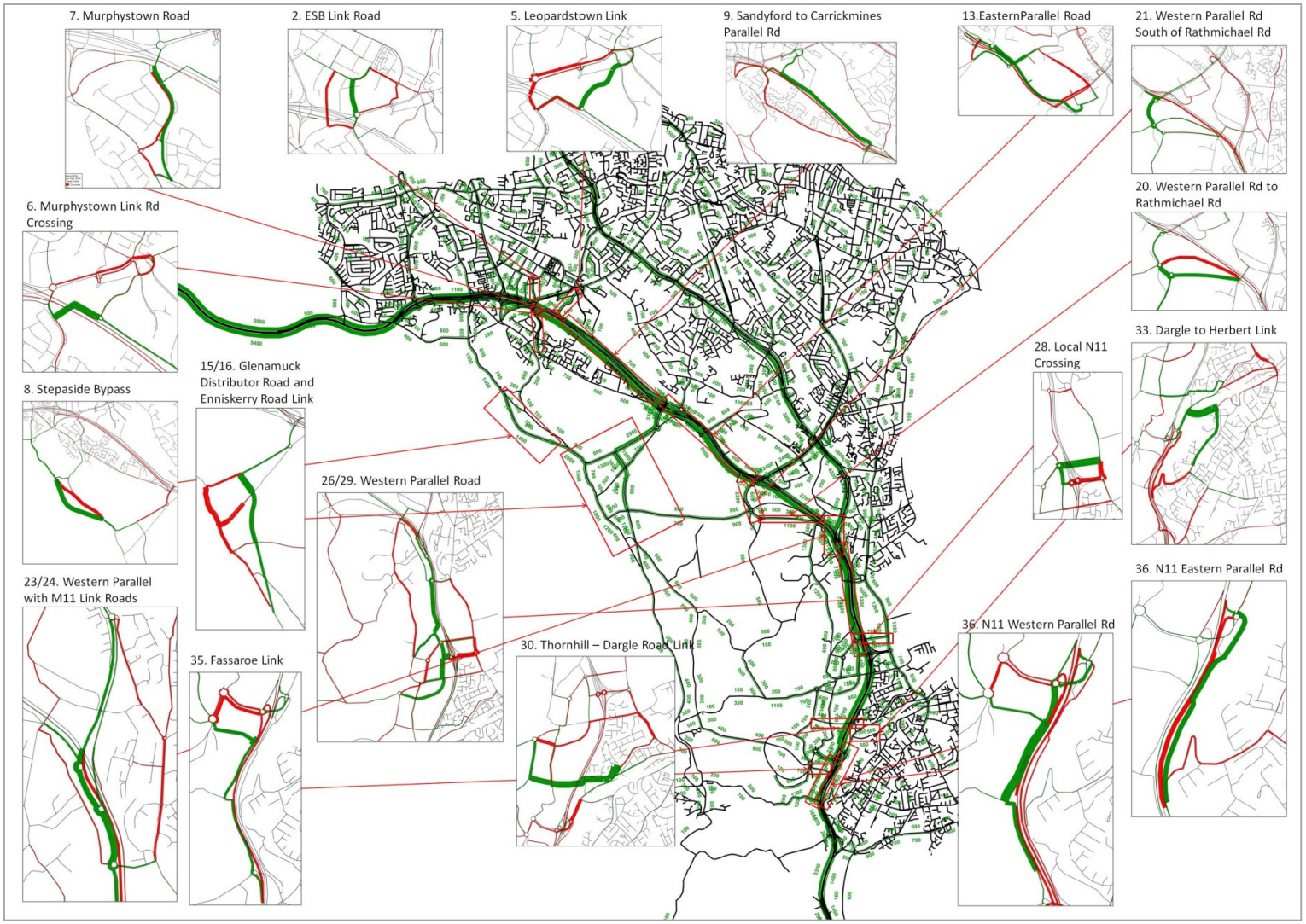
The identification of the optimum future road network required to cater for existing traffic and any future traffic increases in the study area is set out below. This involved the identification of a number of potential new road schemes which were taken from the outcomes of previous work investigating possible solutions to existing problems e.g. upgrades and traffic management measures along the N11 from Kilmacanogue to Fassaroe.

The following criteria were identified as being important for the future schemes:

- The scheme addresses future local demand issues identified;
- The scheme helps to provide an alternative route when incidents occur on national roads;
- The scheme provides for local, short distance trips;
- The scheme complements other proposed links or completes a long distance route;
- The scheme is feasible from an engineering perspective;
- The scheme supports future public transport routes;
- The scheme supports future pedestrian and cycle connectivity needs;

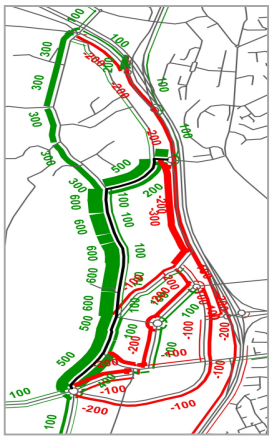
The initial step was to assess the impact of the potential schemes identified for further consideration. These schemes were tested against the criteria outlined above to ensure that all schemes performed as anticipated.

Figure 6.1 – Initital Scenario Testing – Impact of Scheme



The schemes shown in Figure 6.1 were tested as shown above and the modelling confirmed that they all helped to address the criteria. As such they were all adopted as a starting point for the preferred scenario. A number of further schemes were identified as part of the consultation process and were tested as set out below.

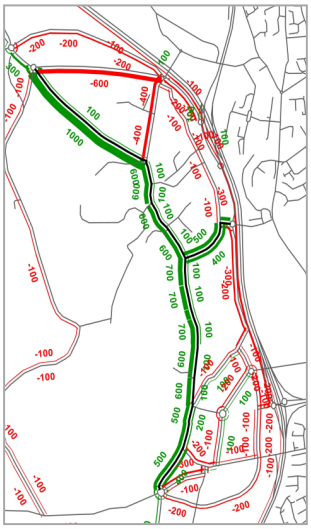
Ferndale Road Upgrade



Scheme: The scheme includes the upgrading of Ferndale Rd to provide an alternative link for the Fassaroe/Old Connaught area. The scheme provides access onto the Western Parallel Route and onto the M50 via the Lehaunstown Interchange.

Impact: The proposed scheme would remove significant local traffic from the N11/M11 as shown in adjacent figure however there are significant issues with the onsite feasibility of upgrading the existing Ferndale Road due to the topographical layout of the road. The scheme was therefore **NOT adopted** as part of the preferred future road scenario.

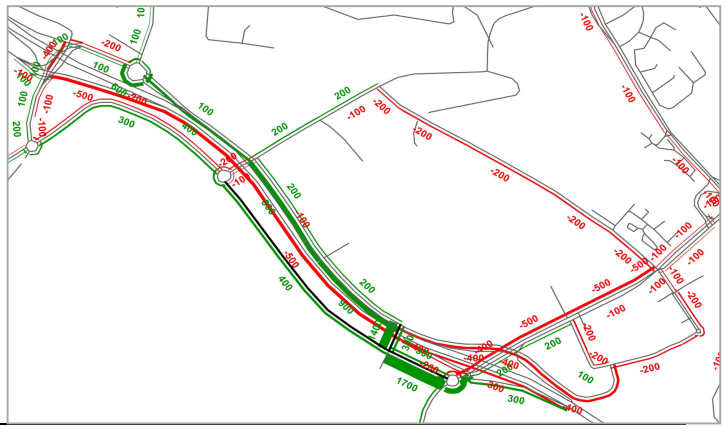
Ferndale – Rathmichael Link



Scheme: The scheme consists of new link between Ferndale Road and Rathmichael Road which improves access to the Lehaunstown/M50 Interchange.

Impact: The scheme would attract significant traffic off the M50/M11/N11 corridor and reduce short hop trips on the M50/M11/N11. The scheme, together with an upgrade of Ferndale Road, would complete the western parallel route between the Fassaroe and Cherrywood areas however the attractiveness the scheme is largely dependent on the upgrading of Ferndale Road. The scheme was therefore **NOT adopted** as part of the preferred future road scenario.

Northern Link between Lehaunstown and Carrickmines



Scheme: Scheme includes the provision of an additional road to the south of the M50 between Lehaunstown and Carrickmines including an overbridge.

Impact: The scheme would provide relief to the Lehaunstown Interchange as traffic to/from Cherrywood can avoid the interchange by using the new link and overbridge. The link also removes some traffic from the M50

north of Lehaunstown as an easier access route is provided. The scheme was therefore **adopted** as part of the preferred future road scenario.

Sandyford Southern Parallel Route

Scheme: The scheme consists of a parallel link on the southern side of the M50 together with an overbridge.

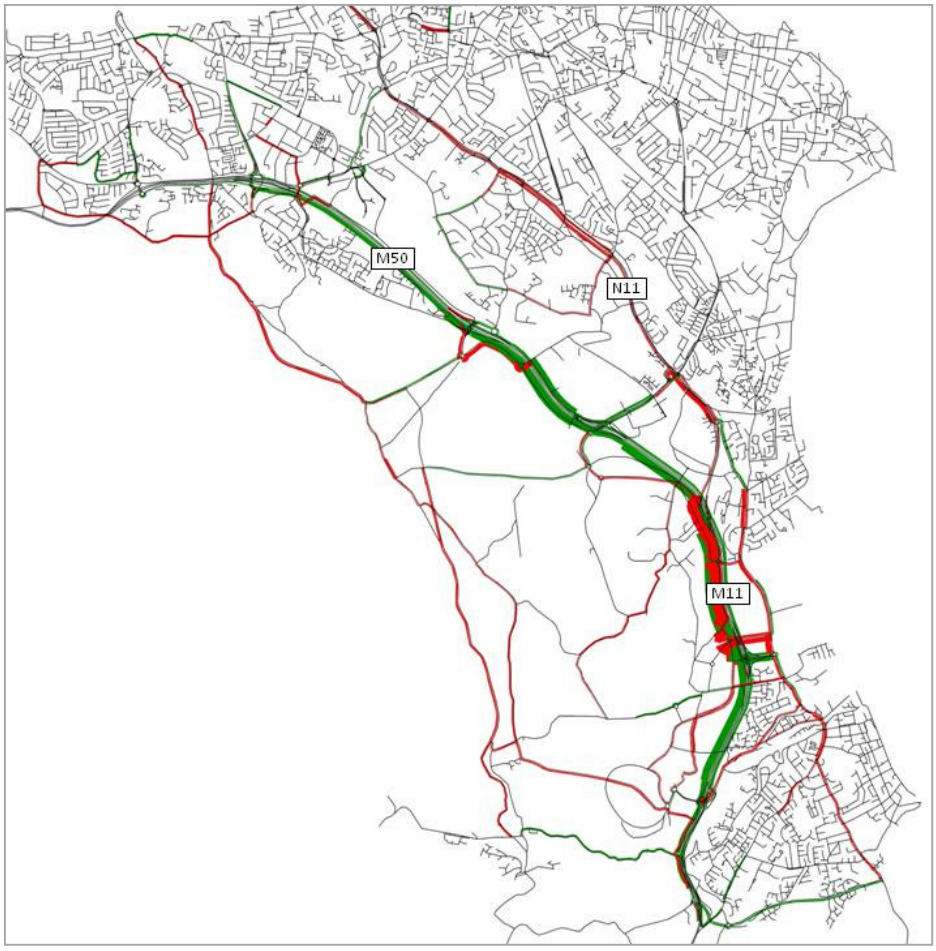
Impact: The testing found that the proposed road performs same role as northern parallel road as can be seen from adjacent figure. It was therefore concluded that the scheme could be implemented if any issues occurred during the delivery of the northern parallel road e.g. ownership or topographical issues. The scheme was therefore **NOT adopted** as part of the preferred future road scenario.

M50 Widening

Scheme: The scheme consists of widening the M50 to 3 lanes in both directions from the end of the existing 3 lane section at Sandyford to the Fassaroe Junction on the N11.

Impact: The testing found that even with the provision of the local roads shown in Figure 6.2 below, traffic volumes on the M50 south of Sandyford remain high at up to 130,000 AADT or over 4,500 vehs per hour. Based on an operational capacity of 1,900 vehs/hr/lane, it is apparent that additional capacity will be required on the M50 to cater for future traffic increases. As can be seen from below the widening will result in some traffic diverting onto the M50 due to the increased capacity. This additional traffic will result in AM peak volumes of nearly 4,700 and AADT flows of over 130,000 however the volume/capacity ratio will be approx 80%. It is evident that to protect the capacity and speeds on the M50 future traffic management measures would be required where additional lanes are provided.

Figure 6.2 – Impact of M50 Widening



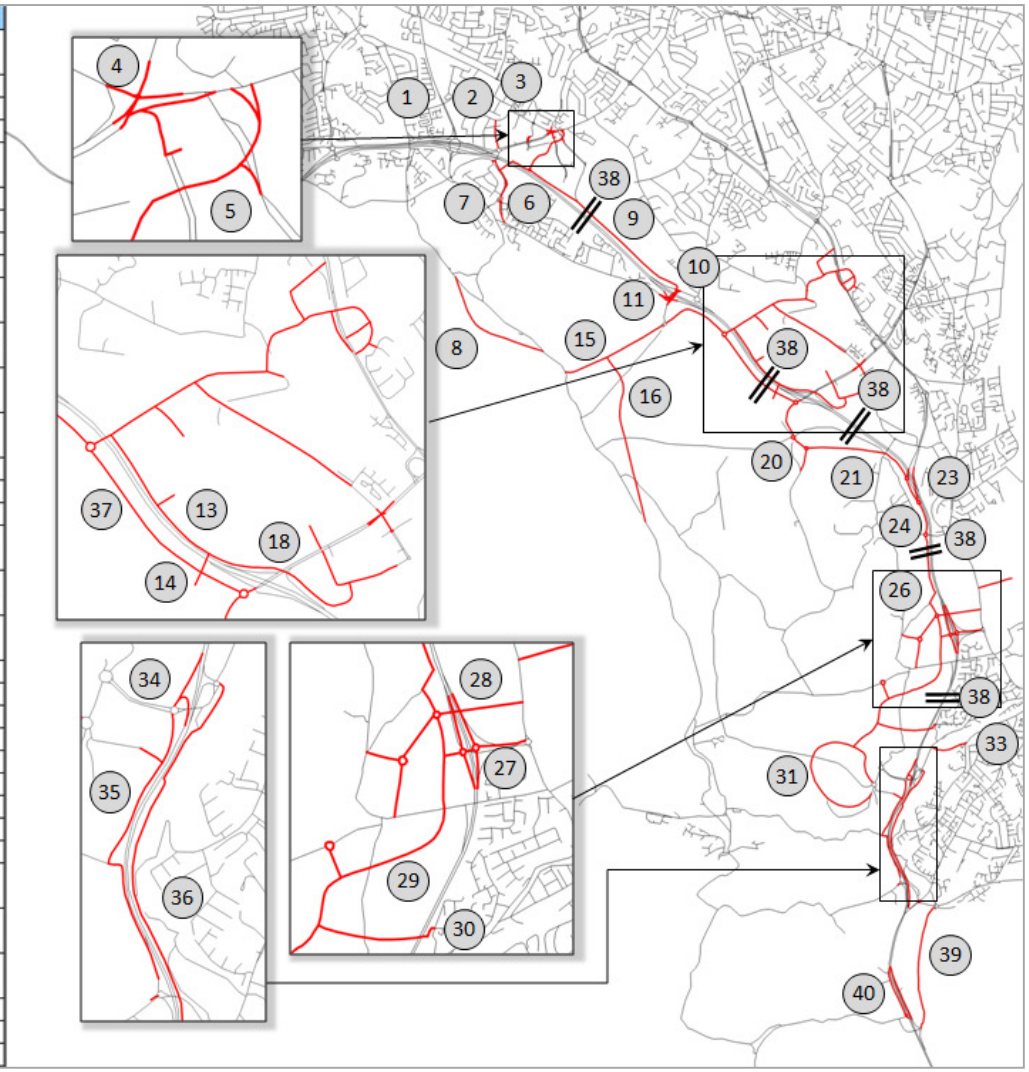
6.2 Final Future Road Scenario

Following the detailed testing exercise the final future road scenario was identified as shown in Figure 6.3 below.

In addition to the new roads schemes shown below it is proposed to upgrade the M50 and M11 from 2 lanes to 3 lanes in both directions between the Sandyford Junction on the M50 and the Fassaroe Junction on the M11.

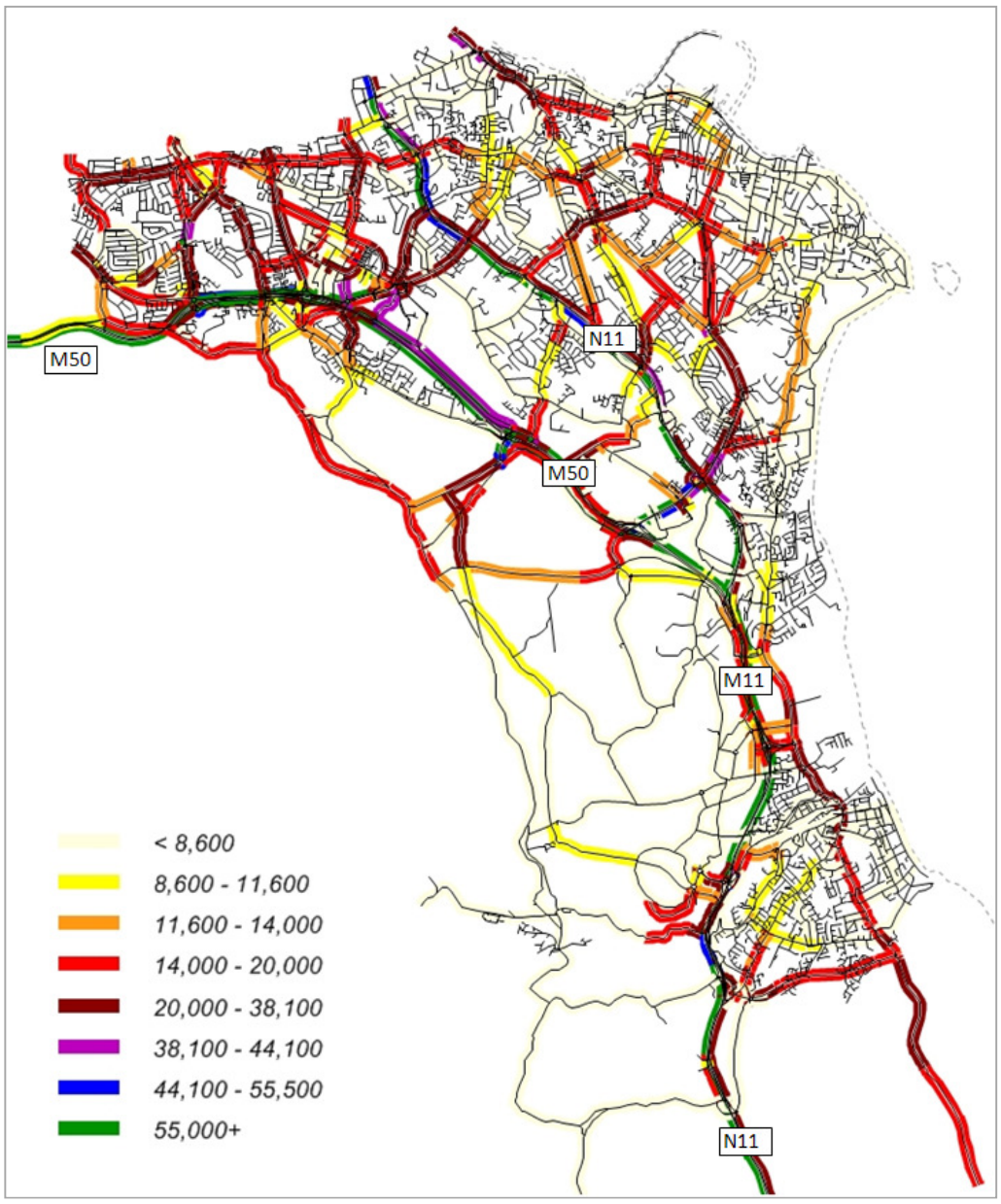
Figure 6.3 – Final Future Road Scenario

No.*	Proposed Road Improvements
1	Grade separation of Drummartin Road / Blackthorn Drive
2	ESB Link Road
3	Burton Hall extension
4	Signalisation of Leopardstown Roundabout
5	Leopardstown Link / Central Park to South County Business Park Link Road
6	Murphystown Link Road
7	Murphystown Road.
8	Stepaside bypass
9	Sandyford to Carrickmines parallel road
10	Upgrade to Carrickmines interchange (J15)
11	Local road crossing of M50 at Carrickmines
13	Eastern parallel road within Cherrywood development
14	Crossing of M50 between Eastern and Western parallel roads
15	Glenamuck Distributor Road
16	Enniskerry Road link / Kilternan bypass
18	Upgrade to Lehaunstown interchange
20	Western parallel road to Rathmichael Road
21	Western parallel road south of Rathmichael Road
23	Link roads to M11 north (Shankill Relief Road
24	Western parallel road
26	Western parallel road:
27	Upgrade of Wilford interchange
28	New local road crossing of M11
29	Western parallel road
30	Thornhill Road – Dargle Road link
31	Fassaroe Distributor Road
33	Dargle Road - Herbert Road Link
34	Upgrade of Fassaroe interchange
35	Link from N11 western parallel service road to Fassaroe
36	N11 Western and Eastern parallel service roads
37	Northern Link between Lehaustown and Carrickmines
38	Widening M50
39	Southern Cross to Killmacanogue Link
40	Killmacanogue Parallel Links



The proposed future road network is shown in a detailed drawing in Appendix A of this report. The final 2030 AADT's in the study area for the future year are shown below. As can be seen flows on the M50 are in the region of 130,000 AADT and flows on sections of the N11 reach nearly 87,000 AADT. The maximum volumes carried by the proposed new road schemes are over 40,000 AADT with the majority of new road schemes carrying volumes of 11,600 – 20,000 AADT. This highlights the need for and attractiveness of the proposed road schemes.

Figure 6.4 – 2030 AADT Do Something Model

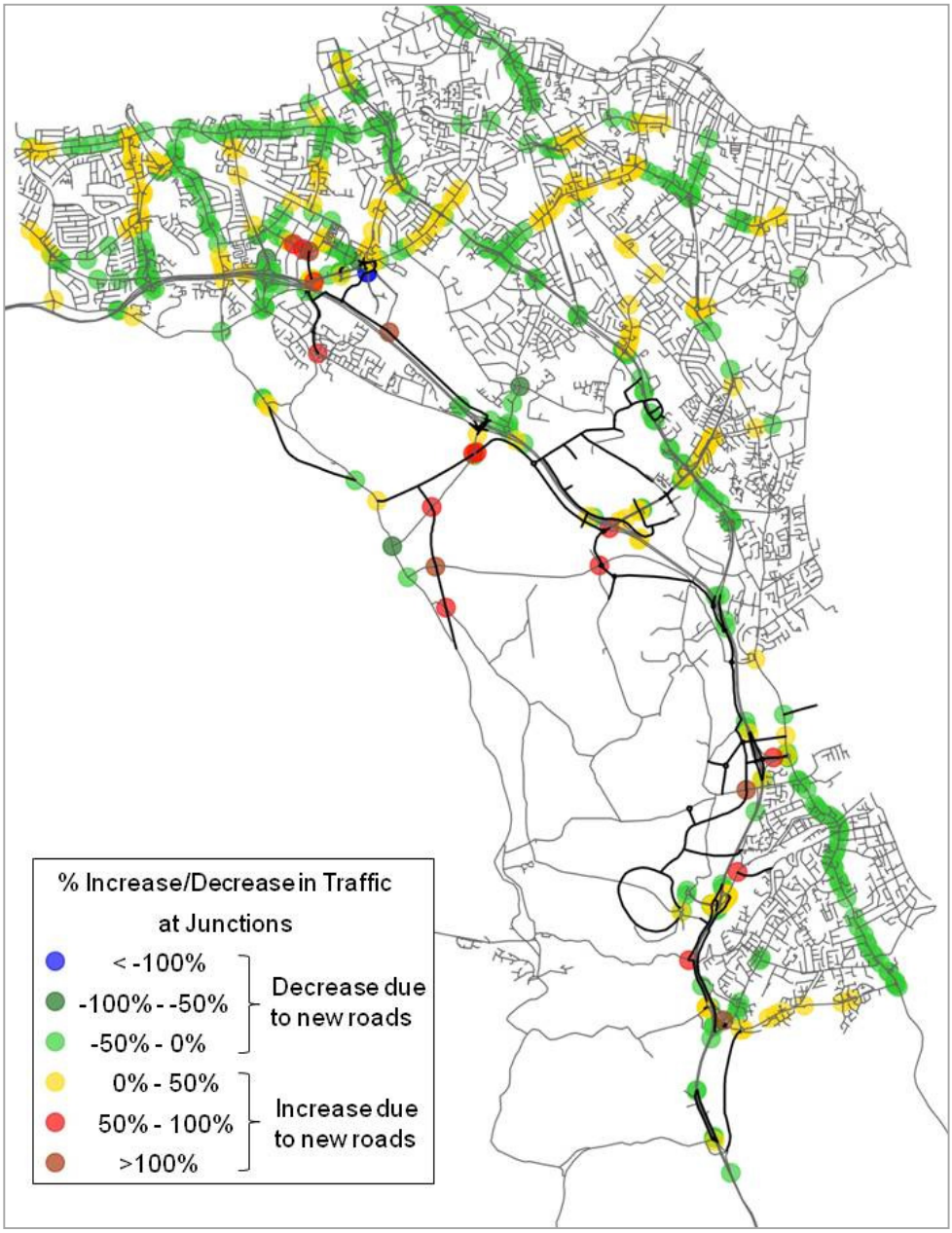


6.3 Impact of Future Road Scenario on Junctions

In addition to providing additional capacity in terms of road link capacity it is also important to ensure the proposed road schemes have a positive impact on junctions which are expected to be under pressure in the future. The figure below shows the impact the Do Something road schemes

have on the Do Minimum Scenario which was shown in Figure 5.4 above. As can be seen below the Do Something road schemes have a positive impact on the vast majority of junction in the study area. Some increases do occur internally within Sandyford Business Estate due to the ESB Link Road and along the Glenamuck Link Road due to traffic diverting onto the more suitable new road and away from local roads.

