Údarás
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National **Transport** Authority

Cork Metropolitan Area Transport Strategy

Demand Analysis Report

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1 Introduction

1.1 Background

The National Transport Authority (NTA) is a public body set up under statute and established in December 2009. The role and functions of the NTA are set out in three Acts of the Oireachtas; the Dublin Transport Authority Act 2008, the Public Transport Regulation Act 2009 and the Taxi Regulation Act 2013. In August 2015, the Department of Transport, Tourism and Sport (DTTaS) published its policy document *"Investing in our Transport Future - Strategic Investment Framework for Land Transport"*. Action 4 of that framework states that: *"Regional transport strategies will be prepared by the NTA and provide an input to regional spatial and economic strategies".*

Having regard to its role in relation to transport, and the action placed upon it in the DTTaS policy document, the NTA, in collaboration with Cork County and City Councils, is developing a Transport Strategy for the Cork Metropolitan Area (CMA) covering the period 2017 to 2036. The strategy will provide a framework for the planning and delivery of transport infrastructure and services in the CMA over the next two decades. It will also provide a planning policy for which other agencies can align their future policies and infrastructure investment.

1.2 Purpose of this Report

The methodology for the development of the CMA Transport Strategy 2017-2036 is undertaken on a step by step basis, from: reviewing the existing policy and transport baseline, undertaking a detailed future demand analysis, developing transport options, optimisation of land use to align with high performing transport corridors, developing the draft Strategy for public consultation and subsequently finalising the Strategy. Figure 1-1 outlines the proposed methodology.

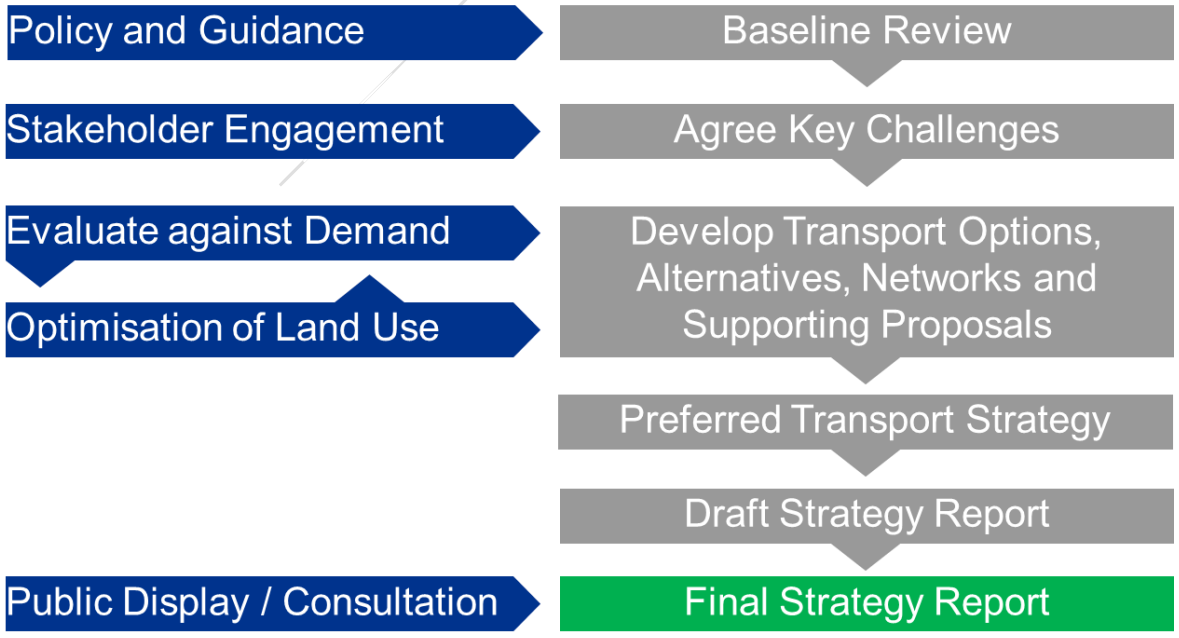


Figure 1-1: Cork Metropolitan Area Transport Strategy Methodology

The third task in the preparation of the Strategy is an assessment of the future travel demand within the CMA. This report outlines the methodology adopted to estimate future land use within the CMA and the assumptions underpinning the 2036 growth in population, employment and education and the distribution of this growth. Two initial model runs have been undertaken for this landuse scenario using the NTA's Southwest Regional Model (SWRM) to assess the likely future 2036 travel demand.

The aim of this stage of the strategy is to establish a thorough understanding of the future travel demand and movement patterns to inform the development of transport options, network and supporting proposals for further testing. The demand and movement patterns have been assessed using individual and combined corridor analysis, the details of which are outlined in this report.

1.3 Report Structure

The following provides a description of the contents of each section of the report;

- **Section 2:** Outline of the estimated 2036 modelled landuse data and the assumptions underpinning this data;
- **Section 3:** Overview of the NTA modelling system and how travel demand is generated from the 2036 landuse data;
- **Section 4:** Comparison of the high-level results from the two scenarios modelled using the 2036 travel demand;
- **Section 5:** Detailed analysis of the future travel demand at a corridor level for the idealised network scenario;
- **Section 6:** Summary of the combined demand from all corridors and the indicative strategic network required to meet this demand.

2 Planning Data Section

2.1 Overview

The NTA prepared a Planning Datasheet for the 2036 Baseline Landuse Scenario for the application within the CMA Transport Strategy. The Planning Datasheet contains data at a settlement level by population, employment and education. This section looks at the settlement level by which the Planning Data was reviewed and adjusted, methodology for the development of the 2036 Baseline Land Use Scenario, an overview of the Planning Datasheets by population, employment and education.

2.2 Settlement Levels

2.2.1 Cork City and County Settlements

The population, employment and education data at its most disaggregated form consists of 2,870 Census Small Areas (CSAs) for the SWRM. In the interest of simplicity these CSAs were grouped into specific settlements that allowed for sensible analysis of these locations. The settlements do not match Electoral District boundaries but are defined based on a best match between the South West Regional Model Zoning System and the planning data at a CSA level. The settlement areas have been developed by the NTA planning team and have been used to adjust previous Planning Datasheets for example the 2035 Local Area Plan Datasheet. Additional growth is added at a settlement level in order to test future year scenarios. The settlements comprise of the following areas and are presented in Table 2-1 and illustrated in Figure 2-1 to Figure 2-3.

Table 2-1: Settlements

Settlements	City	Metropolitan	County
1.	City Centre	Ballincollig	Fermoy
2.	City NW	Blarney	Kinsale
3.	City NE	Carrigaline	Mallow
4.	City SE	Carrigtwohill	Bantry
5.	City SW	Cobh	Youghal
6.	Blackpool	Ballyvolane	Clonakilty
7.	Tivoli	Glanmire	Bandon
8.	Docklands	Midleton	Macroom
9.	Mahon	Monard	Mitchelstown
10.	Wilton	South Environs	Watergrasshill
11.	CUH	Passage West	Millstreet
12.	Model Farm	CSIP	Skibbereen
13.	Apple	Little Island	Kanturk
14.		Ringaskiddy	Dunmanway
15.		Airport	Rathcormac
16.		Metro Villages & Rural Areas	Castlemartyr

17.			Rathluirc
18.			Kilumney
19.			Ballinhassig
20.			Cork Rural