Figure 6.5 – Impact of Do Something Road Schemes on Junctions



6.4 Impact of the Proposed Road Scenario on Travel Time

The impact of the final future road network on journey times was assessed to ensure the future road scheme results in positive impacts for future road users. The assessment looked at number

of popular routes through the study area and found that journey times would decrease by between 3-25% as a result of the proposed road measures.

Table 6.1 – Journey Time Assessment

Route	Direction	2030 Do Minimum	2030 Do Something	2030 Do Minimum	2030 Do Something
		Journey Time (mins:secs)		Average Speed (km/hr)	
M50 @ Sandyford to N11 @ Kilmacanogue	Southbound	9:37	9:17	98	102
	Northbound	13:33	11:16	67	81
Blackthorn Avenue (Sandyford) to Fassaroe	Southbound	14:28	11:04	72	70
	Northbound	17:08	12:49	51	61
N11 @ Brewery to N11 @ Kilmacanogue	Southbound	14:41	14:14	63	65
	Northbound	19:59	17:08	45	53
Cherrywood to Fassaroe	Southbound	6:47	6:18	65	71
	Northbound	7:22	6:51	61	67

In addition to individual routes the overall operation of the network in terms of travel time, delay and average speed was also assessed as per below.

Table 6.2 – Impact of Proposed Road Schemes on M50/M50/N11 Corridor Flows

Location	2030 Do Nothing		2030 Do Something		AADT % Difference
	Two Way AM Peak Period Flow	AADT	Two Way AM Peak Period Flow	AADT	
R113 Leopardstown Rd	4,164	64,827	2,578	40,135	-38%
M50 South of Leopardstown I/C	9,484	147,651	8,342	129,872	-12%
M50 North of Cherrywood I/C	7,855	122,290	8,124	126,478	3%*
M50 North of M50/M11/N11 I/C	5,388	83,883	6,143	95,637	14%*
N11 North of Wyattwille Estate	4,578	71,272	3,079	47,935	-33%
N11 South of Wyattville Estate	4,171	64,936	3,290	51,220	-21%
N11 North of M50/M11/N11 I/C	3,405	53,011	3,079	47,935	-10%
M11 South of M50/M11/N11 I/C	8,793	136,893	8,247	128,393	-6%
M11 North of Fassaroe I/C	7,589	118,149	7,418	115,487	-2%

**Increases due to significant congestion occurring on these sections in Do Min which is relieved by additional lane along M50*

As can be seen Table 6.2 above the proposed road schemes reduce flows along the M50/M11 corridor to manageable levels.

Table 6.3 – Impact of Do Something Road Schemes on Overall Network Performance

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2030 Do-Nothing	56,953	439,940	10,653	3,356	41
2030 Do-Something	56,953	438,257	9,526	2,399	46
Difference	0	-1,683	-1,127	-957	+5

These results highlight the significant positive impact of the Do Something measures with the performance of the study area road network improving across all performance measures. In terms of journey time savings it can be seen from above that during the AM peak period savings of 1,127 hours are recorded. This relates to approximately 845,000 hrs per annum based on the assumption that the hour savings occur three time per day over 250 days. Based on an average value of time of approximately €17/hr for all vehicles this could equate to savings of over €14 million per annum in 2030.

6.5 Impact of Incidents on N11/M50 Corridor

The potential impact of accidents and the alternative routes provided are assessed in this section. The Department Transport, Tourism and Sport has derived that fatalities can cost the exchequer over €2 million whilst delays due to incidents can cost other road users hundreds of thousands in terms of lost time. The future year (2030) demand was utilised to assess the impact for a number of scenarios as set out below.

Northbound Incident south of Sandyford

As can be seen below, an incident along this section of the M50 results in traffic diverting onto Ballyogan Road and Enniskerry Road in both the existing and future scenarios. The impact of the proposed road schemes in this instance is minimal however the Stepaside Bypass will ensure increased traffic does not travel through the village. The key model outputs in the table below highlight the positive impact of the new road schemes with vehicle kilometres, travel time and delays significantly being lower than in the Do Nothing scenario in the event of an incident.

Table 6.4 – Impact of Incident on Network Performance

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2030 Do-Nothing	56,953	439,940	10,653	3,356	41
2030 Do-Nothing with NB Incident	56,953	438,337	11,903	4,279	37
2030 Do-Something with NB Incident	56,953	437,877	10,643	3,253	41

Figure 6.6 – Existing Network

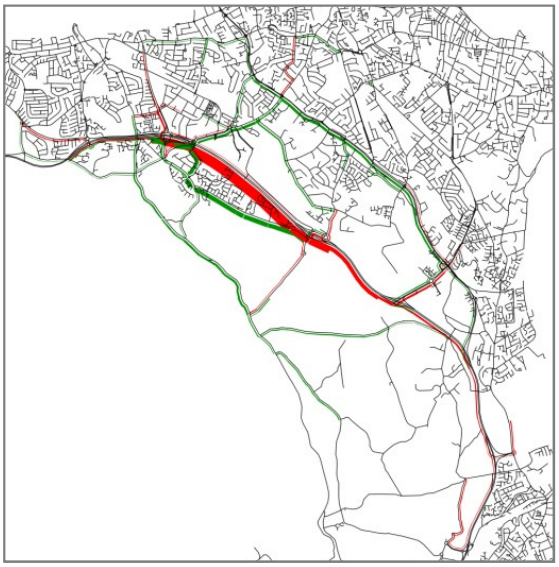
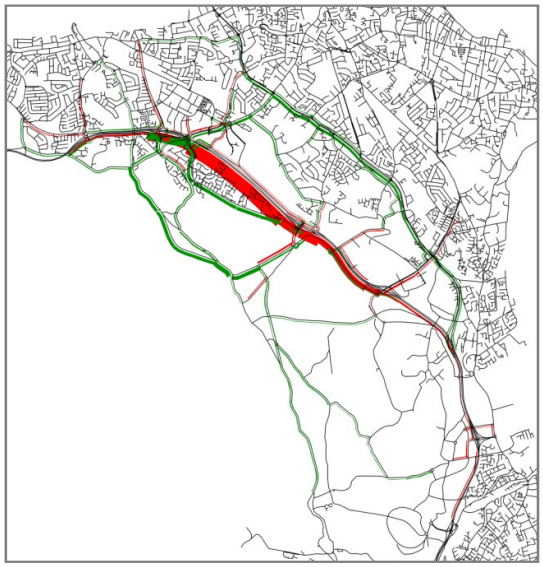


Figure 6.7 – Proposed Network



Northbound Incident south of Carrickmines

Currently the main alternatives to the Carrickmines to Lehaunstown section of the M50 are the N11 and Ballycorus Road/Enniskerry Road as seen in the impact figures below. The assessment has shown that the Eastern and Western Parallel Roads between the Carrickmines and Lehaunstown Interchanges provide a viable alternative route for M50 traffic should an incident occur. From the model outputs presented in the table below it can be seen that diversion onto the parallel roads results in no increases in travel distance or time in the event of an incident.

Table 6.5 – Impact of Incident on Network Performance

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2030 Do-Nothing	56,953	439,940	10,653	3,356	41
2030 Do-Nothing with NB Incident	56,953	442,629	11,918	4,286	37
2030 Do-Something with NB Incident	56,953	439,659	10,062	2,772	44

Figure 6.8 – Existing Network

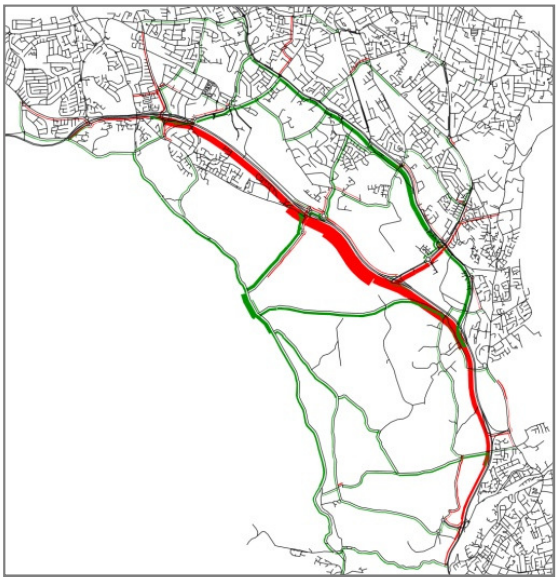
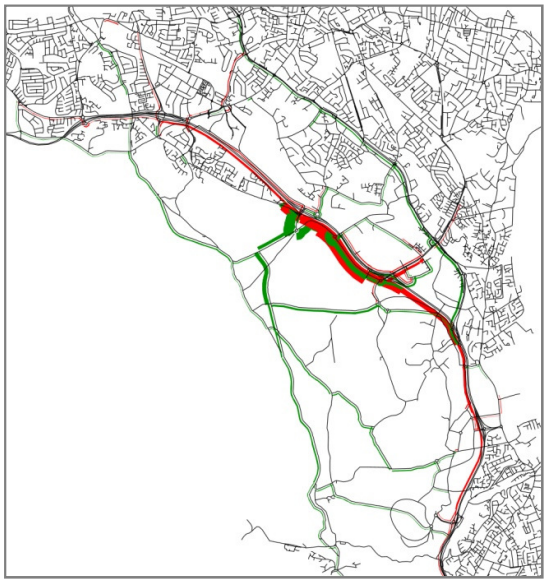


Figure 6.9 – Proposed Network



Northbound Incident south of Lehaunstown

As can be seen below, an incident on the M50 south of Lehaunstown results in traffic diverting via the N11 and the Wyattville Link Road which significantly increases travel distance and time. With the proposed Do Something road network in place traffic can divert via the Parallel Road South of Rathmichael Road which results in decreases in travel distance and time.

Table 6.6 – Impact of Incident on Network Performance

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2030 Do-Nothing	56,953	439,940	10,653	3,356	41
2030 Do-Nothing with NB Incident	56,953	441,162	11,241	3,787	39
2030 Do-Something with NB Incident	56,953	439,278	9,865	2,606	45

Figure 6.10 – Existing Network

Figure 6.11 – Proposed Network

Northbound Incident south of N11/M50 Merge

In the current situation should an incident occur on the M11 south of the M11/M50, merge traffic will divert onto the Ferndale Road/Cherrywood Road/Wyattville Road or the Dublin Road through Shankill. Both of these roads are local roads unsuitable for large volumes of traffic. The construction of the Western Parallel Route to the west of the M11 and the Link Roads over the M11 as part of the Shankill Relief Road scheme will provide an attractive alternative for diverted traffic and significantly reduce travel distance and time.

Table 6.7 – Impact of Incident on Network Performance

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2030 Do-Nothing	56,953	439,940	10,653	3,356	41
2030 Do-Nothing with NB Incident	56,953	440,732	12,283	4,660	36
2030 Do-Something with NB Incident	56,953	440,276	10,374	3,024	42

Figure 6.12 – Existing Network

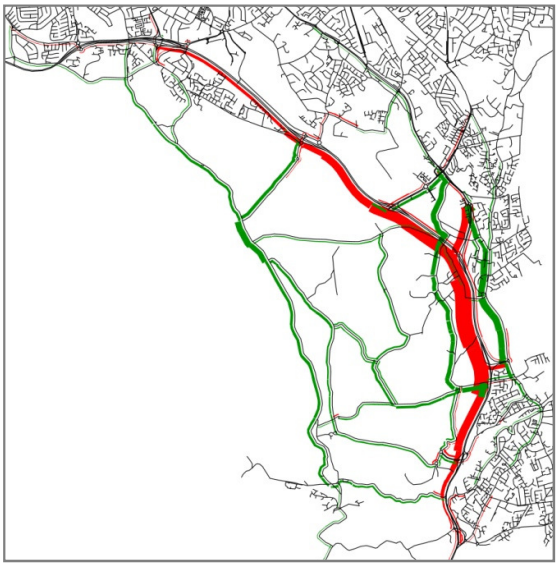
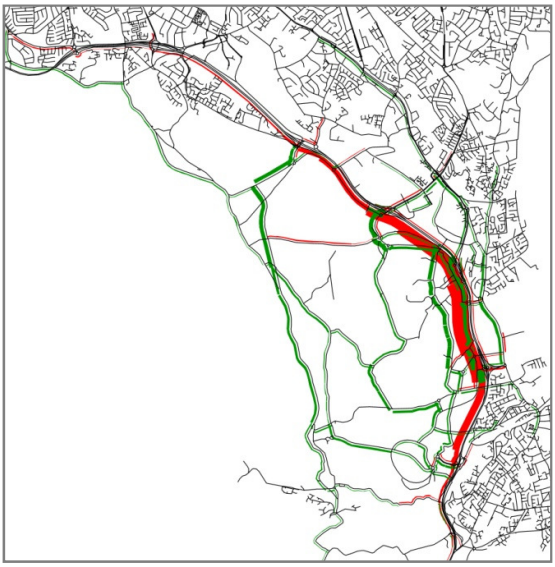


Figure 6.13 – Proposed Network



Southbound Incident south of Sandyford

As can be seen in the below figure, an incident on the M50 south of Sandyford would currently result in traffic diverting onto the N11, the Ballyogan Road and the Enniskerry Road. The introduction of the Do Something road schemes would result in some traffic diverting onto the Sandyford to Carrickmines Parallel Link and also provides a bypass of Stepaside removing extraneous traffic from the village. Travel distance and time also decrease significantly as a result.

Table 6.8 – Impact of Incident on Network Performance

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2030 Do-Nothing	56,953	439,940	10,653	3,356	41
2030 Do-Nothing with SB Incident	56,953	439,672	11,522	3,946	38
2030 Do-Something with SB Incident	56,953	438,537	10,169	2,857	43

Figure 6.14 – Existing Network

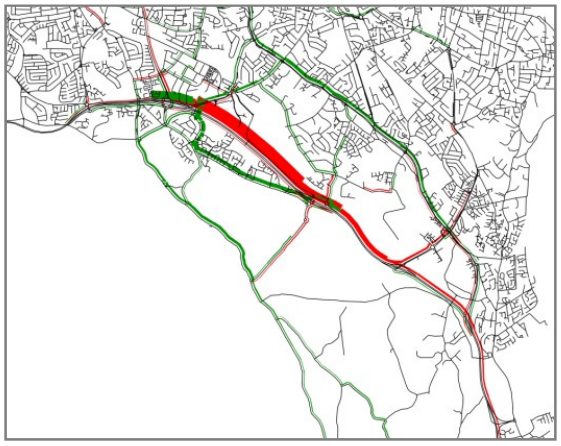
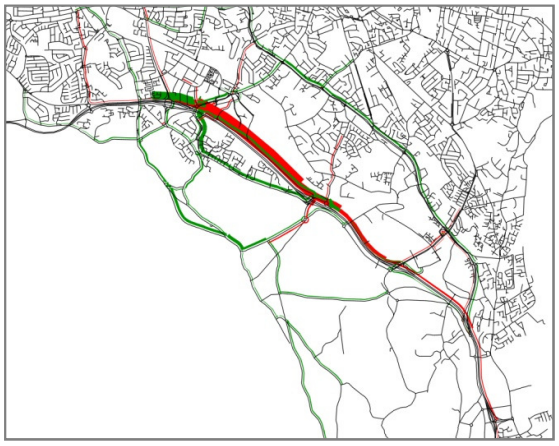


Figure 6.15 – Proposed Network



Southbound Incident south of Carrickmines

An incident on the M50 south of Carrickmines will result in significant diversion onto the N11 via the Leopardstown Road. The Eastern Parallel Road will cater for this traffic should an incident occur as shown in the figure below. The parallel road provides an attractive route and has a positive impact on travel distance and time as outlined in the table below.

Table 6.9 – Impact of Incident on Network Performance

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2030 Do-Nothing	56,953	439,940	10,653	3,356	41
2030 Do-Nothing with SB Incident	56,953	441,320	11,307	3,776	39
2030 Do-Something with SB Incident	56,953	421,377	9,795	2,543	43

Figure 6.16 – Existing Network

Figure 6.17 – Proposed Network

Southbound Incident south of Lehaunstown

As can be seen below, an incident on the M50 south of Lehaunstown results in traffic diverting via Wyattville Road and the N11. The Do Something measures provide an additional alternative route via the Parallel Route south of Rathmichael Road however a significant volume of traffic still diverts onto the N11 even with the new roads in place due to difficulty accessing the M11 southbound.

Table 6.10 – Impact of Incident on Network Performance

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2030 Do-Nothing	56,953	439,940	10,653	3,356	41
2030 Do-Nothing with SB Incident	56,953	440,419	10,861	3,478	41
2030 Do-Something with SB Incident	56,953	438,832	9,701	2,485	45

Figure 6.18 – Existing Network

Figure 6.19 – Proposed Network

Southbound Incident south of M11/M50 Merge

A southbound incident on the M11 south of the M11/M50 merge would result in diversion through Shankill and onto the Ferndale Road. As shown below the western parallel route would provide an attractive route for diverted traffic. The parallel route provides access for traffic with destinations in Fassaroe or Old Connaught without the need for access onto the M11/N11.

Table 6.11 – Impact of Incident on Network Performance

VISUM Modelling Network Statistic	Total Network Trips (veh/hr)	Total Vehicle km	Total Network Travel Time (hrs)	Total Network Delay (hrs)	Average Vehicle Speed (km/hr)
2030 Do-Nothing	56,953	439,940	10,653	3,356	41
2030 Do-Nothing with SB Incident	56,953	439,995	11,329	3,834	39
2030 Do-Something with SB Incident	56,953	438,736	9,836	2,567	45

Figure 6.20 – Existing Network

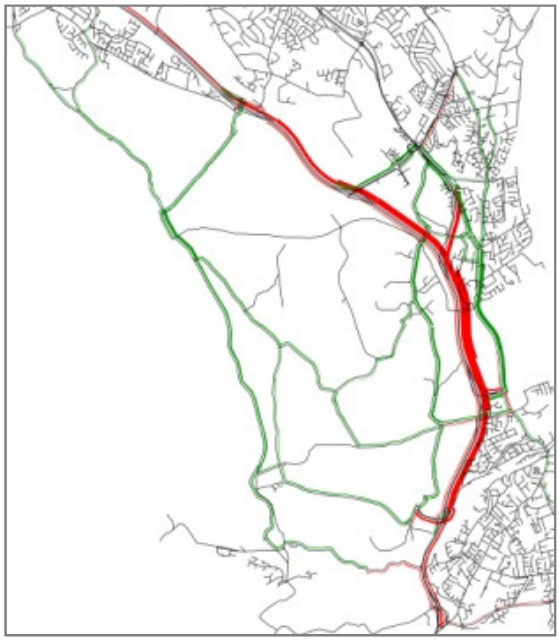
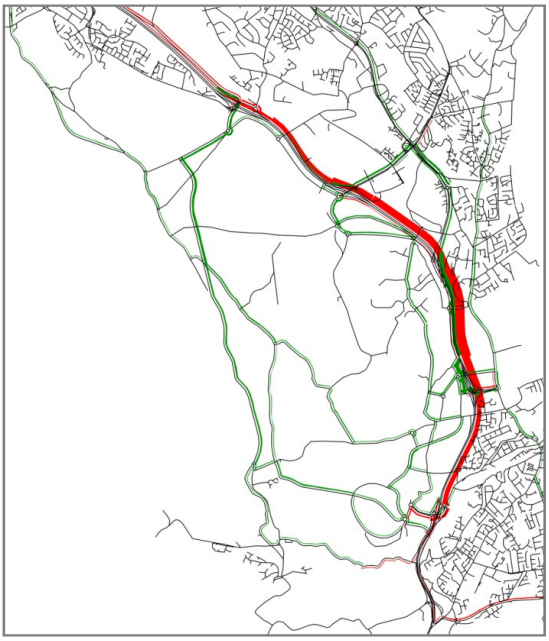


Figure 6.21 – Proposed Network



Overall the proposed road network will provide alternative routes for all sections of the M50 and N11/M11 should an incident occur and together with VMS signage could significantly reduce the impact of incidents on other users.

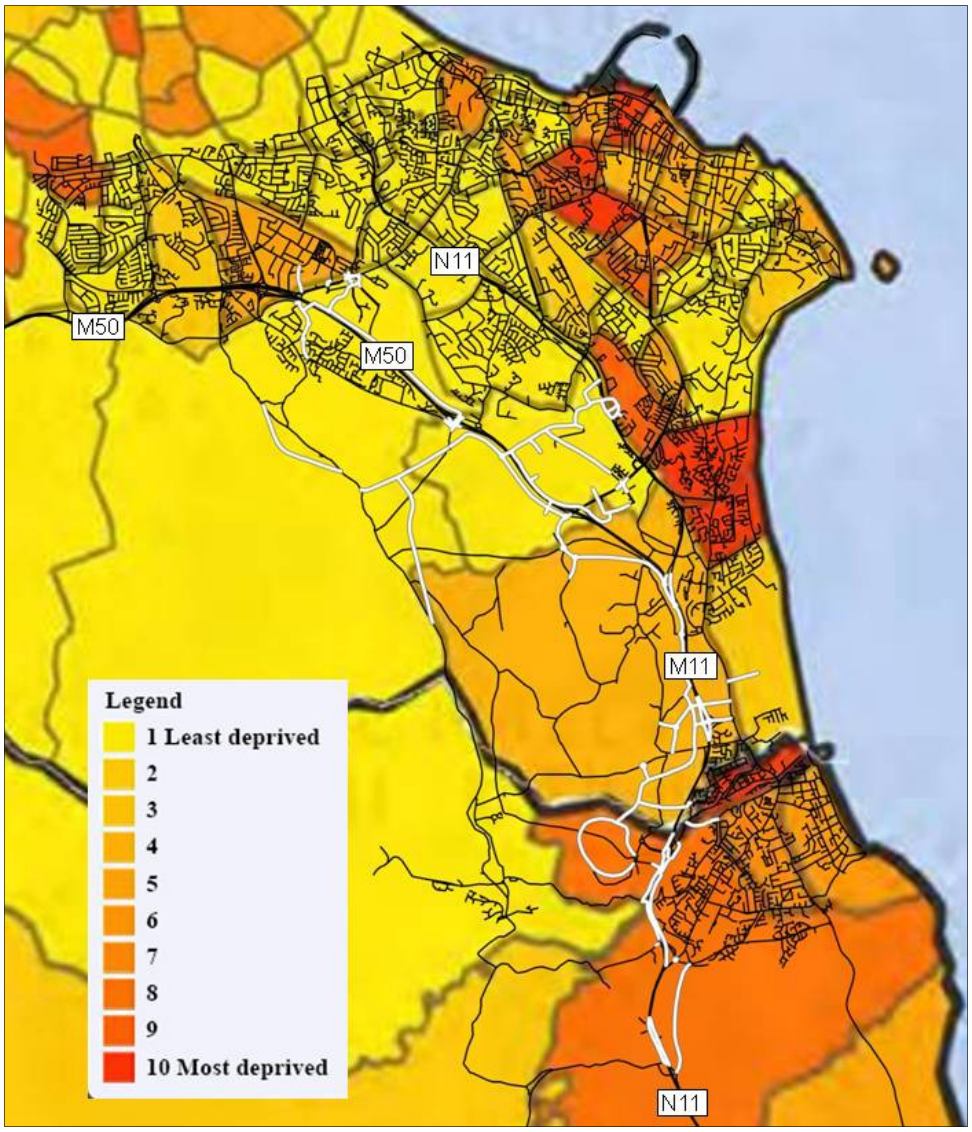
6.6 Impact on Deprived Areas (Accessibility)

Deprivation has been defined by Townsend as a state of "observable and demonstrable disadvantage relative to the local community to which an individual belongs". The Small Area Health Research Unit (SAHRU) Deprivation Index was prepared in conjunction with the Health Service Executive (HSE) utilising 2006 Irish Census information. The index was developed based on five census based indicators, widely believed to represent or be a determinant of material disadvantage, as set out below;

- Unemployment
- Low social class
- No car
- Rented accommodation
- Overcrowding

Figure 6.22 below illustrates the Deprivation Index for each DED within the study area.

Figure 6.22 – SAHRU Index Deprivation Levels based on 2006 Census Information



The construction of the proposed road schemes could have the potential to raise the socio-economic profile of the corridor providing a basis for the proposed increase in population. The assessment found that whilst the schemes will not directly service any significantly deprived areas the proposed schemes will assist in supporting house prices and increasing disposable income. Services and amenities (including jobs) will become more accessible to socially excluded communities through an improved road and public transport network.

Chapter 7 Conclusions

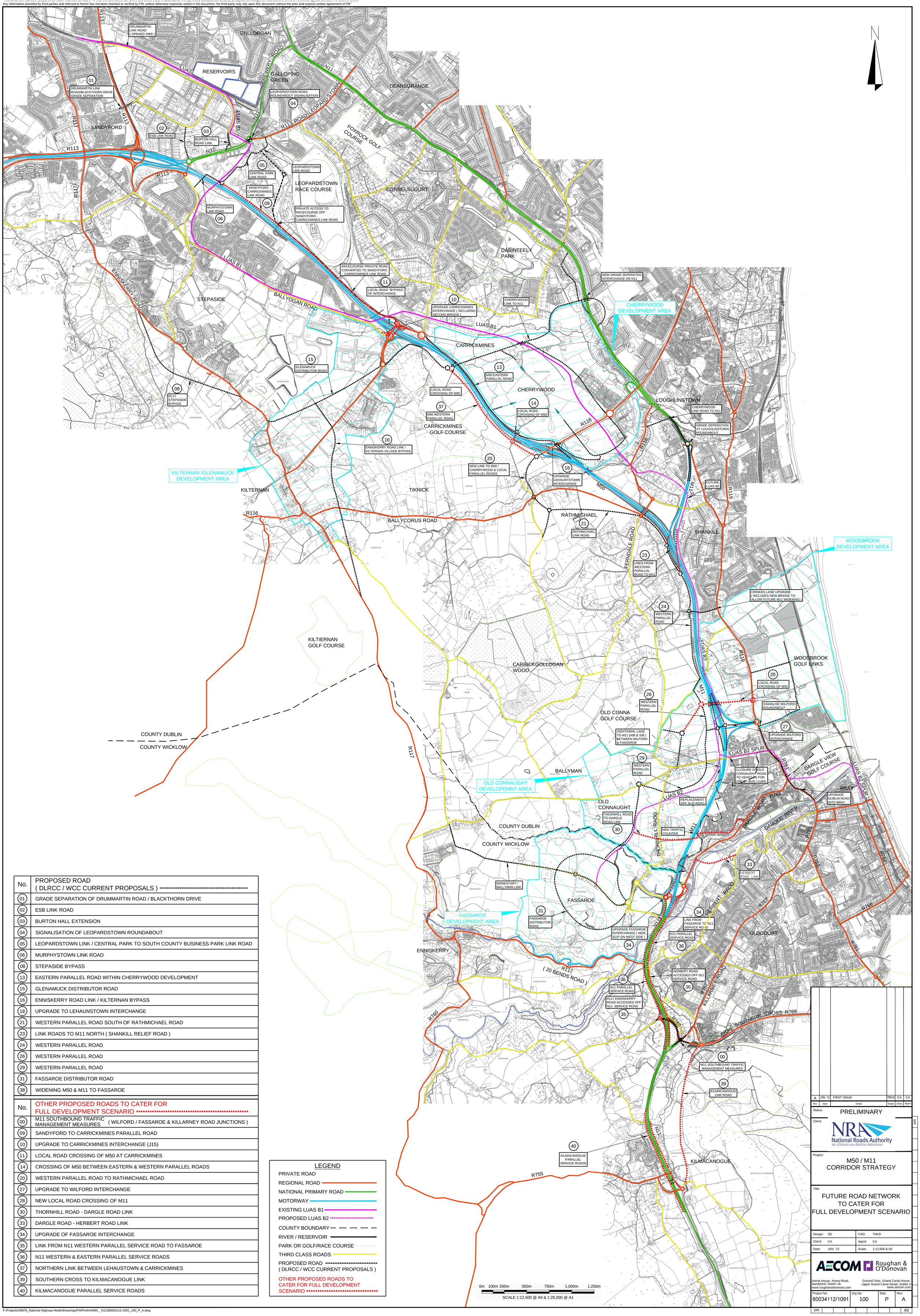
7.1 Overview

The study has shown that in order to protect the function of the M50/M11, taking account of future development proposals along the corridor, significant investment in public transport, roads and smarter travel initiatives will be required. The proposed future 2030 road network will help cater for local traffic and will reduce the reliance on the M50 and N11 national roads. The modelling has shown that if all the proposed road schemes are implemented residual capacity on the M50 in 2030 will increase by over 10% on some sections, over 30% on some sections of the N11 and over 5% on the M11. It would be anticipated that the majority of this residual capacity will be utilised by induced traffic which will occur as a result of land use changes and variable demand responses. In order to ensure the capacity and function of the M50/M11 is protected, it is therefore important that traffic management measures are implemented to lock in the benefits derived from the investment in the projects. The future network will also provide alternative routes in case of incidents along the corridor significantly reducing lost time due to incident related congestion.

It must be stressed that the traffic forecasts assume a high public transport mode share (45% car share for new developments) and as such it is imperative that public transport and smarter travel initiatives are developed prior to or in tandem with any future development in the M50/M11/N11 area. Dun Laoghaire Rathdown County Council have recently undertaken a number of smarter travel studies in the Sandyford and Bray areas investigating the potential for walking/cycle routes to improve connectivity between residential and employment areas and public transport.

It should be noted that many of the individual road schemes proposed are already contained in the Development Plans of Dun Laoghaire Rathdown and Wicklow County Councils as they are required to cater for local traffic. However, in many cases they have not been linked to provide a full local road network. The assessment has shown that the proposed future network will significantly improve traffic conditions along the corridor providing reduced journey times and increased speeds along the corridor and adjacent road network. The initial assessment found that the proposed road network could provide benefits of up to €14 million per year in 2030 when compared to the existing road network.

Appendix A – Proposed Future Road Network



No.	PROPOSED ROAD (DLRCC / WCC CURRENT PROPOSALS) ·····
01	GRADE SEPARATION OF DRUMMARTIN ROAD / BLACKTHORN DRIVE
02	ESB LINK ROAD
03	BURTON HALL EXTENSION
04	SIGNALISATION OF LEOPARDSTOWN ROUNDABOUT
05	LEOPARDSTOWN LINK / CENTRAL PARK TO SOUTH COUNTY BUSINESS PARK LINK ROAD
06	MURPHYSTOWN LINK ROAD
08	STEPASIDE BYPASS
13	EASTERN PARALLEL ROAD WITHIN CHERRYWOOD DEVELOPMENT
15	GLENAMUCK DISTRIBUTOR ROAD
16	ENNISKERRY ROAD LINK / KILTERNAN BYPASS
18	UPGRADE TO LEHAUNSTOWN INTERCHANGE
21	WESTERN PARALLEL ROAD SOUTH OF RATHMICHAEL ROAD
23	LINK ROADS TO M11 NORTH (SHANKILL RELIEF ROAD)
24	WESTERN PARALLEL ROAD
26	WESTERN PARALLEL ROAD
29	WESTERN PARALLEL ROAD
31	FASSAROE DISTRIBUTOR ROAD
38	WIDENING M50 & M11 TO FASSAROE

No.	OTHER PROPOSED ROADS TO CATER FOR FULL DEVELOPMENT SCENARIO ▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
00	M11 SOUTHBOUND TRAFFIC MANAGEMENT MEASURES (WILFORD / FASSAROE & KILLARNEY ROAD JUNCTIONS)
09	SANDYFORD TO CARRICKMINES PARALLEL ROAD
10	UPGRADE TO CARRICKMINES INTERCHANGE (J15)
11	LOCAL ROAD CROSSING OF M50 AT CARRICKMINES
14	CROSSING OF M50 BETWEEN EASTERN & WESTERN PARALLEL ROADS
20	WESTERN PARALLEL ROAD TO RATHMICHAEL ROAD
27	UPGRADE TO WILFORD INTERCHANGE
28	NEW LOCAL ROAD CROSSING OF M11
30	THORNHILL ROAD - DARGLE ROAD LINK
33	DARGLE ROAD - HERBERT ROAD LINK
34	UPGRADE OF FASSAROE INTERCHANGE
35	LINK FROM N11 WESTERN PARALLEL SERVICE ROAD TO FASSAROE
36	N11 WESTERN & EASTERN PARALLEL SERVICE ROADS
37	NORTHERN LINK BETWEEN LEHAUSTOWN & CARRICKMINES
39	SOUTHERN CROSS TO KILMACANOGUE LINK
40	KILMACANOGUE PARALLEL SERVICE ROADS

LEGEND

- PRIVATE ROAD
- REGIONAL ROAD
- NATIONAL PRIMARY ROAD
- MOTORWAY
- EXISTING LUAS B1
- PROPOSED LUAS B2 ·····
- COUNTY BOUNDARY — — — — —
- RIVER / RESERVOIR
- PARK OR GOLF/RACE COURSE
- THIRD CLASS ROADS
- PROPOSED ROAD ····· (DLRCC / WCC CURRENT PROPOSALS)
- OTHER PROPOSED ROADS TO CATER FOR FULL DEVELOPMENT SCENARIO ▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

Rev	Date	Detail	Made	Chk'd	App'd
A	JAN. '12	FIRST ISSUE	TMcD	CA	CA

Status: PRELIMINARY

Client: NRA National Roads Authority An tÚdarás um Bóithre Náisiúnta

Project: M50 / M11 CORRIDOR STRATEGY

Title: FUTURE ROAD NETWORK TO CATER FOR FULL DEVELOPMENT SCENARIO

Design:	SD	CAD:	TMcD
Chk'd:	CA	App'd:	CA
Date:	JAN. '12	Scale:	1:12,500 & A0

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Project No.	Drg No.	Stat.	Rev:
60034112/1091	100	P	A

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Appendix B – Traffic Survey Data

ATC Survey Data (vehs)

Link	Direction	AM Peak Period (07:00 – 09:00)		Interpeak Period (12:00-14:00)	
		Lights	Heavies	Lights	Heavies
1	Northbound	1144	20	932	16
	Southbound	705	7	913	14
2	Eastbound	308	8	432	5
	Westbound	298	4	545	5
3	Northbound	1419	112	1256	68
	Southbound	881	43	1260	68
4	Northbound	257	2	301	1
	Southbound	273	3	349	3
5	Northbound	725	7	518	3
	Southbound	366	5	587	6
6	Northbound	441	6	410	6
	Southbound	240	4	452	6
7	Northbound	458	4	511	4
	Southbound	279	2	531	4
8	Northbound	171	1	218	2
	Southbound	128	1	251	1
9	Northbound	252	6	385	3
	Southbound	241	3	369	4
10	Eastbound	234	5	500	6
	Westbound	718	9	538	8
11	Eastbound	264	3	149	2
	Westbound	74	2	158	2
12	Northbound	219	1	109	2
	Southbound	50	1	126	2
13	Northbound	59	0	46	1
	Southbound	20	0	62	1
14	Northbound	80	2	147	2
	Southbound	91	3	124	2
15	Northbound	150	1	119	1
	Southbound	65	1	133	1
16	Northbound	160	1	91	1
	Southbound	76	1	76	0
17	Northbound	1502	94	1024	38
	Southbound	709	25	1134	35
18	Eastbound	138	1	251	1
	Westbound	140	0	179	1
19	Northbound	441	9	436	6
	Southbound	448	3	428	4
20	Northbound	598	8	596	7
	Southbound	591	6	612	6
21	Northbound	74	1	121	1
	Southbound	77	1	130	1
22	Northbound	648	5	566	4
	Southbound	295	4	590	6
23	Northbound	235	1	588	2
	Southbound	536	3	562	3
24	Eastbound	397	2	410	1
	Westbound	195	2	420	2
25	Eastbound	653	4	668	5
	Westbound	356	5	673	4
26	Eastbound	207	1	120	1
	Westbound	92	0	122	1
27	Eastbound	1109	64	706	24
	Westbound	685	21	520	15
28	Exiting	943	32	575	17
	N/A				
29	Entering	40	0	65	1
	N/A				
30	Entering	768	36	556	27
	N/A				
31	Exiting	426	3	156	2
	N/A				
32	Entering	357	7	260	5

	N/A				
33	Exiting	292	4	286	5
	N/A				
34	Exiting	110	8	70	2
	N/A				
35	Exiting	238	3	239	3
	N/A				
36	Entering	137	5	151	4
	N/A				
37	Entering	266	15	426	12
	N/A				
38	Eastbound	289	2	353	2
	Westbound	332	2	372	2
39	Northbound	352	1	235	1
	Southbound	153	1	270	2
40	Eastbound	64	1	72	1
	Westbound	58	1	64	1

Appendix C – Model Calibration Results

AM Peak Model with Full Matrices 25/08/11

TOTAL TRAFFIC

Number of Links	Links within GEH	Percentage Calibrated	Links Flow Criteria	Percentage Calibrated	Total Traffic Observed	Total Traffic Modelled	Difference	Total Traffic GEH	Average GEH
271	242	89.30%	251	92.62%	140934	138505	-2429	6.498	2.166

LIGHT TRAFFIC

Number of Links	Links within GEH	Percentage Calibrated	Links Flow Criteria	Percentage Calibrated	Light Traffic Observed	Light Traffic Modelled	Difference	Total Traffic GEH	Average GEH
271	239	88.19%	251	92.62%	136598	134152	-2446	6.648	2.158

HEAVIES TRAFFIC

Number of Links	Links within GEH	Percentage Calibrated	Links Flow Criteria	Percentage Calibrated	Heavy Traffic Observed	Heavy Traffic Modelled	Difference	Total Traffic GEH	Average GEH
268	267	99.63%	271	101.12%	4336	4354	18	0.273	1.015

AM Peak Total Traffic Full Matrices 25/08/11

									RESULT =	89.30%		RESULT =	92.62%		
					Observed	Modelled	Difference		REQD =	85.00%		REQD =	85.00%		
No.	**Link Number**	**From Node**	**To Node**	**Link Capacity (PCU's)**	**Total Traffic**	**Total Traffic**	**Total Traffic**	***GEH***	***COUNT***	***GEH TEST***	***CLASS TEST***	***Target Difference***	***Flow Test***	***ACT DIFF***	***FACTOR***
1	50709	121890062	121898078	1250	300.00	228.00	-72.00	4.431	1	1	1	100	1	-72	0.7600
2	50709	121898078	121890062	1250	612.00	491.00	-121.00	5.152	1	0	1	100	0	-121	0.8023
3	51535	121891726	121893802	1350	32.00	16.00	-16.00	3.266	1	1	1	100	1	-16	0.5000
4	51535	121893802	121891726	1350	146.00	139.00	-7.00	0.586	1	1	1	100	1	-7	0.9521
5	51625	121892991	121891635	1600	1226.00	1039.00	-187.00	5.557	1	0	2	184	0	-187	0.8475
6	51746	121890227	121890300	1250	405.00	352.00	-53.00	2.724	1	1	1	100	1	-53	0.8691
7	51746	121890300	121890227	1250	508.00	457.00	-51.00	2.322	1	1	1	100	1	-51	0.8996
8	52177	121893275	121894805	1250	3.00	5.00	2.00	1.000	1	1	1	100	1	2	1.6667
9	52177	121894805	121893275	1250	8.00	7.00	-1.00	0.365	1	1	1	100	1	-1	0.8750
10	52550	121890857	121892152	1250	432.00	359.00	-73.00	3.671	1	1	1	100	1	-73	0.8310
11	52550	121892152	121890857	1250	718.00	537.00	-181.00	7.226	1	0	2	108	0	-181	0.7479
12	52685	121896527	121894461	2500	138.00	151.00	13.00	1.081	1	1	1	100	1	13	1.0942
13	52878	121894049	121896193	1000	184.00	216.00	32.00	2.263	1	1	1	100	1	32	1.1739
14	52878	121896193	121894049	1000	258.00	220.00	-38.00	2.458	1	1	1	100	1	-38	0.8527
15	52944	121893969	121897273	1350	51.00	39.00	-12.00	1.789	1	1	1	100	1	-12	0.7647
16	52944	121897273	121893969	1350	220.00	245.00	25.00	1.640	1	1	1	100	1	25	1.1136
17	551425077	121891403	121890515	1600	261.00	285.00	24.00	1.453	1	1	1	100	1	24	1.0920
18	551425084	121893943	121892794	1600	347.00	420.00	73.00	3.728	1	1	1	100	1	73	1.2104
19	551425144	121891013	121895862	1250	111.00	173.00	62.00	5.203	1	0	1	100	1	62	1.5586
20	551425145	121895862	121891012	1250	1206.00	1116.00	-90.00	2.641	1	1	2	181	1	-90	0.9254
21	551425147	121890589	121890590	1600	55.00	60.00	5.00	0.659	1	1	1	100	1	5	1.0909
22	551425275	121621988	121621989	3500	2004.00	1918.00	-86.00	1.942	1	1	2	301	1	-86	0.9571
23	553058331	121620084	121623438	2500	1164.00	1141.00	-23.00	0.677	1	1	2	175	1	-23	0.9802
24	553058441	121605348	121614253	3500	924.00	1026.00	102.00	3.267	1	1	2	139	1	102	1.1104
25	553059065	121611721	121611722	1000	224.00	212.00	-12.00	0.813	1	1	1	100	1	-12	0.9464
26	553059073	121610601	121610600	1600	296.00	328.00	32.00	1.812	1	1	1	100	1	32	1.1081
27	553059106	121605398	121619874	2500	759.00	796.00	37.00	1.327	1	1	2	114	1	37	1.0487
28	553059107	121619874	121621120	2500	140.00	93.00	-47.00	4.354	1	1	1	100	1	-47	0.6643
29	553059109	121606598	121616305	2500	167.00	145.00	-22.00	1.761	1	1	1	100	1	-22	0.8683
30	553059113	121890242	121891605	1600	212.00	132.00	-80.00	6.100	1	0	1	100	1	-80	0.6226
31	553059417	121639135	121896281	1600	108.00	94.00	-14.00	1.393	1	1	1	100	1	-14	0.8704
32	553059523	121622941	121625886	1250	1308.00	1039.00	-269.00	7.853	1	0	2	196	0	-269	0.7943
33	553059524	121635100	121607850	1250	891.00	760.00	-131.00	4.559	1	1	2	134	1	-131	0.8530
34	553059533	121620621	121620622	1250	501.00	541.00	40.00	1.752	1	1	1	100	1	40	1.0798
35	553059533	121620622	121620621	1250	578.00	597.00	19.00	0.784	1	1	1	100	1	19	1.0329
36	553059583	121617342	121627227	1250	462.00	543.00	81.00	3.613	1	1	1	100	1	81	1.1753
37	553059583	121627227	121617342	1250	281.00	285.00	4.00	0.238	1	1	1	100	1	4	1.0142
38	553060375	121615280	121625962	1000	265.00	260.00	-5.00	0.309	1	1	1	100	1	-5	0.9811
39	553060375	121625962	121615280	1000	303.00	292.00	-11.00	0.638	1	1	1	100	1	-11	0.9637
40	553060427	121607518	121625962	1000	215.00	254.00	39.00	2.547	1	1	1	100	1	39	1.1814
41	553060427	121625962	121607518	1000	158.00	157.00	-1.00	0.080	1	1	1	100	1	-1	0.9937
42	554374956	121605426	121607828	1000	158.00	225.00	67.00	4.842	1	1	1	100	1	67	1.4241
43	554374956	121607828	121605426	1000	161.00	211.00	50.00	3.666	1	1	1	100	1	50	1.3106
44	554375068	121607398	121621276	1250	606.00	643.00	37.00	1.481	1	1	1	100	1	37	1.0611
45	554375068	121621276	121607398	1250	597.00	616.00	19.00	0.772	1	1	1	100	1	19	1.0318
46	554375258	121618893	121618894	1600	680.00	640.00	-40.00	1.557	1	1	1	100	1	-40	0.9412
47	554375258	121618894	121618893	1600	592.00	502.00	-90.00	3.848	1	1	1	100	1	-90	0.8480
48	554375447	121633812	121638072	1250	276.00	216.00	-60.00	3.825	1	1	1	100	1	-60	0.7826
49	554375447	121638072	121633812	1250	259.00	226.00	-33.00	2.119	1	1	1	100	1	-33	0.8726
50	554377074	121630542	121613030	1250	230.00	206.00	-24.00	1.625	1	1	1	100	1	-24	0.8957
51	554377177	121608954	121613998	1000	56.00	99.00	43.00	4.884	1	1	1	100	1	43	1.7679
52	554377177	121613998	121608954	1000	256.00	290.00	34.00	2.058	1	1	1	100	1	34	1.1328
53	554377198	121611229	121625867	1000	1124.00	1057.00	-67.00	2.029	1	1	2	169	1	-67	0.9404
54	554377210	121608953	121608954	1000	25.00	31.00	6.00	1.134	1	1	1	100	1	6	1.2400
55	554377210	121608954	121608953	1000	134.00	102.00	-32.00	2.946	1	1	1	100	1	-32	0.7612
56	554377232	121607527	121607528	1000	86.00	93.00	7.00	0.740	1	1	1	100	1	7	1.0814
57	554377232	121607528	121607527	1000	355.00	340.00	-15.00	0.805	1	1	1	100	1	-15	0.9577
58	554377279	121632861	121632862	1000	67.00	73.00	6.00	0.717	1	1	1	100	1	6	1.0896
59	554377279	121632862	121632861	1000	179.00	168.00	-11.00	0.835	1	1	1	100	1	-11	0.9385
60	554377290	121613997	121637264	1000	304.00	308.00	4.00	0.229	1	1	1	100	1	4	1.0132
61	554377290	121637264	121613997	1000	278.00	258.00	-20.00	1.222	1	1	1	100	1	-20	0.9281
62	554377351	121631201	121640482	1000	733.00	819.00	86.00	3.087	1	1	2	110	1	86	1.1173
63	554377351	121640482	121631201	1000	268.00	280.00	12.00	0.725	1	1	1	100	1	12	1.0448
64	554377363	121615326	121615327	1000	172.00	169.00	-3.00	0.230	1	1	1	100	1	-3	0.9826
65	554377363	121615327	121615326	1000	35.00	34.00	-1.00	0.170	1	1	1	100	1	-1	0.9714
66	554377394	121613315	121613316	1000	399.00	385.00	-14.00	0.707	1	1	1	100	1	-14	0.9649
67	554377394	121613316	121613315	1000	197.00	187.00	-10.00	0.722	1	1	1	100	1	-10	0.9492
68	554391692	121611128	121611129	1250	687.00	690.00	3.00	0.114	1	1	1	100	1	3	1.0044
69	554391692	121611129	121611128	1250	366.00	358.00	-8.00	0.420	1	1	1	100	1	-8	0.9781
70	554434772	121608606	121608607	1250	659.00	656.00	-3.00	0.117	1	1	1	100	1	-3	0.9954
71	554434772	121608607	121608606	1250	710.00	764.00	54.00	1.989	1	1	2	107	1	54	1.0761
72	554435128	121611265	121611266	3500	1723.00	1447.00	-276.00	6.933	1	0	2	258	0	-276	0.8398
73	554435131	121620300	121606031	1600	572.00	526.00	-46.00	1.963	1	1	1	100	1	-46	0.9196
74	554435150	121619343	121606671	3500	927.00	681.00	-246.00	8.676	1	0	2	139	0	-246	0.7346
75	554440201	121612670	121630621	1350	245.00	283.00	38.00	2.339	1	1	1	100	1	38	1.1551
76	554440201	121630621	121612670	1350	123.00	72.00	-51.00	5.165	1	0	1	100	1	-51	0.5854
77	554446206	121616291	121633023	1250	666.00	503.00	-163.00	6.742	1	0	1	100	0	-163	0.7553
78	554446206	121633023	121616291	1250	346.00	288.00	-58.00	3.258	1	1	1	100	1	-58	0.8324
79	554446721	121618027	121618028	1000	353.00	345.00	-8.00	0.428	1	1	1	100	1	-8	0.9773
80	554446721	121618028	121618027	1000	154.00	174.00	20.00	1.562	1	1	1	100	1	20	1.1299
81	554447300	121617552	121618845	1250	211.00	189.00	-22.00	1.556	1	1	1	100	1	-22	0.8957
82	554447665	121626893	121639389	1250	384.00	303.00	-81.00	4.370	1	1	1	100	1	-81	0.7891
83	554447665	121639389	121626893	1250	559.00	422.00	-137.00	6.186	1	0	1	100	0	-137	0.7549
84	554448247	121610747	121634564	3500	1922.00	1883.00	-39.00	0.894	1	1	2	288	1	-39	0.9797
85	554449619	121623860	121630001	1600	1581.00	1424.00	-157.00	4.050	1	1	2	237	1	-157	0.9007
86	554449621	121613278	121613074	1600	1319.00	1348.00	29.00	0.794	1	1	2	198	1	29	1.0220
87	554449624	121613029	121613028	1250	708.00	700.00	-8.00	0.302	1	1	2	106	1	-8	0.9887
88	554449631	121613279	121613029	1250	473.00	447.00	-26.00	1.212	1	1	1	100	1	-26	0.9450
89	554449632	121626390	121610168	1250	473.00	447.00	-26.00	1.212	1	1	1	100	1	-26	0.9450
90	554449634	121610169	121626390	1250	708.00	700.00	-8.00	0.302	1	1	2	106	1	-8	0.9887
91	554449641	121617528	121627514	1250	818.00	832.00	14.00	0.487	1	1	2	123	1	14	1.0171
92	554449641	121627514	121617528	1250	987.00	1002.00	15.00	0.476	1	1	2	148	1	15	1.0152
93	554451784	121622639	121627731	1250	166.00	170.00	4.00	0.309	1	1	1	100	1	4	1.0241
94	554451784	121627731	121622639	1250	69.00	95.00	26.00	2.871	1	1	1	100	1	26	1.3768
95	554451789	121633360	121638313	1250	367.00	342.00	-25.00	1.328	1	1	1	100	1	-25	0.9319
96	554451789	121638313	121633360	1250	469.00	372.00	-97.00	4.730	1	1	1	100	1	-97	0.7932
97	554451856	121611431	121613185	1250	511.00	451.00	-60.00	2.736	1	1	1	100	1	-60	0.8826
98	554451856	121613185	121611431	1250	327.00	320.00	-7.00	0.389	1	1	1	100	1	-7	0.9786
99	554451880	121613186	121617646	1250	507.00	490.00	-17.00	0.761	1	1	1	100	1	-17	0.9665
100	554451880	121617646	121613186	1250	329.00	313.00	-16.00	0.893	1	1	1	100	1	-16	0.9514
101	554455131	121615905	121636538	1500	299.00	230.00	-69.00	4.243	1	1	1	100	1	-69	0.7692
102	554455131	121636538	121615905	1500	653.00	499.00	-154.00	6.417	1	0	1	100	0	-154	0.7642
103	554455133	121628881	121640820	1250	1217.00	1116.00	-101.00	2.957	1	1	2	183	1	-101	0.9170
104	554455133	121640820	121628881	1250	594.00	588.00	-6.00	0.247	1	1	1	100	1	-6	0.9899
105	554455137	121641566	121641577	1500	299.00	260.00	-39.00	2.333	1	1	1	100	1	-39	0.8696
106	554455137	121641577	121641566	1500	666.00	679.00	13.00	0.501	1	1	1	100	1	13	1.0195
107	554455190	121608117	121627871	1000	1023.00	1005.00	-18.00	0.565	1	1	2	153	1	-18	0.9824
108	554455195	121626938	121622071	1000	672.00	655.00	-17.00	0.660	1	1	1	100	1	-17	0.9747
109	554455203	121629133	121632803	1000	1397.00	1335.00	-62.00	1.678	1	1	2	210	1	-62	0.9556
110	554463836	121891255	121891554	1250	207.00	195.00	-12.00	0.846	1	1	1	100	1	-12	0.9420
111	554463836	121891554	121891255	1250	170.00	144.00	-26.00	2.075	1	1	1	100	1	-26	0.8471
112	554463839	121892302	121898485	1250	281.00	341.00	60.00	3.402	1	1	1	100	1	60	1.2135
113	554463839	121898485	121892302	1000	291.00	312.00	21.00	1.209	1	1	1	100	1	21	1.0722
114	554464186	121897835	121898048	1350	326.00	344.00	18.00	0.983	1	1	1	100	1	18	1.0552

115	554464186	121898048	121897835	1350	231.00	148.00	-83.00		6.029	1	0	1	100	1	-83	0.6407
116	554471594	121894456	121896626	1250	425.00	537.00	112.00		5.107	1	0	1	100	0	112	1.2635
117	554471594	121896626	121894456	1250	399.00	456.00	57.00		2.757	1	1	1	100	1	57	1.1429
118	562717684	121634810	121618689	2500	137.00	144.00	7.00		0.591	1	1	1	100	1	7	1.0511
119	562717688	121631171	121622408	3000	2264.00	2240.00	-24.00		0.506	1	1	2	340	1	-24	0.9894
120	562718718	121623337	121616537	1600	241.00	258.00	17.00		1.076	1	1	1	100	1	17	1.0705
121	562718814	121623337	121619283	1600	118.00	131.00	13.00		1.165	1	1	1	100	1	13	1.1102
122	562718826	121619282	121611326	1600	425.00	399.00	-26.00		1.281	1	1	1	100	1	-26	0.9388
123	562718828	121633872	121619282	2500	1204.00	1060.00	-144.00		4.280	1	1	2	181	1	-144	0.8804
124	562718902	121638465	121606716	2500	1112.00	1041.00	-71.00		2.164	1	1	2	167	1	-71	0.9362
125	562718934	121606715	121621401	1250	620.00	616.00	-4.00		0.161	1	1	1	100	1	-4	0.9935
126	562718939	121622425	121624497	1250	118.00	121.00	3.00		0.274	1	1	1	100	1	3	1.0254
127	562719055	121606758	121628638	1600	281.00	276.00	-5.00		0.300	1	1	1	100	1	-5	0.9822
128	562719056	121628977	121628638	1600	142.00	150.00	8.00		0.662	1	1	1	100	1	8	1.0563
129	562719167	121608198	121609349	1000	445.00	492.00	47.00		2.171	1	1	1	100	1	47	1.1056
130	562719167	121609349	121608198	1000	504.00	572.00	68.00		2.932	1	1	1	100	1	68	1.1349
131	562754853	121607865	121615675	1350	77.00	62.00	-15.00		1.799	1	1	1	100	1	-15	0.8052
132	562754853	121615675	121607865	1350	161.00	165.00	4.00		0.313	1	1	1	100	1	4	1.0248
133	578633027	121617752	121622399	1000	561.00	565.00	4.00		0.169	1	1	1	100	1	4	1.0071
134	578633027	121622399	121617752	1000	284.00	330.00	46.00		2.625	1	1	1	100	1	46	1.1620
135	578633032	121624987	121617345	3750	576.00	551.00	-25.00		1.053	1	1	1	100	1	-25	0.9566
136	578633033	121622399	121624987	1250	695.00	643.00	-52.00		2.010	1	1	1	100	1	-52	0.9252
137	578633920	121893996	121890163	1600	33.00	16.00	-17.00		3.435	1	1	1	100	1	-17	0.4848
138	589009150	121633940	121617422	2500	720.00	672.00	-48.00		1.819	1	1	2	108	1	-48	0.9333
139	589027265	121617345	121627577	2500	634.00	732.00	98.00		3.750	1	1	1	100	1	98	1.1546
140	589027588	121606183	121606182	3200	614.00	629.00	15.00		0.602	1	1	1	100	1	15	1.0244
141	589027602	121611481	121629615	1000	129.00	146.00	17.00		1.450	1	1	1	100	1	17	1.1318
142	589027602	121629615	121611481	1000	708.00	689.00	-19.00		0.719	1	1	2	106	1	-19	0.9732
143	589028095	121631827	121637842	1350	726.00	646.00	-80.00		3.054	1	1	2	109	1	-80	0.8898
144	589028095	121637842	121631827	1350	423.00	446.00	23.00		1.103	1	1	1	100	1	23	1.0544
145	589028096	121621564	121631827	1350	657.00	646.00	-11.00		0.431	1	1	1	100	1	-11	0.9833
146	589028097	121631827	121628756	1350	426.00	446.00	20.00		0.958	1	1	1	100	1	20	1.0469
147	589028787	121610595	121638341	1600	804.00	688.00	-116.00		4.247	1	1	2	121	1	-116	0.8557
148	589028904	121610360	121610359	1600	40.00	50.00	10.00		1.491	1	1	1	100	1	10	1.2500
149	590512691	121624430	121628686	2500	588.00	525.00	-63.00		2.671	1	1	1	100	1	-63	0.8929
150	590512691	121628686	121624430	2500	566.00	560.00	-6.00		0.253	1	1	1	100	1	-6	0.9894
151	590513273	121619874	121630244	2500	620.00	702.00	82.00		3.189	1	1	1	100	1	82	1.1323
152	590522817	121894999	121898078	1250	541.00	541.00	0.00		0.000	1	1	1	100	1	0	1.0000
153	590522817	121898078	121894999	1250	313.00	374.00	61.00		3.291	1	1	1	100	1	61	1.1949
154	590522819	121893930	121898078	1000	227.00	147.00	-80.00		5.850	1	0	1	100	1	-80	0.6476
155	590522819	121898078	121893930	1000	63.00	49.00	-14.00		1.871	1	1	1	100	1	-14	0.7778
156	590523489	121606358	121606359	1000	45.00	42.00	-3.00		0.455	1	1	1	100	1	-3	0.9333
157	590523489	121606359	121606358	1000	7.00	10.00	3.00		1.029	1	1	1	100	1	3	1.4286
158	590523492	121629637	121629638	2000	584.00	566.00	-18.00		0.751	1	1	1	100	1	-18	0.9692
159	590523492	121629638	121629637	1600	348.00	288.00	-60.00		3.365	1	1	1	100	1	-60	0.8276
160	590523496	121610586	121610587	2500	719.00	680.00	-39.00		1.475	1	1	2	108	1	-39	0.9458
161	590523496	121610587	121610586	1250	435.00	428.00	-7.00		0.337	1	1	1	100	1	-7	0.9839
162	706770675	121611129	121627670	1000	699.00	594.00	-105.00		4.130	1	1	1	100	0	-105	0.8498
163	706770675	121627670	121611129	1000	319.00	314.00	-5.00		0.281	1	1	1	100	1	-5	0.9843
164	706770682	121611129	121615161	1000	233.00	274.00	41.00		2.575	1	1	1	100	1	41	1.1760
165	706770682	121615161	121611129	1000	137.00	171.00	34.00		2.740	1	1	1	100	1	34	1.2482
166	706770693	121611575	121612979	2000	146.00	107.00	-39.00		3.468	1	1	1	100	1	-39	0.7329
167	706770693	121612979	121611575	2000	68.00	49.00	-19.00		2.484	1	1	1	100	1	-19	0.7206
168	722014758	121610373	121610595	1600	429.00	451.00	22.00		1.049	1	1	1	100	1	22	1.0513
169	724702427	121611229	121624577	1000	146.00	145.00	-1.00		0.083	1	1	1	100	1	-1	0.9932
170	724702427	121624577	121611229	1000	17.00	25.00	8.00		1.746	1	1	1	100	1	8	1.4706
171	724784432	121611313	121626563	3500	1636.00	1684.00	48.00		1.178	1	1	2	245	1	48	1.0293
172	725411687	121630926	121612450	3200	681.00	703.00	22.00		0.836	1	1	1	100	1	22	1.0323
173	726416568	121614069	121636492	1000	236.00	239.00	3.00		0.195	1	1	1	100	1	3	1.0127
174	726416568	121636492	121614069	1000	539.00	531.00	-8.00		0.346	1	1	1	100	1	-8	0.9852
175	727329438	121623610	121607393	4200	3134.00	3157.00	23.00		0.410	1	1	2	470	1	23	1.0073
176	728212505	121640428	121616321	3500	1531.00	1590.00	59.00		1.494	1	1	2	230	1	59	1.0385
177	731162663	121630691	121623610	1600	456.00	601.00	145.00		6.307	1	0	1	100	0	145	1.3180
178	731279538	121621886	121620508	3500	913.00	841.00	-72.00		2.431	1	1	2	137	1	-72	0.9211
179	731307080	121608914	121610352	1400	334.00	462.00	128.00		6.416	1	0	1	100	0	128	1.3832
180	731307080	121610352	121608914	1400	291.00	412.00	121.00		6.454	1	0	1	100	0	121	1.4158
181	732654992	121606182	121622217	4200	1949.00	1922.00	-27.00		0.614	1	1	2	292	1	-27	0.9861
182	732775505	121622364	121626633	1250	371.00	281.00	-90.00		4.985	1	1	1	100	1	-90	0.7574
183	732775505	121626633	121622364	1250	732.00	605.00	-127.00		4.912	1	1	2	110	0	-127	0.8265
184	733454280	121613997	121623158	1000	146.00	133.00	-13.00		1.101	1	1	1	100	1	-13	0.9110
185	733454280	121623158	121613997	1000	30.00	36.00	6.00		1.044	1	1	1	100	1	6	1.2000
186	733497453	121608944	121624018	1250	481.00	462.00	-19.00		0.875	1	1	1	100	1	-19	0.9605
187	734207708	121622217	121639301	1600	423.00	415.00	-8.00		0.391	1	1	1	100	1	-8	0.9811
188	735634557	121609534	121613030	1250	442.00	417.00	-25.00		1.206	1	1	1	100	1	-25	0.9434
189	736191518	121625434	121619338	1600	345.00	305.00	-40.00		2.219	1	1	1	100	1	-40	0.8841
190	736975863	121620669	121622827	1250	361.00	370.00	9.00		0.471	1	1	1	100	1	9	1.0249
191	736975863	121622827	121620669	1250	657.00	628.00	-29.00		1.144	1	1	1	100	1	-29	0.9559
192	738082397	121608870	121615326	1000	200.00	260.00	60.00		3.956	1	1	1	100	1	60	1.3000
193	738082397	121615326	121608870	1000	678.00	690.00	12.00		0.459	1	1	1	100	1	12	1.0177
194	741673148	121632162	121625454	1600	248.00	211.00	-37.00		2.442	1	1	1	100	1	-37	0.8508
195	741855033	121606670	121613276	1250	511.00	501.00	-10.00		0.445	1	1	1	100	1	-10	0.9804
196	741855033	121613276	121606670	1250	481.00	495.00	14.00		0.634	1	1	1	100	1	14	1.0291
197	742562318	121612353	121636229	3500	605.00	679.00	74.00		2.921	1	1	1	100	1	74	1.1223
198	745996482	121636862	121628201	3500	1072.00	947.00	-125.00		3.934	1	1	2	161	1	-125	0.8834
199	746736228	121624205	121610596	1600	975.00	821.00	-154.00		5.139	1	0	2	146	0	-154	0.8421
200	747277847	121637264	121640828	1000	154.00	154.00	0.00		0.000	1	1	1	100	1	0	1.0000
201	747277847	121640828	121637264	1000	45.00	51.00	6.00		0.866	1	1	1	100	1	6	1.1333
202	747340238	121637498	121612287	4200	2861.00	2625.00	-236.00		4.506	1	1	2	429	1	-236	0.9175
203	747491963	121623980	121632230	1000	214.00	213.00	-1.00		0.068	1	1	1	100	1	-1	0.9953
204	747491963	121632230	121623980	1000	116.00	118.00	2.00		0.185	1	1	1	100	1	2	1.0172
205	748372248	121610075	121634807	1250	92.00	96.00	4.00		0.413	1	1	1	100	1	4	1.0435
206	748372248	121634807	121610075	1250	208.00	203.00	-5.00		0.349	1	1	1	100	1	-5	0.9760
207	749070638	121618690	121636392	3000	739.00	761.00	22.00		0.803	1	1	2	111	1	22	1.0298
208	749995697	121608612	121614756	1250	447.00	534.00	87.00		3.928	1	1	1	100	1	87	1.1946
209	749995697	121614756	121608612	1250	244.00	277.00	33.00		2.045	1	1	1	100	1	33	1.1352
210	750014118	121615439	121611010	2500	712.00	697.00	-15.00		0.565	1	1	2	107	1	-15	0.9789
211	750263193	121641108	121611644	4200	1126.00	948.00	-178.00		5.528	1	0	2	169	0	-178	0.8419
212	750364877	121635539	121641402	1000	61.00	59.00	-2.00		0.258	1	1	1	100	1	-2	0.9672
213	750364877	121641402	121635539	1000	6.00	9.00	3.00		1.095	1	1	1	100	1	3	1.5000
214	750717080	121630244	121640459	4200	4357.00	4211.00	-146.00		2.231	1	1	2	654	1	-146	0.9665
215	751024112	121635051	121633455	3200	1333.00	1285.00	-48.00		1.327	1	1	2	200	1	-48	0.9640
216	751108037	121613700	121623860	6300	3600.00	4002.00	402.00		6.520	1	0	2	540	1	402	1.1117
217	751735358	121642477	121621121	5000	1620.00	1570.00	-50.00		1.252	1	1	2	243	1	-50	0.9691
218	752452380	121629477	121611969	1000	732.00	734.00	2.00		0.074	1	1	2	110	1	2	1.0027
219	752528192	121613074	121627124	6300	3563.00	3950.00	387.00		6.314	1	0	2	534	1	387	1.1086
220	2147476835	121630496	121900545	1000	172.00	273.00	101.00		6.771	1	0	1	100	0	101	1.5872
221	2147476835	121900545	121630496	1000	129.00	150.00	21.00		1.778	1	1	1	100	1	21	1.1628
222	2147482944	121900707	121612220	2000	350.00	427.00	77.00		3.907	1	1	1	100	1	77	1.2200
223	2147482953	121900709	121900710	1000	38.00	46.00	8.00		1.234	1	1	1	100	1	8	1.2105
224	2147482953	121900710	121900709	1000	271.00	226.00	-45.00		2.855	1	1	1	100	1	-45	0.8339
225	2147482974	121627782	121900717	1000	228.00	306.00	78.00		4.774	1	1	1	100	1	78	1.3421
226	2147482974	121900717	121627782	1000	413.00	464.00	51.00		2.435	1	1	1	100	1	51	1.1235
227	2147482982	121900720	121607483	1250	1084.00	1094.00	10.00		0.303	1	1	2	163	1	10	1.0092
228	2147482983	121623487	121900721	1250	1371.00	1327.00	-44.00		1.198	1	1	2	206	1	-44	0.9679
229	2147482986	121640508	121900722	1250	523.00	560.00	37.00		1.590	1	1	1	100	1	37	1.0707
230	2147482986	121900722	121640508	1250	392.00	414.00	22.00		1.096	1	1	1	100	1	22	1.0561
231	2147482987	121607393	121900723	3200	1305.00	1258.00	-47.00		1.313	1	1	2	196	1	-47	0.9640
232	2147482990	121900724	121622399	3750	1612.00	1740.00	128.00		3.127	1	1	2	242	1	128	1.0794
233	2147483011	121612670	121900733	1350	234.00	229.00	-5.00		0.329	1	1	1	100	1	-5	0.9786
234	2147483011	121900733	121612670	1350	254.00	284.00	30.00		1.829	1	1	1	100	1	30	1.1181
235	2147483016	121629163	121900735	1350	323.00	205.00	-118.00		7.262	1	0	1	100	0	-118	0.6347
236	2147483016	121900735	121629163	1350	413.00	437.00	24.00		1.164	1	1	1	100	1	24	1.0581

237	2147483021	121900737	121900738	1350	65.00	50.00	-15.00		1.978	1	1	1	100	1	-15	0.7692
238	2147483021	121900738	121900737	1350	59.00	95.00	36.00		4.103	1	1	1	100	1	36	1.6102
239	2147483026	121609235	121900740	1350	289.00	383.00	94.00		5.128	1	0	1	100	1	94	1.3253
240	2147483026	121900740	121609235	1350	250.00	251.00	1.00		0.063	1	1	1	100	1	1	1.0040
241	2147483038	121622881	121900746	1350	362.00	334.00	-28.00		1.501	1	1	1	100	1	-28	0.9227
242	2147483038	121900746	121622881	1350	299.00	324.00	25.00		1.416	1	1	1	100	1	25	1.0836
243	2147483058	121897811	121900757	1350	94.00	72.00	-22.00		2.415	1	1	1	100	1	-22	0.7660
244	2147483058	121900757	121897811	1350	82.00	40.00	-42.00		5.378	1	0	1	100	1	-42	0.4878
245	2147483074	121608870	121900764	1000	381.00	367.00	-14.00		0.724	1	1	1	100	1	-14	0.9633
246	2147483074	121900764	121608870	1000	69.00	58.00	-11.00		1.380	1	1	1	100	1	-11	0.8406
247	2147483082	121608870	121900768	1000	123.00	127.00	4.00		0.358	1	1	1	100	1	4	1.0325
248	2147483090	121900771	121900772	1000	52.00	47.00	-5.00		0.711	1	1	1	100	1	-5	0.9038
249	2147483090	121900772	121900771	1000	29.00	69.00	40.00		5.714	1	0	1	100	1	40	2.3793
250	2147483095	121900739	450053962	1350	66.00	85.00	19.00		2.187	1	1	1	100	1	19	1.2879
251	2147483095	450053962	121900739	1350	151.00	217.00	66.00		4.866	1	1	1	100	1	66	1.4371
252	2147483108	121898276	450073308	1350	20.00	58.00	38.00		6.085	1	0	1	100	1	38	2.9000
253	2147483108	450073308	121898276	1350	59.00	63.00	4.00		0.512	1	1	1	100	1	4	1.0678
254	2147483502	121900851	121607917	4200	1682.00	1586.00	-96.00		2.375	1	1	2	252	1	-96	0.9429
255	2147483504	121607918	121900852	4200	643.00	622.00	-21.00		0.835	1	1	1	100	1	-21	0.9673
256	2147483512	121894203	121900899	1350	124.00	113.00	-11.00		1.010	1	1	1	100	1	-11	0.9113
257	2147483512	121900899	121894203	1350	149.00	126.00	-23.00		1.961	1	1	1	100	1	-23	0.8456
258	2147483514	121900951	121892925	1600	128.00	139.00	11.00		0.952	1	1	1	100	1	11	1.0859
259	2147483516	121891726	450344631	1350	416.00	352.00	-64.00		3.266	1	1	1	100	1	-64	0.8462
260	2147483516	450344631	121891726	1350	42.00	24.00	-18.00		3.133	1	1	1	100	1	-18	0.5714
261	2147483535	121637306	450344633	4200	1596.00	1916.00	320.00		7.636	1	0	2	239	0	320	1.2005
262	2147483540	121614349	450344628	1250	580.00	537.00	-43.00		1.820	1	1	1	100	1	-43	0.9259
263	2147483540	450344628	121614349	1250	159.00	153.00	-6.00		0.480	1	1	1	100	1	-6	0.9623
264	2147483550	121900929	121606076	1250	60.00	66.00	6.00		0.756	1	1	1	100	1	6	1.1000
265	2147483551	121606077	121900927	1250	347.00	335.00	-12.00		0.650	1	1	1	100	1	-12	0.9654
266	2147483563	121614100	121900980	1350	140.00	136.00	-4.00		0.341	1	1	1	100	1	-4	0.9714
267	2147483563	121900980	121614100	1350	407.00	368.00	-39.00		1.981	1	1	1	100	1	-39	0.9042
268	2147483572	121900979	450053962	1350	151.00	136.00	-15.00		1.252	1	1	1	100	1	-15	0.9007
269	2147483572	450053962	121900979	1350	66.00	50.00	-16.00		2.101	1	1	1	100	1	-16	0.7576
270	2147483584	121900875	121900876	2500	337.00	387.00	50.00		2.628	1	1	1	100	1	50	1.1484
271	2147483592	121900904	121894400	2500	551.00	593.00	42.00		1.756	1	1	1	100	1	42	1.0762
					140934	**138505**	**-2429**			**271**	**242**			**251**		

Average GEH **2.166**

AM Peak Light Traffic 25/08/11

					Observed	Modelled	Difference
No.	**Link Number**	**From Node**	**To Node**	**Link Capacity (PCU's)**	**Light Traffic**	**Light Traffic**	**Light Traffic**
1	50709	121890062	121898078	1250	276.00	203.00	-73.00
2	50709	121898078	121890062	1250	584.00	468.00	-116.00
3	51535	121891726	121893802	1350	27.00	13.00	-14.00
4	51535	121893802	121891726	1350	127.00	125.00	-2.00
5	51625	121892991	121891635	1600	1191.00	1005.00	-186.00
6	51746	121890227	121890300	1250	388.00	336.00	-52.00
7	51746	121890300	121890227	1250	492.00	444.00	-48.00
8	52177	121893275	121894805	1250	2.00	5.00	3.00
9	52177	121894805	121893275	1250	7.00	7.00	0.00
10	52550	121890857	121892152	1250	414.00	345.00	-69.00
11	52550	121892152	121890857	1250	701.00	525.00	-176.00
12	52685	121896527	121894461	2500	125.00	140.00	15.00
13	52878	121894049	121896193	1000	183.00	215.00	32.00
14	52878	121896193	121894049	1000	253.00	212.00	-41.00
15	52944	121893969	121897273	1350	50.00	39.00	-11.00
16	52944	121897273	121893969	1350	219.00	245.00	26.00
17	551425077	121891403	121890515	1600	240.00	273.00	33.00
18	551425084	121893943	121892794	1600	329.00	400.00	71.00
19	551425144	121891013	121895862	1250	91.00	148.00	57.00
20	551425145	121895862	121891012	1250	1171.00	1073.00	-98.00
21	551425147	121890589	121890590	1600	35.00	45.00	10.00
22	551425275	121621988	121621989	3500	1909.00	1820.00	-89.00
23	553058331	121620084	121623438	2500	1144.00	1119.00	-25.00
24	553058441	121605348	121614253	3500	881.00	979.00	98.00
25	553059065	121611721	121611722	1000	213.00	205.00	-8.00
26	553059073	121610601	121610600	1600	292.00	324.00	32.00
27	553059106	121605398	121619874	2500	737.00	768.00	31.00
28	553059107	121619874	121621120	2500	133.00	88.00	-45.00
29	553059109	121606598	121616305	2500	159.00	145.00	-14.00
30	553059113	121890242	121891605	1600	203.00	122.00	-81.00
31	553059417	121639135	121896281	1600	100.00	87.00	-13.00
32	553059523	121622941	121625886	1250	1266.00	1016.00	-250.00
33	553059524	121635100	121607850	1250	866.00	746.00	-120.00
34	553059533	121620621	121620622	1250	488.00	525.00	37.00
35	553059533	121620622	121620621	1250	568.00	582.00	14.00
36	553059583	121617342	121627227	1250	458.00	535.00	77.00
37	553059583	121627227	121617342	1250	279.00	280.00	1.00
38	553060375	121615280	121625962	1000	260.00	254.00	-6.00
39	553060375	121625962	121615280	1000	297.00	287.00	-10.00
40	553060427	121607518	121625962	1000	213.00	250.00	37.00
41	553060427	121625962	121607518	1000	155.00	153.00	-2.00
42	554374956	121605426	121607828	1000	149.00	217.00	68.00
43	554374956	121607828	121605426	1000	147.00	197.00	50.00
44	554375068	121607398	121621276	1250	598.00	634.00	36.00
45	554375068	121621276	121607398	1250	591.00	610.00	19.00
46	554375258	121618893	121618894	1600	665.00	624.00	-41.00
47	554375258	121618894	121618893	1600	584.00	493.00	-91.00
48	554375447	121633812	121638072	1250	273.00	213.00	-60.00
49	554375447	121638072	121633812	1250	257.00	222.00	-35.00
50	554377074	121630542	121613030	1250	219.00	197.00	-22.00
51	554377177	121608954	121613998	1000	52.00	95.00	43.00
52	554377177	121613998	121608954	1000	252.00	284.00	32.00
53	554377198	121611229	121625867	1000	1104.00	1039.00	-65.00
54	554377210	121608953	121608954	1000	25.00	31.00	6.00
55	554377210	121608954	121608953	1000	131.00	100.00	-31.00
56	554377232	121607527	121607528	1000	84.00	90.00	6.00
57	554377232	121607528	121607527	1000	352.00	337.00	-15.00
58	554377279	121632861	121632862	1000	60.00	65.00	5.00
59	554377279	121632862	121632861	1000	178.00	165.00	-13.00
60	554377290	121613997	121637264	1000	285.00	292.00	7.00
61	554377290	121637264	121613997	1000	269.00	251.00	-18.00
62	554377351	121631201	121640482	1000	716.00	801.00	85.00
63	554377351	121640482	121631201	1000	254.00	262.00	8.00
64	554377363	121615326	121615327	1000	167.00	163.00	-4.00
65	554377363	121615327	121615326	1000	27.00	26.00	-1.00
66	554377394	121613315	121613316	1000	397.00	384.00	-13.00
67	554377394	121613316	121613315	1000	195.00	184.00	-11.00
68	554391692	121611128	121611129	1250	678.00	681.00	3.00
69	554391692	121611129	121611128	1250	353.00	346.00	-7.00
70	554434772	121608606	121608607	1250	631.00	627.00	-4.00
71	554434772	121608607	121608606	1250	698.00	751.00	53.00
72	554435128	121611265	121611266	3500	1641.00	1359.00	-282.00
73	554435131	121620300	121606031	1600	545.00	504.00	-41.00
74	554435150	121619343	121606671	3500	883.00	651.00	-232.00
75	554440201	121612670	121630621	1350	239.00	275.00	36.00
76	554440201	121630621	121612670	1350	120.00	67.00	-53.00
77	554446206	121616291	121633023	1250	648.00	495.00	-153.00
78	554446206	121633023	121616291	1250	338.00	282.00	-56.00
79	554446721	121618027	121618028	1000	352.00	342.00	-10.00
80	554446721	121618028	121618027	1000	153.00	172.00	19.00
81	554447300	121617552	121618845	1250	201.00	182.00	-19.00
82	554447665	121626893	121639389	1250	365.00	295.00	-70.00
83	554447665	121639389	121626893	1250	535.00	409.00	-126.00
84	554448247	121610747	121634564	3500	1831.00	1798.00	-33.00
85	554449619	121623860	121630001	1600	1542.00	1385.00	-157.00
86	554449621	121613278	121613074	1600	1296.00	1325.00	29.00
87	554449624	121613029	121613028	1250	702.00	692.00	-10.00
88	554449631	121613279	121613029	1250	465.00	436.00	-29.00
89	554449632	121626390	121610168	1250	465.00	436.00	-29.00
90	554449634	121610169	121626390	1250	702.00	692.00	-10.00
91	554449641	121617528	121627514	1250	809.00	821.00	12.00
92	554449641	121627514	121617528	1250	962.00	979.00	17.00
93	554451784	121622639	121627731	1250	165.00	164.00	-1.00
94	554451784	121627731	121622639	1250	66.00	90.00	24.00
95	554451789	121633360	121638313	1250	355.00	331.00	-24.00
96	554451789	121638313	121633360	1250	458.00	359.00	-99.00
97	554451856	121611431	121613185	1250	487.00	426.00	-61.00
98	554451856	121613185	121611431	1250	309.00	303.00	-6.00
99	554451880	121613186	121617646	1250	485.00	469.00	-16.00
100	554451880	121617646	121613186	1250	311.00	300.00	-11.00
101	554455131	121615905	121636538	1500	295.00	226.00	-69.00
102	554455131	121636538	121615905	1500	648.00	492.00	-156.00
103	554455133	121628881	121640820	1250	1195.00	1103.00	-92.00
104	554455133	121640820	121628881	1250	580.00	577.00	-3.00
105	554455137	121641566	121641577	1500	291.00	253.00	-38.00
106	554455137	121641577	121641566	1500	652.00	668.00	16.00
107	554455190	121608117	121627871	1000	996.00	977.00	-19.00
108	554455195	121626938	121622071	1000	644.00	629.00	-15.00
109	554455203	121629133	121632803	1000	1375.00	1315.00	-60.00
110	554463836	121891255	121891554	1250	195.00	184.00	-11.00
111	554463836	121891554	121891255	1250	158.00	135.00	-23.00
112	554463839	121892302	121898485	1250	264.00	325.00	61.00
113	554463839	121898485	121892302	1000	276.00	293.00	17.00
114	554464186	121897835	121898048	1350	302.00	328.00	26.00

		RESULT =	**88.19%**		RESULT =	**92.62%**		
		REQD =	85.00%		REQD =	85.00%		
GEH	***COUNT***	***GEH TEST***	***CLASS TEST***	***Target Difference***	***Flow Test***	***ACT DIFF***	***FACTOR***
4.717	1	1	1	100	1	-73	0.7355
5.058	1	0	1	100	0	-116	0.8014
3.130	1	1	1	100	1	-14	0.4815
0.178	1	1	1	100	1	-2	0.9843
5.613	1	0	2	179	0	-186	0.8438
2.733	1	1	1	100	1	-52	0.8660
2.219	1	1	1	100	1	-48	0.9024
1.604	1	1	1	100	1	3	2.5000
0.000	1	1	1	100	1	0	1.0000
3.542	1	1	1	100	1	-69	0.8333
7.109	1	0	2	105	0	-176	0.7489
1.303	1	1	1	100	1	15	1.1200
2.268	1	1	1	100	1	32	1.1749
2.689	1	1	1	100	1	-41	0.8379
1.649	1	1	1	100	1	-11	0.7800
1.707	1	1	1	100	1	26	1.1187
2.060	1	1	1	100	1	33	1.1375
3.719	1	1	1	100	1	71	1.2158
5.214	1	0	1	100	1	57	1.6264
2.926	1	1	2	176	1	-98	0.9163
1.581	1	1	1	100	1	10	1.2857
2.061	1	1	2	286	1	-89	0.9534
0.743	1	1	2	172	1	-25	0.9781
3.214	1	1	2	132	1	98	1.1112
0.553	1	1	1	100	1	-8	0.9624
1.823	1	1	1	100	1	32	1.1096
1.130	1	1	2	111	1	31	1.0421
4.281	1	1	1	100	1	-45	0.6617
1.136	1	1	1	100	1	-14	0.9119
6.354	1	0	1	100	1	-81	0.6010
1.344	1	1	1	100	1	-13	0.8700
7.401	1	0	2	190	0	-250	0.8025
4.227	1	1	2	130	1	-120	0.8614
1.644	1	1	1	100	1	37	1.0758
0.584	1	1	1	100	1	14	1.0246
3.456	1	1	1	100	1	77	1.1681
0.060	1	1	1	100	1	1	1.0036
0.374	1	1	1	100	1	-6	0.9769
0.585	1	1	1	100	1	-10	0.9663
2.432	1	1	1	100	1	37	1.1737
0.161	1	1	1	100	1	-2	0.9871
5.027	1	0	1	100	1	68	1.4564
3.812	1	1	1	100	1	50	1.3401
1.450	1	1	1	100	1	36	1.0602
0.775	1	1	1	100	1	19	1.0321
1.615	1	1	1	100	1	-41	0.9383
3.921	1	1	1	100	1	-91	0.8442
3.849	1	1	1	100	1	-60	0.7802
2.262	1	1	1	100	1	-35	0.8638
1.525	1	1	1	100	1	-22	0.8995
5.016	1	0	1	100	1	43	1.8269
1.955	1	1	1	100	1	32	1.1270
1.986	1	1	2	166	1	-65	0.9411
1.134	1	1	1	100	1	6	1.2400
2.885	1	1	1	100	1	-31	0.7634
0.643	1	1	1	100	1	6	1.0714
0.808	1	1	1	100	1	-15	0.9574
0.632	1	1	1	100	1	5	1.0833
0.993	1	1	1	100	1	-13	0.9270
0.412	1	1	1	100	1	7	1.0246
1.116	1	1	1	100	1	-18	0.9331
3.086	1	1	2	107	1	85	1.1187
0.498	1	1	1	100	1	8	1.0315
0.311	1	1	1	100	1	-4	0.9760
0.194	1	1	1	100	1	-1	0.9630
0.658	1	1	1	100	1	-13	0.9673
0.799	1	1	1	100	1	-11	0.9436
0.115	1	1	1	100	1	3	1.0044
0.374	1	1	1	100	1	-7	0.9802
0.159	1	1	1	100	1	-4	0.9937
1.969	1	1	1	100	1	53	1.0759
7.281	1	0	2	246	0	-282	0.8282
1.790	1	1	1	100	1	-41	0.9248
8.377	1	0	2	132	0	-232	0.7373
2.246	1	1	1	100	1	36	1.1506
5.481	1	0	1	100	1	-53	0.5583
6.400	1	0	1	100	0	-153	0.7639
3.181	1	1	1	100	1	-56	0.8343
0.537	1	1	1	100	1	-10	0.9716
1.490	1	1	1	100	1	19	1.1242
1.373	1	1	1	100	1	-19	0.9055
3.853	1	1	1	100	1	-70	0.8082
5.800	1	0	1	100	0	-126	0.7645
0.775	1	1	2	275	1	-33	0.9820
4.104	1	1	2	231	1	-157	0.8982
0.801	1	1	2	194	1	29	1.0224
0.379	1	1	2	105	1	-10	0.9858
1.366	1	1	1	100	1	-29	0.9376
1.366	1	1	1	100	1	-29	0.9376
0.379	1	1	2	105	1	-10	0.9858
0.420	1	1	2	121	1	12	1.0148
0.546	1	1	2	144	1	17	1.0177
0.078	1	1	1	100	1	-1	0.9939
2.717	1	1	1	100	1	24	1.3636
1.296	1	1	1	100	1	-24	0.9324
4.898	1	1	1	100	1	-99	0.7838
2.855	1	1	1	100	1	-61	0.8747
0.343	1	1	1	100	1	-6	0.9806
0.733	1	1	1	100	1	-16	0.9670
0.629	1	1	1	100	1	-11	0.9646
4.275	1	1	1	100	1	-69	0.7661
6.534	1	0	1	100	0	-156	0.7593
2.714	1	1	2	179	1	-92	0.9230
0.125	1	1	1	100	1	-3	0.9948
2.304	1	1	1	100	1	-38	0.8694
0.623	1	1	1	100	1	16	1.0245
0.605	1	1	2	149	1	-19	0.9809
0.595	1	1	1	100	1	-15	0.9767
1.636	1	1	2	206	1	-60	0.9564
0.799	1	1	1	100	1	-11	0.9436
1.900	1	1	1	100	1	-23	0.8544
3.555	1	1	1	100	1	61	1.2311
1.008	1	1	1	100	1	17	1.0616
1.465	1	1	1	100	1	26	1.0861

115	554464186	121898048	121897835	1350	221.00	140.00	-81.00	6.029	1	0	1	100	1	-81	0.6335
116	554471594	121894456	121896626	1250	397.00	508.00	111.00	5.218	1	0	1	100	0	111	1.2796
117	554471594	121896626	121894456	1250	372.00	428.00	56.00	2.800	1	1	1	100	1	56	1.1505
118	562717684	121634810	121618689	2500	128.00	135.00	7.00	0.610	1	1	1	100	1	7	1.0547
119	562717688	121631171	121622408	3000	2230.00	2205.00	-25.00	0.531	1	1	2	335	1	-25	0.9888
120	562718718	121623337	121616537	1600	238.00	257.00	19.00	1.208	1	1	1	100	1	19	1.0798
121	562718814	121623337	121619283	1600	110.00	125.00	15.00	1.384	1	1	1	100	1	15	1.1364
122	562718826	121619282	121611326	1600	416.00	387.00	-29.00	1.447	1	1	1	100	1	-29	0.9303
123	562718828	121633872	121619282	2500	1158.00	1012.00	-146.00	4.432	1	1	2	174	1	-146	0.8739
124	562718902	121638465	121606716	2500	1089.00	1014.00	-75.00	2.313	1	1	2	163	1	-75	0.9311
125	562718934	121606715	121621401	1250	614.00	609.00	-5.00	0.202	1	1	1	100	1	-5	0.9919
126	562718939	121622425	121624497	1250	112.00	114.00	2.00	0.188	1	1	1	100	1	2	1.0179
127	562719055	121606758	121628638	1600	266.00	262.00	-4.00	0.246	1	1	1	100	1	-4	0.9850
128	562719056	121628977	121628638	1600	137.00	143.00	6.00	0.507	1	1	1	100	1	6	1.0438
129	562719167	121608198	121609349	1000	429.00	479.00	50.00	2.347	1	1	1	100	1	50	1.1166
130	562719167	121609349	121608198	1000	485.00	555.00	70.00	3.070	1	1	1	100	1	70	1.1443
131	562754853	121607865	121615675	1350	76.00	62.00	-14.00	1.685	1	1	1	100	1	-14	0.8158
132	562754853	121615675	121607865	1350	160.00	165.00	5.00	0.392	1	1	1	100	1	5	1.0313
133	578633027	121617752	121622399	1000	545.00	554.00	9.00	0.384	1	1	1	100	1	9	1.0165
134	578633027	121622399	121617752	1000	267.00	316.00	49.00	2.870	1	1	1	100	1	49	1.1835
135	578633032	121624987	121617345	3750	565.00	543.00	-22.00	0.935	1	1	1	100	1	-22	0.9611
136	578633033	121622399	121624987	1250	683.00	631.00	-52.00	2.029	1	1	1	100	1	-52	0.9239
137	578633920	121893996	121890163	1600	28.00	13.00	-15.00	3.313	1	1	1	100	1	-15	0.4643
138	589009150	121633940	121617422	2500	712.00	663.00	-49.00	1.869	1	1	2	107	1	-49	0.9312
139	589027265	121617345	121627577	2500	612.00	700.00	88.00	3.436	1	1	1	100	1	88	1.1438
140	589027588	121606183	121606182	3200	602.00	612.00	10.00	0.406	1	1	1	100	1	10	1.0166
141	589027602	121611481	121629615	1000	121.00	136.00	15.00	1.323	1	1	1	100	1	15	1.1240
142	589027602	121629615	121611481	1000	701.00	685.00	-16.00	0.608	1	1	2	105	1	-16	0.9772
143	589028095	121631827	121637842	1350	713.00	633.00	-80.00	3.084	1	1	2	107	1	-80	0.8878
144	589028095	121637842	121631827	1350	416.00	437.00	21.00	1.017	1	1	1	100	1	21	1.0505
145	589028096	121621564	121631827	1350	645.00	633.00	-12.00	0.475	1	1	1	100	1	-12	0.9814
146	589028097	121631827	121628756	1350	419.00	437.00	18.00	0.870	1	1	1	100	1	18	1.0430
147	589028787	121610595	121638341	1600	768.00	663.00	-105.00	3.925	1	1	2	115	1	-105	0.8633
148	589028904	121610360	121610359	1600	40.00	50.00	10.00	1.491	1	1	1	100	1	10	1.2500
149	590512691	121624430	121628686	2500	580.00	518.00	-62.00	2.646	1	1	1	100	1	-62	0.8931
150	590512691	121628686	121624430	2500	550.00	544.00	-6.00	0.257	1	1	1	100	1	-6	0.9891
151	590513273	121619874	121630244	2500	604.00	679.00	75.00	2.961	1	1	1	100	1	75	1.1242
152	590522817	121894999	121898078	1250	507.00	517.00	10.00	0.442	1	1	1	100	1	10	1.0197
153	590522817	121898078	121894999	1250	288.00	350.00	62.00	3.471	1	1	1	100	1	62	1.2153
154	590522819	121893930	121898078	1000	225.00	147.00	-78.00	5.719	1	0	1	100	1	-78	0.6533
155	590522819	121898078	121893930	1000	58.00	49.00	-9.00	1.230	1	1	1	100	1	-9	0.8448
156	590523489	121606358	121606359	1000	41.00	39.00	-2.00	0.316	1	1	1	100	1	-2	0.9512
157	590523489	121606359	121606358	1000	7.00	7.00	0.00	0.000	1	1	1	100	1	0	1.0000
158	590523492	121629637	121629638	2000	577.00	562.00	-15.00	0.629	1	1	1	100	1	-15	0.9740
159	590523492	121629638	121629637	1600	340.00	283.00	-57.00	3.230	1	1	1	100	1	-57	0.8324
160	590523496	121610586	121610587	2500	714.00	675.00	-39.00	1.480	1	1	2	107	1	-39	0.9454
161	590523496	121610587	121610586	1250	429.00	422.00	-7.00	0.339	1	1	1	100	1	-7	0.9837
162	706770675	121611129	121627670	1000	692.00	592.00	-100.00	3.947	1	1	1	100	0	-100	0.8555
163	706770675	121627670	121611129	1000	310.00	308.00	-2.00	0.114	1	1	1	100	1	-2	0.9935
164	706770682	121611129	121615161	1000	228.00	268.00	40.00	2.540	1	1	1	100	1	40	1.1754
165	706770682	121615161	121611129	1000	131.00	164.00	33.00	2.717	1	1	1	100	1	33	1.2519
166	706770693	121611575	121612979	2000	145.00	105.00	-40.00	3.578	1	1	1	100	1	-40	0.7241
167	706770693	121612979	121611575	2000	67.00	48.00	-19.00	2.506	1	1	1	100	1	-19	0.7164
168	722014758	121610373	121610595	1600	426.00	451.00	25.00	1.194	1	1	1	100	1	25	1.0587
169	724702427	121611229	121624577	1000	143.00	140.00	-3.00	0.252	1	1	1	100	1	-3	0.9790
170	724702427	121624577	121611229	1000	16.00	23.00	7.00	1.585	1	1	1	100	1	7	1.4375
171	724784432	121611313	121626563	3500	1558.00	1607.00	49.00	1.232	1	1	2	234	1	49	1.0315
172	725411687	121630926	121612450	3200	666.00	694.00	28.00	1.074	1	1	1	100	1	28	1.0420
173	726416568	121614069	121636492	1000	235.00	237.00	2.00	0.130	1	1	1	100	1	2	1.0085
174	726416568	121636492	121614069	1000	536.00	527.00	-9.00	0.390	1	1	1	100	1	-9	0.9832
175	727329438	121623610	121607393	4200	3069.00	3041.00	-28.00	0.507	1	1	2	460	1	-28	0.9909
176	728212505	121640428	121616321	3500	1419.00	1481.00	62.00	1.628	1	1	2	213	1	62	1.0437
177	731162663	121630691	121623610	1600	448.00	593.00	145.00	6.356	1	0	1	100	0	145	1.3237
178	731279538	121621886	121620508	3500	870.00	804.00	-66.00	2.281	1	1	2	131	1	-66	0.9241
179	731307080	121608914	121610352	1400	332.00	457.00	125.00	6.293	1	0	1	100	0	125	1.3765
180	731307080	121610352	121608914	1400	289.00	409.00	120.00	6.423	1	0	1	100	0	120	1.4152
181	732654992	121606182	121622217	4200	1849.00	1801.00	-48.00	1.124	1	1	2	277	1	-48	0.9740
182	732775505	121622364	121626633	1250	366.00	276.00	-90.00	5.023	1	0	1	100	1	-90	0.7541
183	732775505	121626633	121622364	1250	725.00	600.00	-125.00	4.856	1	1	2	109	0	-125	0.8276
184	733454280	121613997	121623158	1000	145.00	131.00	-14.00	1.192	1	1	1	100	1	-14	0.9034
185	733454280	121623158	121613997	1000	29.00	35.00	6.00	1.061	1	1	1	100	1	6	1.2069
186	733497453	121608944	121624018	1250	458.00	441.00	-17.00	0.802	1	1	1	100	1	-17	0.9629
187	734207708	121622217	121639301	1600	411.00	401.00	-10.00	0.496	1	1	1	100	1	-10	0.9757
188	735634557	121609534	121613030	1250	421.00	407.00	-14.00	0.688	1	1	1	100	1	-14	0.9667
189	736191518	121625434	121619338	1600	341.00	299.00	-42.00	2.348	1	1	1	100	1	-42	0.8768
190	736975863	121620669	121622827	1250	356.00	364.00	8.00	0.422	1	1	1	100	1	8	1.0225
191	736975863	121622827	121620669	1250	653.00	622.00	-31.00	1.228	1	1	1	100	1	-31	0.9525
192	738082397	121608870	121615326	1000	188.00	244.00	56.00	3.810	1	1	1	100	1	56	1.2979
193	738082397	121615326	121608870	1000	666.00	677.00	11.00	0.424	1	1	1	100	1	11	1.0165
194	741673148	121632162	121625454	1600	243.00	206.00	-37.00	2.469	1	1	1	100	1	-37	0.8477
195	741855033	121606670	121613276	1250	487.00	492.00	5.00	0.226	1	1	1	100	1	5	1.0103
196	741855033	121613276	121606670	1250	458.00	489.00	31.00	1.425	1	1	1	100	1	31	1.0677
197	742562318	121612353	121636229	3500	576.00	646.00	70.00	2.832	1	1	1	100	1	70	1.1215
198	745996482	121636862	121628201	3500	1021.00	896.00	-125.00	4.038	1	1	2	153	1	-125	0.8776
199	746736228	121624205	121610596	1600	943.00	776.00	-167.00	5.696	1	0	2	141	0	-167	0.8229
200	747277847	121637264	121640828	1000	151.00	150.00	-1.00	0.082	1	1	1	100	1	-1	0.9934
201	747277847	121640828	121637264	1000	42.00	47.00	5.00	0.750	1	1	1	100	1	5	1.1190
202	747340238	121637498	121612287	4200	2761.00	2535.00	-226.00	4.392	1	1	2	414	1	-226	0.9181
203	747491963	121623980	121632230	1000	213.00	212.00	-1.00	0.069	1	1	1	100	1	-1	0.9953
204	747491963	121632230	121623980	1000	115.00	118.00	3.00	0.278	1	1	1	100	1	3	1.0261
205	748372248	121610075	121634807	1250	92.00	93.00	1.00	0.104	1	1	1	100	1	1	1.0109
206	748372248	121634807	121610075	1250	207.00	200.00	-7.00	0.491	1	1	1	100	1	-7	0.9662
207	749070638	121618690	121636392	3000	721.00	744.00	23.00	0.850	1	1	2	108	1	23	1.0319
208	749995697	121608612	121614756	1250	441.00	526.00	85.00	3.866	1	1	1	100	1	85	1.1927
209	749995697	121614756	121608612	1250	240.00	271.00	31.00	1.939	1	1	1	100	1	31	1.1292
210	750014118	121615439	121611010	2500	705.00	689.00	-16.00	0.606	1	1	2	106	1	-16	0.9773
211	750263193	121641108	121611644	4200	1042.00	880.00	-162.00	5.226	1	0	2	156	0	-162	0.8445
212	750364877	121635539	121641402	1000	59.00	56.00	-3.00	0.396	1	1	1	100	1	-3	0.9492
213	750364877	121641402	121635539	1000	6.00	6.00	0.00	0.000	1	1	1	100	1	0	1.0000
214	750717080	121630244	121640459	4200	4270.00	4083.00	-187.00	2.894	1	1	2	641	1	-187	0.9562
215	751024112	121635051	121633455	3200	1300.00	1251.00	-49.00	1.372	1	1	2	195	1	-49	0.9623
216	751108037	121613700	121623860	6300	3450.00	3827.00	377.00	6.250	1	0	2	518	1	377	1.1093
217	751735358	121642477	121621121	5000	1532.00	1470.00	-62.00	1.600	1	1	2	230	1	-62	0.9595
218	752452380	121629477	121611969	1000	703.00	708.00	5.00	0.188	1	1	2	105	1	5	1.0071
219	752528192	121613074	121627124	6300	3468.00	3821.00	353.00	5.847	1	0	2	520	1	353	1.1018
220	2147476835	121630496	121900545	1000	171.00	269.00	98.00	6.607	1	0	1	100	1	98	1.5731
221	2147476835	121900545	121630496	1000	128.00	142.00	14.00	1.205	1	1	1	100	1	14	1.1094
222	2147482944	121900707	121612220	2000	333.00	410.00	77.00	3.995	1	1	1	100	1	77	1.2312
223	2147482953	121900709	121900710	1000	38.00	46.00	8.00	1.234	1	1	1	100	1	8	1.2105
224	2147482953	121900710	121900709	1000	271.00	225.00	-46.00	2.921	1	1	1	100	1	-46	0.8303
225	2147482974	121627782	121900717	1000	220.00	296.00	76.00	4.732	1	1	1	100	1	76	1.3455
226	2147482974	121900717	121627782	1000	402.00	451.00	49.00	2.373	1	1	1	100	1	49	1.1219
227	2147482982	121900720	121607483	1250	1059.00	1069.00	10.00	0.307	1	1	2	159	1	10	1.0094
228	2147482983	121623487	121900721	1250	1352.00	1302.00	-50.00	1.373	1	1	2	203	1	-50	0.9630
229	2147482986	121640508	121900722	1250	518.00	553.00	35.00	1.512	1	1	1	100	1	35	1.0676
230	2147482986	121900722	121640508	1250	378.00	408.00	30.00	1.513	1	1	1	100	1	30	1.0794
231	2147482987	121607393	121900723	3200	1294.00	1239.00	-55.00	1.545	1	1	2	194	1	-55	0.9575
232	2147482990	121900724	121622399	3750	1594.00	1707.00	113.00	2.781	1	1	2	239	1	113	1.0709
233	2147483011	121612670	121900733	1350	224.00	218.00	-6.00	0.404	1	1	1	100	1	-6	0.9732
234	2147483011	121900733	121612670	1350	246.00	273.00	27.00	1.676	1	1	1	100	1	27	1.1098
235	2147483016	121629163	121900735	1350	315.00	195.00	-120.00	7.515	1	0	1	100	0	-120	0.6190
236	2147483016	121900735	121629163	1350	405.00	428.00	23.00	1.127	1	1	1	100	1	23	1.0568

237	2147483021	121900737	121900738	1350	64.00	48.00	-16.00	2.138	1	1	1	100	1	-16	0.7500
238	2147483021	121900738	121900737	1350	58.00	92.00	34.00	3.926	1	1	1	100	1	34	1.5862
239	2147483026	121609235	121900740	1350	261.00	366.00	105.00	5.930	1	0	1	100	0	105	1.4023
240	2147483026	121900740	121609235	1350	228.00	238.00	10.00	0.655	1	1	1	100	1	10	1.0439
241	2147483038	121622881	121900746	1350	338.00	320.00	-18.00	0.992	1	1	1	100	1	-18	0.9467
242	2147483038	121900746	121622881	1350	280.00	309.00	29.00	1.690	1	1	1	100	1	29	1.1036
243	2147483058	121897811	121900757	1350	91.00	66.00	-25.00	2.822	1	1	1	100	1	-25	0.7253
244	2147483058	121900757	121897811	1350	80.00	38.00	-42.00	5.468	1	0	1	100	1	-42	0.4750
245	2147483074	121608870	121900764	1000	377.00	364.00	-13.00	0.675	1	1	1	100	1	-13	0.9655
246	2147483074	121900764	121608870	1000	64.00	54.00	-10.00	1.302	1	1	1	100	1	-10	0.8438
247	2147483082	121608870	121900768	1000	121.00	124.00	3.00	0.271	1	1	1	100	1	3	1.0248
248	2147483090	121900771	121900772	1000	50.00	45.00	-5.00	0.725	1	1	1	100	1	-5	0.9000
249	2147483090	121900772	121900771	1000	29.00	68.00	39.00	5.600	1	0	1	100	1	39	2.3448
250	2147483095	121900739	450053962	1350	65.00	81.00	16.00	1.873	1	1	1	100	1	16	1.2462
251	2147483095	450053962	121900739	1350	150.00	213.00	63.00	4.676	1	1	1	100	1	63	1.4200
252	2147483108	121898276	450073308	1350	20.00	54.00	34.00	5.590	1	0	1	100	1	34	2.7000
253	2147483108	450073308	121898276	1350	59.00	61.00	2.00	0.258	1	1	1	100	1	2	1.0339
254	2147483502	121900851	121607917	4200	1651.00	1548.00	-103.00	2.575	1	1	2	248	1	-103	0.9376
255	2147483504	121607918	121900852	4200	613.00	590.00	-23.00	0.938	1	1	1	100	1	-23	0.9625
256	2147483512	121894203	121900899	1350	114.00	107.00	-7.00	0.666	1	1	1	100	1	-7	0.9386
257	2147483512	121900899	121894203	1350	136.00	113.00	-23.00	2.061	1	1	1	100	1	-23	0.8309
258	2147483514	121900951	121892925	1600	109.00	125.00	16.00	1.479	1	1	1	100	1	16	1.1468
259	2147483516	121891726	450344631	1350	398.00	338.00	-60.00	3.128	1	1	1	100	1	-60	0.8492
260	2147483516	450344631	121891726	1350	38.00	21.00	-17.00	3.130	1	1	1	100	1	-17	0.5526
261	2147483535	121637306	450344633	4200	1502.00	1849.00	347.00	8.477	1	0	2	225	0	347	1.2310
262	2147483540	121614349	450344628	1250	567.00	532.00	-35.00	1.493	1	1	1	100	1	-35	0.9383
263	2147483540	450344628	121614349	1250	144.00	146.00	2.00	0.166	1	1	1	100	1	2	1.0139
264	2147483550	121900929	121606076	1250	58.00	63.00	5.00	0.643	1	1	1	100	1	5	1.0862
265	2147483551	121606077	121900927	1250	345.00	332.00	-13.00	0.707	1	1	1	100	1	-13	0.9623
266	2147483563	121614100	121900980	1350	137.00	129.00	-8.00	0.694	1	1	1	100	1	-8	0.9416
267	2147483563	121900980	121614100	1350	400.00	360.00	-40.00	2.052	1	1	1	100	1	-40	0.9000
268	2147483572	121900979	450053962	1350	150.00	136.00	-14.00	1.171	1	1	1	100	1	-14	0.9067
269	2147483572	450053962	121900979	1350	65.00	49.00	-16.00	2.119	1	1	1	100	1	-16	0.7538
270	2147483584	121900875	121900876	2500	316.00	367.00	51.00	2.760	1	1	1	100	1	51	1.1614
271	2147483592	121900904	121894400	2500	525.00	562.00	37.00	1.587	1	1	1	100	1	37	1.0705
					136598	**134152**	**-2446**		**271**	**239**			**251**		

Average GEH **2.158**

AM Peak Heavy Traffic 25/08/11

					Observed	Modelled	Difference
No.	**Link Number**	**From Node**	**To Node**	**Link Capacity (PCU's)**	**Heavy Traffic**	**Heavy Traffic**	**Heavy Traffic**
1	50709	121890062	121898078	1250	24.00	24.00	0.00
2	50709	121898078	121890062	1250	28.00	24.00	-4.00
3	51535	121891726	121893802	1350	5.00	2.00	-3.00
4	51535	121893802	121891726	1350	19.00	13.00	-6.00
5	51625	121892991	121891635	1600	35.00	34.00	-1.00
6	51746	121890227	121890300	1250	17.00	16.00	-1.00
7	51746	121890300	121890227	1250	16.00	13.00	-3.00
8	52177	121893275	121894805	1250	1.00	0.00	-1.00
9	52177	121894805	121893275	1250	1.00	0.00	-1.00
10	52550	121890857	121892152	1250	18.00	14.00	-4.00
11	52550	121892152	121890857	1250	17.00	12.00	-5.00
12	52685	121896527	121894461	2500	13.00	11.00	-2.00
13	52878	121894049	121896193	1000	1.00	1.00	0.00
14	52878	121896193	121894049	1000	5.00	8.00	3.00
15	52944	121893969	121897273	1350	1.00	0.00	-1.00
16	52944	121897273	121893969	1350	1.00	0.00	-1.00
17	551425077	121891403	121890515	1600	21.00	12.00	-9.00
18	551425084	121893943	121892794	1600	18.00	21.00	3.00
19	551425144	121891013	121895862	1250	20.00	26.00	6.00
20	551425145	121895862	121891012	1250	35.00	43.00	8.00
21	551425147	121890589	121890590	1600	20.00	15.00	-5.00
22	551425275	121621988	121621989	3500	95.00	98.00	3.00
23	553058331	121620084	121623438	2500	20.00	22.00	2.00
24	553058441	121605348	121614253	3500	43.00	48.00	5.00
25	553059065	121611721	121611722	1000	11.00	7.00	-4.00
26	553059073	121610601	121610600	1600	4.00	4.00	0.00
27	553059106	121605398	121619874	2500	22.00	28.00	6.00
28	553059107	121619874	121621120	2500	7.00	5.00	-2.00
29	553059109	121606598	121616305	2500	8.00	0.00	-8.00
30	553059113	121890242	121891605	1600	9.00	9.00	0.00
31	553059417	121639135	121896281	1600	8.00	7.00	-1.00
32	553059523	121622941	121625886	1250	42.00	23.00	-19.00
33	553059524	121635100	121607850	1250	25.00	14.00	-11.00
34	553059533	121620621	121620622	1250	13.00	16.00	3.00
35	553059533	121620622	121620621	1250	10.00	14.00	4.00
36	553059583	121617342	121627227	1250	4.00	8.00	4.00
37	553059583	121627227	121617342	1250	2.00	5.00	3.00
38	553060375	121615280	121625962	1000	5.00	6.00	1.00
39	553060375	121625962	121615280	1000	6.00	5.00	-1.00
40	553060427	121607518	121625962	1000	2.00	3.00	1.00
41	553060427	121625962	121607518	1000	3.00	4.00	1.00
42	554374956	121605426	121607828	1000	9.00	8.00	-1.00
43	554374956	121607828	121605426	1000	14.00	14.00	0.00
44	554375068	121607398	121621276	1250	8.00	9.00	1.00
45	554375068	121621276	121607398	1250	6.00	6.00	0.00
46	554375258	121618893	121618894	1600	15.00	16.00	1.00
47	554375258	121618894	121618893	1600	8.00	9.00	1.00
48	554375447	121633812	121638072	1250	3.00	4.00	1.00
49	554375447	121638072	121633812	1250	2.00	4.00	2.00
50	554377074	121630542	121613030	1250	11.00	9.00	-2.00
51	554377177	121608954	121613998	1000	4.00	4.00	0.00
52	554377177	121613998	121608954	1000	4.00	6.00	2.00
53	554377198	121611229	121625867	1000	20.00	18.00	-2.00
54	554377210	121608953	121608954	1000	0.00	1.00	1.00
55	554377210	121608954	121608953	1000	3.00	1.00	-2.00
56	554377232	121607527	121607528	1000	2.00	3.00	1.00
57	554377232	121607528	121607527	1000	3.00	4.00	1.00
58	554377279	121632861	121632862	1000	7.00	7.00	0.00
59	554377279	121632862	121632861	1000	1.00	2.00	1.00
60	554377290	121613997	121637264	1000	19.00	16.00	-3.00
61	554377290	121637264	121613997	1000	9.00	7.00	-2.00
62	554377351	121631201	121640482	1000	17.00	18.00	1.00
63	554377351	121640482	121631201	1000	14.00	18.00	4.00
64	554377363	121615326	121615327	1000	5.00	6.00	1.00
65	554377363	121615327	121615326	1000	8.00	8.00	0.00
66	554377394	121613315	121613316	1000	2.00	1.00	-1.00
67	554377394	121613316	121613315	1000	2.00	3.00	1.00
68	554391692	121611128	121611129	1250	9.00	9.00	0.00
69	554391692	121611129	121611128	1250	13.00	12.00	-1.00
70	554434772	121608606	121608607	1250	28.00	29.00	1.00
71	554434772	121608607	121608606	1250	12.00	13.00	1.00
72	554435128	121611265	121611266	3500	82.00	88.00	6.00
73	554435131	121620300	121606031	1600	27.00	22.00	-5.00
74	554435150	121619343	121606671	3500	44.00	31.00	-13.00
75	554440201	121612670	121630621	1350	6.00	8.00	2.00
76	554440201	121630621	121612670	1350	3.00	5.00	2.00
77	554446206	121616291	121633023	1250	18.00	8.00	-10.00
78	554446206	121633023	121616291	1250	8.00	6.00	-2.00
79	554446721	121618027	121618028	1000	1.00	2.00	1.00
80	554446721	121618028	121618027	1000	1.00	2.00	1.00
81	554447300	121617552	121618845	1250	10.00	7.00	-3.00
82	554447665	121626893	121639389	1250	19.00	8.00	-11.00
83	554447665	121639389	121626893	1250	24.00	12.00	-12.00
84	554448247	121610747	121634564	3500	91.00	85.00	-6.00
85	554449619	121623860	121630001	1600	39.00	38.00	-1.00
86	554449621	121613278	121613074	1600	23.00	23.00	0.00
87	554449624	121613029	121613028	1250	6.00	8.00	2.00
88	554449631	121613279	121613029	1250	8.00	11.00	3.00
89	554449632	121626390	121610168	1250	8.00	11.00	3.00
90	554449634	121610169	121626390	1250	6.00	8.00	2.00
91	554449641	121617528	121627514	1250	9.00	11.00	2.00
92	554449641	121627514	121617528	1250	25.00	24.00	-1.00
93	554451784	121622639	121627731	1250	1.00	6.00	5.00
94	554451784	121627731	121622639	1250	3.00	5.00	2.00
95	554451789	121633360	121638313	1250	12.00	11.00	-1.00
96	554451789	121638313	121633360	1250	11.00	13.00	2.00
97	554451856	121611431	121613185	1250	24.00	25.00	1.00
98	554451856	121613185	121611431	1250	18.00	17.00	-1.00
99	554451880	121613186	121617646	1250	22.00	21.00	-1.00
100	554451880	121617646	121613186	1250	18.00	13.00	-5.00
101	554455131	121615905	121636538	1500	4.00	5.00	1.00
102	554455131	121636538	121615905	1500	5.00	7.00	2.00
103	554455133	121628881	121640820	1250	22.00	13.00	-9.00
104	554455133	121640820	121628881	1250	14.00	11.00	-3.00
105	554455137	121641566	121641577	1500	8.00	7.00	-1.00
106	554455137	121641577	121641566	1500	14.00	11.00	-3.00
107	554455190	121608117	121627871	1000	27.00	27.00	0.00
108	554455195	121626938	121622071	1000	28.00	26.00	-2.00
109	554455203	121629133	121632803	1000	22.00	20.00	-2.00
110	554463836	121891255	121891554	1250	12.00	12.00	0.00
111	554463836	121891554	121891255	1250	12.00	9.00	-3.00
112	554463839	121892302	121898485	1250	17.00	17.00	0.00
113	554463839	121898485	121892302	1000	15.00	19.00	4.00
114	554464186	121897835	121898048	1350	24.00	16.00	-8.00

	RESULT =	**99.63%**		RESULT =	**101.12%**		
	REQD =	85.00%		REQD =	85.00%		
GEH	***COUNT***	***GEH TEST***	***CLASS TEST***	***Target Difference***	***Flow Test***	***ACT DIFF***	***FACTOR***
0.000	1	1	1	100	1	0	1.0000
0.784	1	1	1	100	1	-4	0.8571
1.604	1	1	1	100	1	-3	0.4000
1.500	1	1	1	100	1	-6	0.6842
0.170	1	1	1	100	1	-1	0.9714
0.246	1	1	1	100	1	-1	0.9412
0.788	1	1	1	100	1	-3	0.8125
1.414	1	1	1	100	1	-1	0.0000
1.414	1	1	1	100	1	-1	0.0000
1.000	1	1	1	100	1	-4	0.7778
1.313	1	1	1	100	1	-5	0.7059
0.577	1	1	1	100	1	-2	0.8462
0.000	1	1	1	100	1	0	1.0000
1.177	1	1	1	100	1	3	1.6000
1.414	1	1	1	100	1	-1	0.0000
1.414	1	1	1	100	1	-1	0.0000
2.216	1	1	1	100	1	-9	0.5714
0.679	1	1	1	100	1	3	1.1667
1.251	1	1	1	100	1	6	1.3000
1.281	1	1	1	100	1	8	1.2286
1.195	1	1	1	100	1	-5	0.7500
0.305	1	1	1	100	1	3	1.0316
0.436	1	1	1	100	1	2	1.1000
0.741	1	1	1	100	1	5	1.1163
1.333	1	1	1	100	1	-4	0.6364
0.000	1	1	1	100	1	0	1.0000
1.200	1	1	1	100	1	6	1.2727
0.816	1	1	1	100	1	-2	0.7143
4.000	1	1	1	100	1	-8	0.0000
0.000	1	1	1	100	1	0	1.0000
0.365	1	1	1	100	1	-1	0.8750
3.333	1	1	1	100	1	-19	0.5476
2.491	1	1	1	100	1	-11	0.5600
0.788	1	1	1	100	1	3	1.2308
1.155	1	1	1	100	1	4	1.4000
1.633	1	1	1	100	1	4	2.0000
1.604	1	1	1	100	1	3	2.5000
0.426	1	1	1	100	1	1	1.2000
0.426	1	1	1	100	1	-1	0.8333
0.632	1	1	1	100	1	1	1.5000
0.535	1	1	1	100	1	1	1.3333
0.343	1	1	1	100	1	-1	0.8889
0.000	1	1	1	100	1	0	1.0000
0.343	1	1	1	100	1	1	1.1250
0.000	1	1	1	100	1	0	1.0000
0.254	1	1	1	100	1	1	1.0667
0.343	1	1	1	100	1	1	1.1250
0.535	1	1	1	100	1	1	1.3333
1.155	1	1	1	100	1	2	2.0000
0.632	1	1	1	100	1	-2	0.8182
0.000	1	1	1	100	1	0	1.0000
0.894	1	1	1	100	1	2	1.5000
0.459	1	1	1	100	1	-2	0.9000
1.414	1	1	1	100	1	1	-
1.414	1	1	1	100	1	-2	0.3333
0.632	1	1	1	100	1	1	1.5000
0.535	1	1	1	100	1	1	1.3333
0.000	1	1	1	100	1	0	1.0000
0.816	1	1	1	100	1	1	2.0000
0.717	1	1	1	100	1	-3	0.8421
0.707	1	1	1	100	1	-2	0.7778
0.239	1	1	1	100	1	1	1.0588
1.000	1	1	1	100	1	4	1.2857
0.426	1	1	1	100	1	1	1.2000
0.000	1	1	1	100	1	0	1.0000
0.816	1	1	1	100	1	-1	0.5000
0.632	1	1	1	100	1	1	1.5000
0.000	1	1	1	100	1	0	1.0000
0.283	1	1	1	100	1	-1	0.9231
0.187	1	1	1	100	1	1	1.0357
0.283	1	1	1	100	1	1	1.0833
0.651	1	1	1	100	1	6	1.0732
1.010	1	1	1	100	1	-5	0.8148
2.123	1	1	1	100	1	-13	0.7045
0.756	1	1	1	100	1	2	1.3333
1.000	1	1	1	100	1	2	1.6667
2.774	1	1	1	100	1	-10	0.4444
0.756	1	1	1	100	1	-2	0.7500
0.816	1	1	1	100	1	1	2.0000
0.816	1	1	1	100	1	1	2.0000
1.029	1	1	1	100	1	-3	0.7000
2.994	1	1	1	100	1	-11	0.4211
2.828	1	1	1	100	1	-12	0.5000
0.640	1	1	1	100	1	-6	0.9341
0.161	1	1	1	100	1	-1	0.9744
0.000	1	1	1	100	1	0	1.0000
0.756	1	1	1	100	1	2	1.3333
0.973	1	1	1	100	1	3	1.3750
0.973	1	1	1	100	1	3	1.3750
0.756	1	1	1	100	1	2	1.3333
0.632	1	1	1	100	1	2	1.2222
0.202	1	1	1	100	1	-1	0.9600
2.673	1	1	1	100	1	5	6.0000
1.000	1	1	1	100	1	2	1.6667
0.295	1	1	1	100	1	-1	0.9167
0.577	1	1	1	100	1	2	1.1818
0.202	1	1	1	100	1	1	1.0417
0.239	1	1	1	100	1	-1	0.9444
0.216	1	1	1	100	1	-1	0.9545
1.270	1	1	1	100	1	-5	0.7222
0.471	1	1	1	100	1	1	1.2500
0.816	1	1	1	100	1	2	1.4000
2.151	1	1	1	100	1	-9	0.5909
0.849	1	1	1	100	1	-3	0.7857
0.365	1	1	1	100	1	-1	0.8750
0.849	1	1	1	100	1	-3	0.7857
0.000	1	1	1	100	1	0	1.0000
0.385	1	1	1	100	1	-2	0.9286
0.436	1	1	1	100	1	-2	0.9091
0.000	1	1	1	100	1	0	1.0000
0.926	1	1	1	100	1	-3	0.7500
0.000	1	1	1	100	1	0	1.0000
0.970	1	1	1	100	1	4	1.2667
1.789	1	1	1	100	1	-8	0.6667

115	554464186	121898048	121897835	1350	10.00	8.00	-2.00	0.667	1	1	1	100	1	-2	0.8000
116	554471594	121894456	121896626	1250	28.00	29.00	1.00	0.187	1	1	1	100	1	1	1.0357
117	554471594	121896626	121894456	1250	27.00	29.00	2.00	0.378	1	1	1	100	1	2	1.0741
118	562717684	121634810	121618689	2500	9.00	9.00	0.00	0.000	1	1	1	100	1	0	1.0000
119	562717688	121631171	121622408	3000	34.00	35.00	1.00	0.170	1	1	1	100	1	1	1.0294
120	562718718	121623337	121616537	1600	3.00	1.00	-2.00	1.414	1	1	1	100	1	-2	0.3333
121	562718814	121623337	121619283	1600	8.00	6.00	-2.00	0.756	1	1	1	100	1	-2	0.7500
122	562718826	121619282	121611326	1600	9.00	12.00	3.00	0.926	1	1	1	100	1	3	1.3333
123	562718828	121633872	121619282	2500	46.00	48.00	2.00	0.292	1	1	1	100	1	2	1.0435
124	562718902	121638465	121606716	2500	23.00	27.00	4.00	0.800	1	1	1	100	1	4	1.1739
125	562718934	121606715	121621401	1250	6.00	7.00	1.00	0.392	1	1	1	100	1	1	1.1667
126	562718939	121622425	121624497	1250	6.00	7.00	1.00	0.392	1	1	1	100	1	1	1.1667
127	562719055	121606758	121628638	1600	15.00	14.00	-1.00	0.263	1	1	1	100	1	-1	0.9333
128	562719056	121628977	121628638	1600	5.00	7.00	2.00	0.816	1	1	1	100	1	2	1.4000
129	562719167	121608198	121609349	1000	16.00	13.00	-3.00	0.788	1	1	1	100	1	-3	0.8125
130	562719167	121609349	121608198	1000	19.00	17.00	-2.00	0.471	1	1	1	100	1	-2	0.8947
131	562754853	121607865	121615675	1350	1.00	0.00	-1.00	1.414	1	1	1	100	1	-1	0.0000
132	562754853	121615675	121607865	1350	1.00	0.00	-1.00	1.414	1	1	1	100	1	-1	0.0000
133	578633027	121617752	121622399	1000	16.00	11.00	-5.00	1.361	1	1	1	100	1	-5	0.6875
134	578633027	121622399	121617752	1000	17.00	14.00	-3.00	0.762	1	1	1	100	1	-3	0.8235
135	578633032	121624987	121617345	3750	11.00	8.00	-3.00	0.973	1	1	1	100	1	-3	0.7273
136	578633033	121622399	121624987	1250	12.00	12.00	0.00	0.000	1	1	1	100	1	0	1.0000
137	578633920	121893996	121890163	1600	5.00	2.00	-3.00	1.604	1	1	1	100	1	-3	0.4000
138	589009150	121633940	121617422	2500	8.00	8.00	0.00	0.000	1	1	1	100	1	0	1.0000
139	589027265	121617345	121627577	2500	22.00	32.00	10.00	1.925	1	1	1	100	1	10	1.4545
140	589027588	121606183	121606182	3200	12.00	17.00	5.00	1.313	1	1	1	100	1	5	1.4167
141	589027602	121611481	121629615	1000	8.00	9.00	1.00	0.343	1	1	1	100	1	1	1.1250
142	589027602	121629615	121611481	1000	7.00	4.00	-3.00	1.279	1	1	1	100	1	-3	0.5714
143	589028095	121631827	121637842	1350	13.00	13.00	0.00	0.000	1	1	1	100	1	0	1.0000
144	589028095	121637842	121631827	1350	7.00	9.00	2.00	0.707	1	1	1	100	1	2	1.2857
145	589028096	121621564	121631827	1350	12.00	13.00	1.00	0.283	1	1	1	100	1	1	1.0833
146	589028097	121631827	121628756	1350	7.00	9.00	2.00	0.707	1	1	1	100	1	2	1.2857
147	589028787	121610595	121638341	1600	36.00	25.00	-11.00	1.992	1	1	1	100	1	-11	0.6944
148	589028904	121610360	121610359	1600	0.00	0.00	0.00	-	1	0	1	100	1	0	-
149	590512691	121624430	121628686	2500	8.00	7.00	-1.00	0.365	1	1	1	100	1	-1	0.8750
150	590512691	121628686	121624430	2500	16.00	16.00	0.00	0.000	1	1	1	100	1	0	1.0000
151	590513273	121619874	121630244	2500	16.00	23.00	7.00	1.585	1	1	1	100	1	7	1.4375
152	590522817	121894999	121898078	1250	34.00	24.00	-10.00	1.857	1	1	1	100	1	-10	0.7059
153	590522817	121898078	121894999	1250	25.00	25.00	0.00	0.000	1	1	1	100	1	0	1.0000
154	590522819	121893930	121898078	1000	2.00	0.00	-2.00	2.000	-	1	1	100	1	-2	0.0000
155	590522819	121898078	121893930	1000	5.00	0.00	-5.00	3.162	1	1	1	100	1	-5	0.0000
156	590523489	121606358	121606359	1000	4.00	4.00	0.00	0.000	1	1	1	100	1	0	1.0000
157	590523489	121606359	121606358	1000	0.00	3.00	3.00	2.449	1	1	1	100	1	3	-
158	590523492	121629637	121629638	2000	7.00	4.00	-3.00	1.279	1	1	1	100	1	-3	0.5714
159	590523492	121629638	121629637	1600	8.00	5.00	-3.00	1.177	1	1	1	100	1	-3	0.6250
160	590523496	121610586	121610587	2500	5.00	6.00	1.00	0.426	1	1	1	100	1	1	1.2000
161	590523496	121610587	121610586	1250	6.00	6.00	0.00	0.000	1	1	1	100	1	0	1.0000
162	706770675	121611129	121627670	1000	7.00	3.00	-4.00	1.789	1	1	1	100	1	-4	0.4286
163	706770675	121627670	121611129	1000	9.00	6.00	-3.00	1.095	1	1	1	100	1	-3	0.6667
164	706770682	121611129	121615161	1000	5.00	5.00	0.00	0.000	1	1	1	100	1	0	1.0000
165	706770682	121615161	121611129	1000	6.00	7.00	1.00	0.392	1	1	1	100	1	1	1.1667
166	706770693	121611575	121612979	2000	1.00	2.00	1.00	0.816	1	1	1	100	1	1	2.0000
167	706770693	121612979	121611575	2000	1.00	1.00	0.00	0.000	1	1	1	100	1	0	1.0000
168	722014758	121610373	121610595	1600	3.00	0.00	-3.00	2.449	1	1	1	100	1	-3	0.0000
169	724702427	121611229	121624577	1000	3.00	4.00	1.00	0.535	1	1	1	100	1	1	1.3333
170	724702427	121624577	121611229	1000	1.00	2.00	1.00	0.816	1	1	1	100	1	1	2.0000
171	724784432	121611313	121626563	3500	78.00	77.00	-1.00	0.114	1	1	1	100	1	-1	0.9872
172	725411687	121630926	121612450	3200	15.00	9.00	-6.00	1.732	1	1	1	100	1	-6	0.6000
173	726416568	121614069	121636492	1000	1.00	2.00	1.00	0.816	1	1	1	100	1	1	2.0000
174	726416568	121636492	121614069	1000	3.00	4.00	1.00	0.535	1	1	1	100	1	1	1.3333
175	727329438	121623610	121607393	4200	65.00	117.00	52.00	5.451	1	0	1	100	1	52	1.8000
176	728212505	121640428	121616321	3500	112.00	109.00	-3.00	0.285	1	1	1	100	1	-3	0.9732
177	731162663	121630691	121623610	1600	8.00	9.00	1.00	0.343	1	1	1	100	1	1	1.1250
178	731279538	121621886	121620508	3500	43.00	37.00	-6.00	0.949	1	1	1	100	1	-6	0.8605
179	731307080	121608914	121610352	1400	2.00	5.00	3.00	1.604	1	1	1	100	1	3	2.5000
180	731307080	121610352	121608914	1400	2.00	3.00	1.00	0.632	1	1	1	100	1	1	1.5000
181	732654992	121606182	121622217	4200	100.00	120.00	20.00	1.907	1	1	1	100	1	20	1.2000
182	732775505	121622364	121626633	1250	5.00	4.00	-1.00	0.471	1	1	1	100	1	-1	0.8000
183	732775505	121626633	121622364	1250	7.00	4.00	-3.00	1.279	1	1	1	100	1	-3	0.5714
184	733454280	121613997	121623158	1000	1.00	1.00	0.00	0.000	1	1	1	100	1	0	1.0000
185	733454280	121623158	121613997	1000	1.00	2.00	1.00	0.816	1	1	1	100	1	1	2.0000
186	733497453	121608944	121624018	1250	23.00	21.00	-2.00	0.426	1	1	1	100	1	-2	0.9130
187	734207708	121622217	121639301	1600	12.00	14.00	2.00	0.555	1	1	1	100	1	2	1.1667
188	735634557	121609534	121613030	1250	21.00	10.00	-11.00	2.794	1	1	1	100	1	-11	0.4762
189	736191518	121625434	121619338	1600	4.00	7.00	3.00	1.279	1	1	1	100	1	3	1.7500
190	736975863	121620669	121622827	1250	5.00	6.00	1.00	0.426	1	1	1	100	1	1	1.2000
191	736975863	121622827	121620669	1250	4.00	6.00	2.00	0.894	1	1	1	100	1	2	1.5000
192	738082397	121608870	121615326	1000	12.00	16.00	4.00	1.069	1	1	1	100	1	4	1.3333
193	738082397	121615326	121608870	1000	12.00	14.00	2.00	0.555	1	1	1	100	1	2	1.1667
194	741673148	121632162	121625454	1600	5.00	6.00	1.00	0.426	1	1	1	100	1	1	1.2000
195	741855033	121606670	121613276	1250	24.00	9.00	-15.00	3.693	1	1	1	100	1	-15	0.3750
196	741855033	121613276	121606670	1250	23.00	7.00	-16.00	4.131	1	1	1	100	1	-16	0.3043
197	742562318	121612353	121636229	3500	29.00	33.00	4.00	0.718	1	1	1	100	1	4	1.1379
198	745996482	121636862	121628201	3500	51.00	51.00	0.00	0.000	1	1	1	100	1	0	1.0000
199	746736228	121624205	121610596	1600	32.00	44.00	12.00	1.947	1	1	1	100	1	12	1.3750
200	747277847	121637264	121640828	1000	3.00	4.00	1.00	0.535	1	1	1	100	1	1	1.3333
201	747277847	121640828	121637264	1000	3.00	4.00	1.00	0.535	1	1	1	100	1	1	1.3333
202	747340238	121637498	121612287	4200	100.00	90.00	-10.00	1.026	1	1	1	100	1	-10	0.9000
203	747491963	121623980	121632230	1000	1.00	2.00	1.00	0.816	1	1	1	100	1	1	2.0000
204	747491963	121632230	121623980	1000	1.00	0.00	-1.00	1.414	1	1	1	100	1	-1	0.0000
205	748372248	121610075	121634807	1250	0.00	3.00	3.00	2.449	1	1	1	100	1	3	-
206	748372248	121634807	121610075	1250	1.00	3.00	2.00	1.414	1	1	1	100	1	2	3.0000
207	749070638	121618690	121636392	3000	18.00	17.00	-1.00	0.239	1	1	1	100	1	-1	0.9444
208	749995697	121608612	121614756	1250	6.00	8.00	2.00	0.756	1	1	1	100	1	2	1.3333
209	749995697	121614756	121608612	1250	4.00	5.00	1.00	0.471	1	1	1	100	1	1	1.2500
210	750014118	121615439	121611010	2500	7.00	8.00	1.00	0.365	1	1	1	100	1	1	1.1429
211	750263193	121641108	121611644	4200	84.00	67.00	-17.00	1.956	1	1	1	100	1	-17	0.7976
212	750364877	121635539	121641402	1000	2.00	3.00	1.00	0.632	1	1	1	100	1	1	1.5000
213	750364877	121641402	121635539	1000	0.00	3.00	3.00	2.449	1	1	1	100	1	3	-
214	750717080	121630244	121640459	4200	87.00	128.00	41.00	3.954	1	1	1	100	1	41	1.4713
215	751024112	121635051	121633455	3200	33.00	34.00	1.00	0.173	1	1	1	100	1	1	1.0303
216	751108037	121613700	121623860	6300	150.00	175.00	25.00	1.961	1	1	1	100	1	25	1.1667
217	751735358	121642477	121621121	5000	88.00	100.00	12.00	1.238	1	1	1	100	1	12	1.1364
218	752452380	121629477	121611969	1000	29.00	25.00	-4.00	0.770	1	1	1	100	1	-4	0.8621
219	752528192	121613074	121627124	6300	95.00	130.00	35.00	3.300	1	1	1	100	1	35	1.3684
220	2147476835	121630496	121900545	1000	1.00	4.00	3.00	1.897	1	1	1	100	1	3	4.0000
221	2147476835	121900545	121630496	1000	1.00	8.00	7.00	3.300	1	1	1	100	1	7	8.0000
222	2147482944	121900707	121612220	2000	17.00	17.00	0.00	0.000	1	1	1	100	1	0	1.0000
223	2147482953	121900709	121900710	1000	0.00	0.00	0.00	-	1	0	1	100	1	0	-
224	2147482953	121900710	121900709	1000	0.00	0.00	0.00	-	1	0	1	100	1	0	-
225	2147482974	121627782	121900717	1000	8.00	10.00	2.00	0.667	1	1	1	100	1	2	1.2500
226	2147482974	121900717	121627782	1000	11.00	14.00	3.00	0.849	1	1	1	100	1	3	1.2727
227	2147482982	121900720	121607483	1250	25.00	26.00	1.00	0.198	1	1	1	100	1	1	1.0400
228	2147482983	121623487	121900721	1250	19.00	26.00	7.00	1.476	1	1	1	100	1	7	1.3684
229	2147482986	121640508	121900722	1250	5.00	7.00	2.00	0.816	1	1	1	100	1	2	1.4000
230	2147482986	121900722	121640508	1250	14.00	6.00	-8.00	2.530	1	1	1	100	1	-8	0.4286
231	2147482987	121607393	121900723	3200	11.00	18.00	7.00	1.838	1	1	1	100	1	7	1.6364
232	2147482990	121900724	121622399	3750	18.00	34.00	16.00	3.138	1	1	1	100	1	16	1.8889
233	2147483011	121612670	121900733	1350	10.00	11.00	1.00	0.309	1	1	1	100	1	1	1.1000
234	2147483011	121900733	121612670	1350	8.00	10.00	2.00	0.667	1	1	1	100	1	2	1.2500
235	2147483016	121629163	121900735	1350	8.00	10.00	2.00	0.667	1	1	1	100	1	2	1.2500
236	2147483016	121900735	121629163	1350	8.00	9.00	1.00	0.343	1	1	1	100	1	1	1.1250

237	2147483021	121900737	121900738	1350	1.00	3.00	2.00	1.414	-	1	1	100	1	2	3.0000
238	2147483021	121900738	121900737	1350	1.00	4.00	3.00	1.897	-	1	1	100	1	3	4.0000
239	2147483026	121609235	121900740	1350	28.00	17.00	-11.00	2.319	1	1	1	100	1	-11	0.6071
240	2147483026	121900740	121609235	1350	22.00	13.00	-9.00	2.151	1	1	1	100	1	-9	0.5909
241	2147483038	121622881	121900746	1350	24.00	14.00	-10.00	2.294	1	1	1	100	1	-10	0.5833
242	2147483038	121900746	121622881	1350	19.00	15.00	-4.00	0.970	1	1	1	100	1	-4	0.7895
243	2147483058	121897811	121900757	1350	3.00	6.00	3.00	1.414	1	1	1	100	1	3	2.0000
244	2147483058	121900757	121897811	1350	2.00	2.00	0.00	0.000	1	1	1	100	1	0	1.0000
245	2147483074	121608870	121900764	1000	4.00	3.00	-1.00	0.535	1	1	1	100	1	-1	0.7500
246	2147483074	121900764	121608870	1000	5.00	4.00	-1.00	0.471	1	1	1	100	1	-1	0.8000
247	2147483082	121608870	121900768	1000	2.00	4.00	2.00	1.155	1	1	1	100	1	2	2.0000
248	2147483090	121900771	121900772	1000	2.00	2.00	0.00	0.000	1	1	1	100	1	0	1.0000
249	2147483090	121900772	121900771	1000	0.00	2.00	2.00	2.000	1	1	1	100	1	2	-
250	2147483095	121900739	450053962	1350	1.00	4.00	3.00	1.897	1	1	1	100	1	3	4.0000
251	2147483095	450053962	121900739	1350	1.00	5.00	4.00	2.309	1	1	1	100	1	4	5.0000
252	2147483108	121898276	450073308	1350	0.00	4.00	4.00	2.828	1	1	1	100	1	4	-
253	2147483108	450073308	121898276	1350	0.00	2.00	2.00	2.000	1	1	1	100	1	2	-
254	2147483502	121900851	121607917	4200	31.00	38.00	7.00	1.192	1	1	1	100	1	7	1.2258
255	2147483504	121607918	121900852	4200	30.00	32.00	2.00	0.359	1	1	1	100	1	2	1.0667
256	2147483512	121894203	121900899	1350	10.00	6.00	-4.00	1.414	1	1	1	100	1	-4	0.6000
257	2147483512	121900899	121894203	1350	13.00	12.00	-1.00	0.283	1	1	1	100	1	-1	0.9231
258	2147483514	121900951	121892925	1600	19.00	13.00	-6.00	1.500	1	1	1	100	1	-6	0.6842
259	2147483516	121891726	450344631	1350	18.00	13.00	-5.00	1.270	1	1	1	100	1	-5	0.7222
260	2147483516	450344631	121891726	1350	4.00	2.00	-2.00	1.155	1	1	1	100	1	-2	0.5000
261	2147483535	121637306	450344633	4200	94.00	67.00	-27.00	3.009	1	1	1	100	1	-27	0.7128
262	2147483540	121614349	450344628	1250	13.00	5.00	-8.00	2.667	1	1	1	100	1	-8	0.3846
263	2147483540	450344628	121614349	1250	15.00	7.00	-8.00	2.412	1	1	1	100	1	-8	0.4667
264	2147483550	121900929	121606076	1250	2.00	2.00	0.00	0.000	1	1	1	100	1	0	1.0000
265	2147483551	121606077	121900927	1250	2.00	3.00	1.00	0.632	1	1	1	100	1	1	1.5000
266	2147483563	121614100	121900980	1350	3.00	7.00	4.00	1.789	1	1	1	100	1	4	2.3333
267	2147483563	121900980	121614100	1350	7.00	8.00	1.00	0.365	1	1	1	100	1	1	1.1429
268	2147483572	121900979	450053962	1350	1.00	0.00	-1.00	1.414	1	1	1	100	1	-1	0.0000
269	2147483572	450053962	121900979	1350	1.00	1.00	0.00	0.000	1	1	1	100	1	0	1.0000
270	2147483584	121900875	121900876	2500	21.00	20.00	-1.00	0.221	1	1	1	100	1	-1	0.9524
271	2147483592	121900904	121894400	2500	26.00	31.00	5.00	0.937	1	1	1	100	1	5	1.1923
					4336	**4354**	**18**		**268**	**267**			**271**		

Average GEH **1.015**

Appendix D – Model Validation Results

AM Peak Model with Full Matrices 25/08/11

TOTAL TRAFFIC

Number of Links	Links within GEH	Percentage Validated	Links Flow Criteria	Percentage Validated	Total Traffic Observed	Total Traffic Modelled	Difference	Total Traffic GEH	Average GEH
84	72	85.71%	76	90.48%	60683	58093	-2590	10.628	3.070

LIGHT TRAFFIC

Number of Links	Links within GEH	Percentage Validated	Links Flow Criteria	Percentage Validated	Light Traffic Observed	Light Traffic Modelled	Difference	Total Traffic GEH	Average GEH
84	72	85.71%	75	89.29%	58719	56072	-2647	11.049	3.039

HEAVIES TRAFFIC

Number of Links	Links within GEH	Percentage Validated	Links Flow Criteria	Percentage Validated	Heavy Traffic Observed	Heavy Traffic Modelled	Difference	Total Traffic GEH	Average GEH
84	84	100.00%	84	100.00%	1964	2025	61	1.366	1.411

AM Peak Total Traffic Full Matrices 25/08/11

				Observed	Modelled	Difference		RESULT =	85.71%		RESULT =	90.48%		
								REQD =	85.00%		REQD =	85.00%		
Link Number	**From Node**	**To Node**	**Link Capacity (PCU's)**	**Total Traffic**	**Total Traffic**	**Total Traffic**	***GEH***	***COUNT***	***GEH TEST***	***CLASS TEST***	***Target Difference***	***Flow Test***	***ACT DIFF***	***FACTOR***
50827	121890406	121891434	1350	929.00	803.00	-126.00	4.282	1	1	2	139	1	-126	0.8644
50827	121891434	121890406	1350	443.00	384.00	-59.00	2.901	1	1	1	100	1	-59	0.8668
52278	121894401	121892466	1250	1169.00	1116.00	-53.00	1.568	1	1	2	175	1	-53	0.9547
52940	121891726	121898566	1350	76.00	51.00	-25.00	3.137	1	1	1	100	1	-25	0.6711
52940	121898566	121891726	1350	267.00	240.00	-27.00	1.696	1	1	1	100	1	-27	0.8989
551425082	121895471	121896214	1250	231.00	148.00	-83.00	6.029	1	0	1	100	1	-83	0.6407
551425082	121896214	121895471	1250	395.00	344.00	-51.00	2.653	1	1	1	100	1	-51	0.8709
553058337	121612881	121612882	1200	316.00	243.00	-73.00	4.366	1	1	1	100	1	-73	0.7690
553058337	121612882	121612881	1200	302.00	152.00	-150.00	9.956	1	0	1	100	0	-150	0.5033
553058466	121626288	121621232	3500	1639.00	1664.00	25.00	0.615	1	1	2	246	1	25	1.0153
553060374	121625962	121631400	1000	462.00	525.00	63.00	2.836	1	1	1	100	1	63	1.1364
553060374	121631400	121625962	1000	478.00	540.00	62.00	2.748	1	1	1	100	1	62	1.1297
553060380	121609841	121611406	1000	140.00	163.00	23.00	1.869	1	1	1	100	1	23	1.1643
553060380	121611406	121609841	1000	139.00	109.00	-30.00	2.694	1	1	1	100	1	-30	0.7842
553060416	121625962	121625963	1000	167.00	203.00	36.00	2.647	1	1	1	100	1	36	1.2156
553060416	121625963	121625962	1000	132.00	123.00	-9.00	0.797	1	1	1	100	1	-9	0.9318
554375079	121640048	121641516	1250	450.00	647.00	197.00	8.412	1	0	1	100	0	197	1.4378
554375079	121641516	121640048	1250	451.00	476.00	25.00	1.161	1	1	1	100	1	25	1.0554
554377192	121607528	121632444	1000	94.00	41.00	-53.00	6.451	1	0	1	100	1	-53	0.4362
554377192	121632444	121607528	1000	305.00	264.00	-41.00	2.431	1	1	1	100	1	-41	0.8656
554377235	121632803	121611229	1000	1270.00	1177.00	-93.00	2.659	1	1	2	191	1	-93	0.9268
554377307	121613997	121613998	1000	234.00	217.00	-17.00	1.132	1	1	1	100	1	-17	0.9274
554377307	121613998	121613997	1000	375.00	363.00	-12.00	0.625	1	1	1	100	1	-12	0.9680
554377378	121613998	121632862	1000	238.00	272.00	34.00	2.129	1	1	1	100	1	34	1.1429
554377378	121632862	121613998	1000	585.00	609.00	24.00	0.982	1	1	1	100	1	24	1.0410
554391693	121611129	121611574	1250	566.00	615.00	49.00	2.016	1	1	1	100	1	49	1.0866
554391693	121611574	121611129	1250	733.00	666.00	-67.00	2.533	1	1	2	110	1	-67	0.9086
554435144	121614323	121620260	1250	583.00	491.00	-92.00	3.970	1	1	1	100	1	-92	0.8422
554435144	121620260	121614323	1250	558.00	691.00	133.00	5.322	1	0	1	100	0	133	1.2384
554455197	121629478	121629477	1000	762.00	734.00	-28.00	1.024	1	1	2	114	1	-28	0.9633
554455209	121611968	121626256	1000	510.00	490.00	-20.00	0.894	1	1	1	100	1	-20	0.9608
554455209	121626256	121611968	1000	1231.00	1141.00	-90.00	2.613	1	1	2	185	1	-90	0.9269
554472346	121892465	121894922	1250	354.00	305.00	-49.00	2.699	1	1	1	100	1	-49	0.8616
562717636	121611046	121613030	1250	150.00	145.00	-5.00	0.412	1	1	1	100	1	-5	0.9667
562717689	121622408	121625861	3000	2405.00	2240.00	-165.00	3.424	1	1	2	361	1	-165	0.9314
589009149	121625862	121625923	3000	2055.00	1857.00	-198.00	4.477	1	1	2	308	1	-198	0.9036
589028058	121642236	121628686	2500	546.00	560.00	14.00	0.595	1	1	1	100	1	14	1.0256
589028092	121628686	121639300	2500	588.00	525.00	-63.00	2.671	1	1	1	100	1	-63	0.8929
590512871	121616768	121636391	1250	1254.00	1197.00	-57.00	1.628	1	1	2	188	1	-57	0.9545
590512871	121636391	121616768	1250	254.00	269.00	15.00	0.928	1	1	1	100	1	15	1.0591
590522820	121893930	121890858	2000	63.00	49.00	-14.00	1.871	1	1	1	100	1	-14	0.7778
590522823	121891351	121893930	1000	158.00	147.00	-11.00	0.891	1	1	1	100	1	-11	0.9304
723990380	121610112	121614723	1250	309.00	288.00	-21.00	1.215	1	1	1	100	1	-21	0.9320
723990380	121614723	121610112	1250	504.00	616.00	112.00	4.733	1	1	1	100	0	112	1.2222
725759658	121612898	121616364	1600	284.00	145.00	-139.00	9.491	1	0	1	100	0	-139	0.5106
725759658	121616364	121612898	1600	241.00	115.00	-126.00	9.444	1	0	1	100	0	-126	0.4772
728405630	121616537	121610600	2500	1201.00	1046.00	-155.00	4.624	1	1	2	180	1	-155	0.8709
728918498	121617345	121631201	1000	1541.00	1573.00	32.00	0.811	1	1	2	231	1	32	1.0208
728918498	121631201	121617345	1000	355.00	424.00	69.00	3.496	1	1	1	100	1	69	1.1944
733598330	121614449	121623337	1600	466.00	389.00	-77.00	3.724	1	1	1	100	1	-77	0.8348
733786193	121612450	121613074	6300	2417.00	2603.00	186.00	3.713	1	1	2	363	1	186	1.0770
744032705	121638341	121625434	4200	3269.00	2861.00	-408.00	7.370	1	0	2	490	1	-408	0.8752
747420527	121629530	121623665	3500	2136.00	1919.00	-217.00	4.819	1	1	2	320	1	-217	0.8984
747832158	121628977	121626335	2500	1044.00	1036.00	-8.00	0.248	1	1	2	157	1	-8	0.9923
748843238	121625454	121624205	4200	1996.00	1718.00	-278.00	6.451	1	0	2	299	1	-278	0.8607
751080053	121640459	121637498	5500	4543.00	4211.00	-332.00	5.018	1	0	2	681	1	-332	0.9269
751257437	121623860	121635051	6300	2474.00	2578.00	104.00	2.069	1	1	2	371	1	104	1.0420
752699003	121611644	121642477	5000	1769.00	1570.00	-199.00	4.870	1	1	2	265	1	-199	0.8875
2147482939	121623935	121900705	1000	484.00	432.00	-52.00	2.430	1	1	1	100	1	-52	0.8926
2147482939	121900705	121623935	1000	376.00	353.00	-23.00	1.205	1	1	1	100	1	-23	0.9388
2147482979	121608870	121900719	1000	345.00	367.00	22.00	1.166	1	1	1	100	1	22	1.0638
2147482979	121900719	121608870	1000	296.00	330.00	34.00	1.922	1	1	1	100	1	34	1.1149
2147482999	121619122	121900727	1000	518.00	539.00	21.00	0.913	1	1	1	100	1	21	1.0405
2147482999	121900727	121619122	1000	463.00	550.00	87.00	3.866	1	1	1	100	1	87	1.1879
2147483015	121629076	121900735	1350	546.00	438.00	-108.00	4.869	1	1	1	100	0	-108	0.8022
2147483015	121900735	121629076	1350	288.00	148.00	-140.00	9.482	1	0	1	100	0	-140	0.5139
2147483024	121609235	121900739	1350	193.00	191.00	-2.00	0.144	1	1	1	100	1	-2	0.9896
2147483024	121900739	121609235	1350	237.00	283.00	46.00	2.853	1	1	1	100	1	46	1.1941
2147483025	121612670	121900740	1350	226.00	257.00	31.00	1.995	1	1	1	100	1	31	1.1372
2147483025	121900740	121612670	1350	329.00	413.00	84.00	4.361	1	1	1	100	1	84	1.2553
2147483036	121900744	121900745	1350	244.00	273.00	29.00	1.804	1	1	1	100	1	29	1.1189
2147483036	121900745	121900744	1350	258.00	314.00	56.00	3.311	1	1	1	100	1	56	1.2171
2147483054	121892821	121900754	1000	279.00	258.00	-21.00	1.282	1	1	1	100	1	-21	0.9247
2147483054	121900754	121892821	1000	240.00	253.00	13.00	0.828	1	1	1	100	1	13	1.0542
2147483068	121632644	121900762	2500	986.00	868.00	-118.00	3.876	1	1	2	148	1	-118	0.8803
2147483069	121900762	121610360	2500	706.00	738.00	32.00	1.191	1	1	2	106	1	32	1.0453
2147483070	121610596	121900763	2500	1173.00	1272.00	99.00	2.831	1	1	2	176	1	99	1.0844
2147483071	121900763	121611944	2500	1460.00	1287.00	-173.00	4.668	1	1	2	219	1	-173	0.8815
2147483538	450344634	121635082	4200	734.00	824.00	90.00	3.225	1	1	2	110	1	90	1.1226
2147483543	121627667	121900854	1000	327.00	290.00	-37.00	2.107	1	1	1	100	1	-37	0.8869
2147483543	121900854	121627667	1000	245.00	237.00	-8.00	0.515	1	1	1	100	1	-8	0.9673
2147483546	121900931	121608957	3000	986.00	907.00	-79.00	2.568	1	1	2	148	1	-79	0.9199
2147483567	121609235	121900892	1350	74.00	61.00	-13.00	1.582	1	1	1	100	1	-13	0.8243
2147483567	121900892	121609235	1350	64.00	122.00	58.00	6.014	1	0	1	100	1	58	1.9063
				60683	**58093**	**-2590**		**84**	**72**			**76**		

Average GEH **3.070**

AM Peak Light Traffic 25/08/11

				Observed	Modelled	Difference		RESULT =	85.71%		RESULT =	89.29%		
								REQD =	85.00%		REQD =	85.00%		
Link Number	**From Node**	**To Node**	**Link Capacity (PCU's)**	**Light Traffic**	**Light Traffic**	**Light Traffic**	***GEH***	***COUNT***	***GEH TEST***	***CLASS TEST***	***Target Difference***	***Flow Test***	***ACT DIFF***	***FACTOR***
50827	121890406	121891434	1350	891.00	768.00	-123.00	4.271	1	1	2	134	1	-123	0.8620
50827	121891434	121890406	1350	411.00	358.00	-53.00	2.703	1	1	1	100	1	-53	0.8710
52278	121894401	121892466	1250	1134.00	1073.00	-61.00	1.836	1	1	2	170	1	-61	0.9462
52940	121891726	121898566	1350	74.00	49.00	-25.00	3.188	1	1	1	100	1	-25	0.6622
52940	121898566	121891726	1350	264.00	237.00	-27.00	1.706	1	1	1	100	1	-27	0.8977
551425082	121895471	121896214	1250	221.00	140.00	-81.00	6.029	1	0	1	100	1	-81	0.6335
551425082	121896214	121895471	1250	371.00	328.00	-43.00	2.300	1	1	1	100	1	-43	0.8841
553058337	121612881	121612882	1200	308.00	227.00	-81.00	4.952	1	1	1	100	1	-81	0.7370
553058337	121612882	121612881	1200	298.00	139.00	-159.00	10.757	1	0	1	100	0	-159	0.4664
553058466	121626288	121621232	3500	1561.00	1564.00	3.00	0.076	1	1	2	234	1	3	1.0019
553060374	121625962	121631400	1000	454.00	513.00	59.00	2.683	1	1	1	100	1	59	1.1300
553060374	121631400	121625962	1000	469.00	529.00	60.00	2.686	1	1	1	100	1	60	1.1279
553060380	121609841	121611406	1000	140.00	155.00	15.00	1.235	1	1	1	100	1	15	1.1071
553060380	121611406	121609841	1000	138.00	102.00	-36.00	3.286	1	1	1	100	1	-36	0.7391
553060416	121625962	121625963	1000	164.00	199.00	35.00	2.598	1	1	1	100	1	35	1.2134
553060416	121625963	121625962	1000	129.00	119.00	-10.00	0.898	1	1	1	100	1	-10	0.9225
554375079	121640048	121641516	1250	441.00	630.00	189.00	8.167	1	0	1	100	0	189	1.4286
554375079	121641516	121640048	1250	448.00	464.00	16.00	0.749	1	1	1	100	1	16	1.0357
554377192	121607528	121632444	1000	91.00	38.00	-53.00	6.599	1	0	1	100	1	-53	0.4176
554377192	121632444	121607528	1000	302.00	262.00	-40.00	2.382	1	1	1	100	1	-40	0.8675
554377235	121632803	121611229	1000	1250.00	1156.00	-94.00	2.710	1	1	2	188	1	-94	0.9248
554377307	121613997	121613998	1000	225.00	210.00	-15.00	1.017	1	1	1	100	1	-15	0.9333
554377307	121613998	121613997	1000	357.00	348.00	-9.00	0.479	1	1	1	100	1	-9	0.9748
554377378	121613998	121632862	1000	228.00	262.00	34.00	2.172	1	1	1	100	1	34	1.1491
554377378	121632862	121613998	1000	565.00	589.00	24.00	0.999	1	1	1	100	1	24	1.0425
554391693	121611129	121611574	1250	554.00	607.00	53.00	2.200	1	1	1	100	1	53	1.0957
554391693	121611574	121611129	1250	719.00	660.00	-59.00	2.247	1	1	2	108	1	-59	0.9179
554435144	121614323	121620260	1250	555.00	466.00	-89.00	3.939	1	1	1	100	1	-89	0.8396
554435144	121620260	121614323	1250	531.00	679.00	148.00	6.017	1	0	1	100	0	148	1.2787
554455197	121629478	121629477	1000	735.00	708.00	-27.00	1.005	1	1	2	110	1	-27	0.9633
554455209	121611968	121626256	1000	482.00	469.00	-13.00	0.596	1	1	1	100	1	-13	0.9730
554455209	121626256	121611968	1000	1207.00	1126.00	-81.00	2.372	1	1	2	181	1	-81	0.9329
554472346	121892465	121894922	1250	335.00	279.00	-56.00	3.196	1	1	1	100	1	-56	0.8328
562717636	121611046	121613030	1250	143.00	141.00	-2.00	0.168	1	1	1	100	1	-2	0.9860
562717689	121622408	121625861	3000	2377.00	2205.00	-172.00	3.593	1	1	2	357	1	-172	0.9276
589009149	121625862	121625923	3000	2020.00	1821.00	-199.00	4.541	1	1	2	303	1	-199	0.9015
589028058	121642236	121628686	2500	531.00	544.00	13.00	0.561	1	1	1	100	1	13	1.0245
589028092	121628686	121639300	2500	580.00	518.00	-62.00	2.646	1	1	1	100	1	-62	0.8931
590512871	121616768	121636391	1250	1237.00	1189.00	-48.00	1.378	1	1	2	186	1	-48	0.9612
590512871	121636391	121616768	1250	234.00	253.00	19.00	1.218	1	1	1	100	1	19	1.0812
590522820	121893930	121890858	2000	58.00	49.00	-9.00	1.230	1	1	1	100	1	-9	0.8448
590522823	121891351	121893930	1000	155.00	147.00	-8.00	0.651	1	1	1	100	1	-8	0.9484
723990380	121610112	121614723	1250	297.00	281.00	-16.00	0.941	1	1	1	100	1	-16	0.9461
723990380	121614723	121610112	1250	497.00	612.00	115.00	4.884	1	1	1	100	0	115	1.2314
725759658	121612898	121616364	1600	273.00	142.00	-131.00	9.094	1	0	1	100	0	-131	0.5201
725759658	121616364	121612898	1600	226.00	106.00	-120.00	9.314	1	0	1	100	0	-120	0.4690
728405630	121616537	121610600	2500	1159.00	1002.00	-157.00	4.776	1	1	2	174	1	-157	0.8645
728918498	121617345	121631201	1000	1518.00	1543.00	25.00	0.639	1	1	2	228	1	25	1.0165
728918498	121631201	121617345	1000	333.00	388.00	55.00	2.897	1	1	1	100	1	55	1.1652
733598330	121614449	121623337	1600	456.00	382.00	-74.00	3.615	1	1	1	100	1	-74	0.8377
733786193	121612450	121613074	6300	2348.00	2495.00	147.00	2.987	1	1	2	352	1	147	1.0626
744032705	121638341	121625434	4200	3194.00	2747.00	-447.00	8.201	1	0	2	479	1	-447	0.8601
747420527	121629530	121623665	3500	2035.00	1821.00	-214.00	4.874	1	1	2	305	1	-214	0.8948
747832158	121628977	121626335	2500	1024.00	1010.00	-14.00	0.439	1	1	2	154	1	-14	0.9863
748843238	121625454	121624205	4200	1891.00	1607.00	-284.00	6.791	1	0	2	284	0	-284	0.8498
751080053	121640459	121637498	5500	4412.00	4083.00	-329.00	5.048	1	0	2	662	1	-329	0.9254
751257437	121623860	121635051	6300	2353.00	2441.00	88.00	1.797	1	1	2	353	1	88	1.0374
752699003	121611644	121642477	5000	1655.00	1470.00	-185.00	4.680	1	1	2	248	1	-185	0.8882
2147482939	121623935	121900705	1000	470.00	424.00	-46.00	2.176	1	1	1	100	1	-46	0.9021
2147482939	121900705	121623935	1000	361.00	345.00	-16.00	0.852	1	1	1	100	1	-16	0.9557
2147482979	121608870	121900719	1000	336.00	352.00	16.00	0.863	1	1	1	100	1	16	1.0476
2147482979	121900719	121608870	1000	288.00	319.00	31.00	1.779	1	1	1	100	1	31	1.1076
2147482999	121619122	121900727	1000	509.00	528.00	19.00	0.834	1	1	1	100	1	19	1.0373
2147482999	121900727	121619122	1000	455.00	539.00	84.00	3.768	1	1	1	100	1	84	1.1846
2147483015	121629076	121900735	1350	536.00	430.00	-106.00	4.823	1	1	1	100	0	-106	0.8022
2147483015	121900735	121629076	1350	281.00	141.00	-140.00	9.638	1	0	1	100	0	-140	0.5018
2147483024	121609235	121900739	1350	177.00	181.00	4.00	0.299	1	1	1	100	1	4	1.0226
2147483024	121900739	121609235	1350	213.00	272.00	59.00	3.789	1	1	1	100	1	59	1.2770
2147483025	121612670	121900740	1350	216.00	244.00	28.00	1.846	1	1	1	100	1	28	1.1296
2147483025	121900740	121612670	1350	314.00	396.00	82.00	4.352	1	1	1	100	1	82	1.2611
2147483036	121900744	121900745	1350	241.00	262.00	21.00	1.324	1	1	1	100	1	21	1.0871
2147483036	121900745	121900744	1350	252.00	300.00	48.00	2.889	1	1	1	100	1	48	1.1905
2147483054	121892821	121900754	1000	266.00	250.00	-16.00	0.996	1	1	1	100	1	-16	0.9398
2147483054	121900754	121892821	1000	227.00	249.00	22.00	1.426	1	1	1	100	1	22	1.0969
2147483068	121632644	121900762	2500	968.00	843.00	-125.00	4.154	1	1	2	145	1	-125	0.8709
2147483069	121900762	121610360	2500	685.00	713.00	28.00	1.059	1	1	1	100	1	28	1.0409
2147483070	121610596	121900763	2500	1109.00	1228.00	119.00	3.481	1	1	2	166	1	119	1.1073
2147483071	121900763	121611944	2500	1415.00	1242.00	-173.00	4.746	1	1	2	212	1	-173	0.8777
2147483538	450344634	121635082	4200	709.00	792.00	83.00	3.030	1	1	2	106	1	83	1.1171
2147483543	121627667	121900854	1000	319.00	285.00	-34.00	1.956	1	1	1	100	1	-34	0.8934
2147483543	121900854	121627667	1000	228.00	223.00	-5.00	0.333	1	1	1	100	1	-5	0.9781
2147483546	121900931	121608957	3000	965.00	888.00	-77.00	2.530	1	1	2	145	1	-77	0.9202
2147483567	121609235	121900892	1350	64.00	58.00	-6.00	0.768	1	1	1	100	1	-6	0.9063
2147483567	121900892	121609235	1350	57.00	118.00	61.00	6.521	1	0	1	100	1	61	2.0702
				58719	**56072**	**-2647**		**84**	**72**			**75**		

Average GEH **3.039**

AM Peak Heavy Traffic 25/08/11

				Observed	Modelled	Difference		RESULT =	100.00%		RESULT =	100.00%		
								REQD =	85.00%		REQD =	85.00%		
Link Number	**From Node**	**To Node**	**Link Capacity (PCU's)**	**Heavy Traffic**	**Heavy Traffic**	**Heavy Traffic**	***GEH***	***COUNT***	***GEH TEST***	***CLASS TEST***	***Target Difference***	***Flow Test***	***ACT DIFF***	***FACTOR***
50827	121890406	121891434	1350	38.00	34.00	-4.00	0.667	1	1	1	100	1	-4	0.8947
50827	121891434	121890406	1350	32.00	26.00	-6.00	1.114	1	1	1	100	1	-6	0.8125
52278	121894401	121892466	1250	35.00	43.00	8.00	1.281	1	1	1	100	1	8	1.2286
52940	121891726	121898566	1350	2.00	2.00	0.00	0.000	1	1	1	100	1	0	1.0000
52940	121898566	121891726	1350	3.00	3.00	0.00	0.000	1	1	1	100	1	0	1.0000
551425082	121895471	121896214	1250	10.00	8.00	-2.00	0.667	1	1	1	100	1	-2	0.8000
551425082	121896214	121895471	1250	24.00	16.00	-8.00	1.789	1	1	1	100	1	-8	0.6667
553058337	121612881	121612882	1200	8.00	16.00	8.00	2.309	1	1	1	100	1	8	2.0000
553058337	121612882	121612881	1200	4.00	13.00	9.00	3.087	1	1	1	100	1	9	3.2500
553058466	121626288	121621232	3500	78.00	100.00	22.00	2.332	1	1	1	100	1	22	1.2821
553060374	121625962	121631400	1000	8.00	12.00	4.00	1.265	1	1	1	100	1	4	1.5000
553060374	121631400	121625962	1000	9.00	11.00	2.00	0.632	1	1	1	100	1	2	1.2222
553060380	121609841	121611406	1000	0.00	7.00	7.00	3.742	1	1	1	100	1	7	-
553060380	121611406	121609841	1000	1.00	7.00	6.00	3.000	1	1	1	100	1	6	7.0000
553060416	121625962	121625963	1000	3.00	4.00	1.00	0.535	1	1	1	100	1	1	1.3333
553060416	121625963	121625962	1000	3.00	4.00	1.00	0.535	1	1	1	100	1	1	1.3333
554375079	121640048	121641516	1250	9.00	17.00	8.00	2.219	1	1	1	100	1	8	1.8889
554375079	121641516	121640048	1250	3.00	12.00	9.00	3.286	1	1	1	100	1	9	4.0000
554377192	121607528	121632444	1000	3.00	3.00	0.00	0.000	1	1	1	100	1	0	1.0000
554377192	121632444	121607528	1000	3.00	2.00	-1.00	0.632	1	1	1	100	1	-1	0.6667
554377235	121632803	121611229	1000	20.00	20.00	0.00	0.000	1	1	1	100	1	0	1.0000
554377307	121613997	121613998	1000	9.00	7.00	-2.00	0.707	1	1	1	100	1	-2	0.7778
554377307	121613998	121613997	1000	18.00	16.00	-2.00	0.485	1	1	1	100	1	-2	0.8889
554377378	121613998	121632862	1000	10.00	11.00	1.00	0.309	1	1	1	100	1	1	1.1000
554377378	121632862	121613998	1000	20.00	20.00	0.00	0.000	1	1	1	100	1	0	1.0000
554391693	121611129	121611574	1250	12.00	8.00	-4.00	1.265	1	1	1	100	1	-4	0.6667
554391693	121611574	121611129	1250	14.00	6.00	-8.00	2.530	1	1	1	100	1	-8	0.4286
554435144	121614323	121620260	1250	28.00	25.00	-3.00	0.583	1	1	1	100	1	-3	0.8929
554435144	121620260	121614323	1250	27.00	13.00	-14.00	3.130	1	1	1	100	1	-14	0.4815
554455197	121629478	121629477	1000	27.00	25.00	-2.00	0.392	1	1	1	100	1	-2	0.9259
554455209	121611968	121626256	1000	28.00	21.00	-7.00	1.414	1	1	1	100	1	-7	0.7500
554455209	121626256	121611968	1000	24.00	15.00	-9.00	2.038	1	1	1	100	1	-9	0.6250
554472346	121892465	121894922	1250	19.00	26.00	7.00	1.476	1	1	1	100	1	7	1.3684
562717636	121611046	121613030	1250	7.00	4.00	-3.00	1.279	1	1	1	100	1	-3	0.5714
562717689	121622408	121625861	3000	28.00	35.00	7.00	1.247	1	1	1	100	1	7	1.2500
589009149	121625862	121625923	3000	35.00	37.00	2.00	0.333	1	1	1	100	1	2	1.0571
589028058	121642236	121628686	2500	15.00	16.00	1.00	0.254	1	1	1	100	1	1	1.0667
589028092	121628686	121639300	2500	8.00	7.00	-1.00	0.365	1	1	1	100	1	-1	0.8750
590512871	121616768	121636391	1250	17.00	8.00	-9.00	2.546	1	1	1	100	1	-9	0.4706
590512871	121636391	121616768	1250	20.00	16.00	-4.00	0.943	1	1	1	100	1	-4	0.8000
590522820	121893930	121890858	2000	5.00	0.00	-5.00	3.162	1	1	1	100	1	-5	0.0000
590522823	121891351	121893930	1000	3.00	0.00	-3.00	2.449	1	1	1	100	1	-3	0.0000
723990380	121610112	121614723	1250	12.00	7.00	-5.00	1.622	1	1	1	100	1	-5	0.5833
723990380	121614723	121610112	1250	7.00	4.00	-3.00	1.279	1	1	1	100	1	-3	0.5714
725759658	121612898	121616364	1600	11.00	3.00	-8.00	3.024	1	1	1	100	1	-8	0.2727
725759658	121616364	121612898	1600	15.00	10.00	-5.00	1.414	1	1	1	100	1	-5	0.6667
728405630	121616537	121610600	2500	42.00	43.00	1.00	0.153	1	1	1	100	1	1	1.0238
728918498	121617345	121631201	1000	23.00	30.00	7.00	1.360	1	1	1	100	1	7	1.3043
728918498	121631201	121617345	1000	22.00	36.00	14.00	2.600	1	1	1	100	1	14	1.6364
733598330	121614449	121623337	1600	10.00	8.00	-2.00	0.667	1	1	1	100	1	-2	0.8000
733786193	121612450	121613074	6300	69.00	107.00	38.00	4.051	1	1	1	100	1	38	1.5507
744032705	121638341	121625434	4200	75.00	115.00	40.00	4.104	1	1	1	100	1	40	1.5333
747420527	121629530	121623665	3500	101.00	98.00	-3.00	0.301	1	1	1	100	1	-3	0.9703
747832158	121628977	121626335	2500	20.00	27.00	7.00	1.444	1	1	1	100	1	7	1.3500
748843238	121625454	121624205	4200	105.00	112.00	7.00	0.672	1	1	1	100	1	7	1.0667
751080053	121640459	121637498	5500	131.00	128.00	-3.00	0.264	1	1	1	100	1	-3	0.9771
751257437	121623860	121635051	6300	121.00	137.00	16.00	1.409	1	1	1	100	1	16	1.1322
752699003	121611644	121642477	5000	114.00	100.00	-14.00	1.353	1	1	1	100	1	-14	0.8772
2147482939	121623935	121900705	1000	14.00	8.00	-6.00	1.809	1	1	1	100	1	-6	0.5714
2147482939	121900705	121623935	1000	15.00	9.00	-6.00	1.732	1	1	1	100	1	-6	0.6000
2147482979	121608870	121900719	1000	9.00	14.00	5.00	1.474	1	1	1	100	1	5	1.5556
2147482979	121900719	121608870	1000	8.00	10.00	2.00	0.667	1	1	1	100	1	2	1.2500
2147482999	121619122	121900727	1000	9.00	11.00	2.00	0.632	1	1	1	100	1	2	1.2222
2147482999	121900727	121619122	1000	8.00	12.00	4.00	1.265	1	1	1	100	1	4	1.5000
2147483015	121629076	121900735	1350	10.00	8.00	-2.00	0.667	1	1	1	100	1	-2	0.8000
2147483015	121900735	121629076	1350	7.00	7.00	0.00	0.000	1	1	1	100	1	0	1.0000
2147483024	121609235	121900739	1350	16.00	11.00	-5.00	1.361	1	1	1	100	1	-5	0.6875
2147483024	121900739	121609235	1350	24.00	11.00	-13.00	3.108	1	1	1	100	1	-13	0.4583
2147483025	121612670	121900740	1350	10.00	13.00	3.00	0.885	1	1	1	100	1	3	1.3000
2147483025	121900740	121612670	1350	15.00	17.00	2.00	0.500	1	1	1	100	1	2	1.1333
2147483036	121900744	121900745	1350	3.00	11.00	8.00	3.024	1	1	1	100	1	8	3.6667
2147483036	121900745	121900744	1350	6.00	14.00	8.00	2.530	1	1	1	100	1	8	2.3333
2147483054	121892821	121900754	1000	13.00	8.00	-5.00	1.543	1	1	1	100	1	-5	0.6154
2147483054	121900754	121892821	1000	13.00	5.00	-8.00	2.667	1	1	1	100	1	-8	0.3846
2147483068	121632644	121900762	2500	18.00	25.00	7.00	1.510	1	1	1	100	1	7	1.3889
2147483069	121900762	121610360	2500	21.00	25.00	4.00	0.834	1	1	1	100	1	4	1.1905
2147483070	121610596	121900763	2500	64.00	44.00	-20.00	2.722	1	1	1	100	1	-20	0.6875
2147483071	121900763	121611944	2500	45.00	44.00	-1.00	0.150	1	1	1	100	1	-1	0.9778
2147483538	450344634	121635082	4200	25.00	32.00	7.00	1.311	1	1	1	100	1	7	1.2800
2147483543	121627667	121900854	1000	8.00	5.00	-3.00	1.177	1	1	1	100	1	-3	0.6250
2147483543	121900854	121627667	1000	17.00	14.00	-3.00	0.762	1	1	1	100	1	-3	0.8235
2147483546	121900931	121608957	3000	21.00	19.00	-2.00	0.447	1	1	1	100	1	-2	0.9048
2147483567	121609235	121900892	1350	10.00	3.00	-7.00	2.746	1	1	1	100	1	-7	0.3000
2147483567	121900892	121609235	1350	7.00	4.00	-3.00	1.279	1	1	1	100	1	-3	0.5714
				1964	**2025**	**61**		**84**	**84**			**84**		

Average GEH **1.411**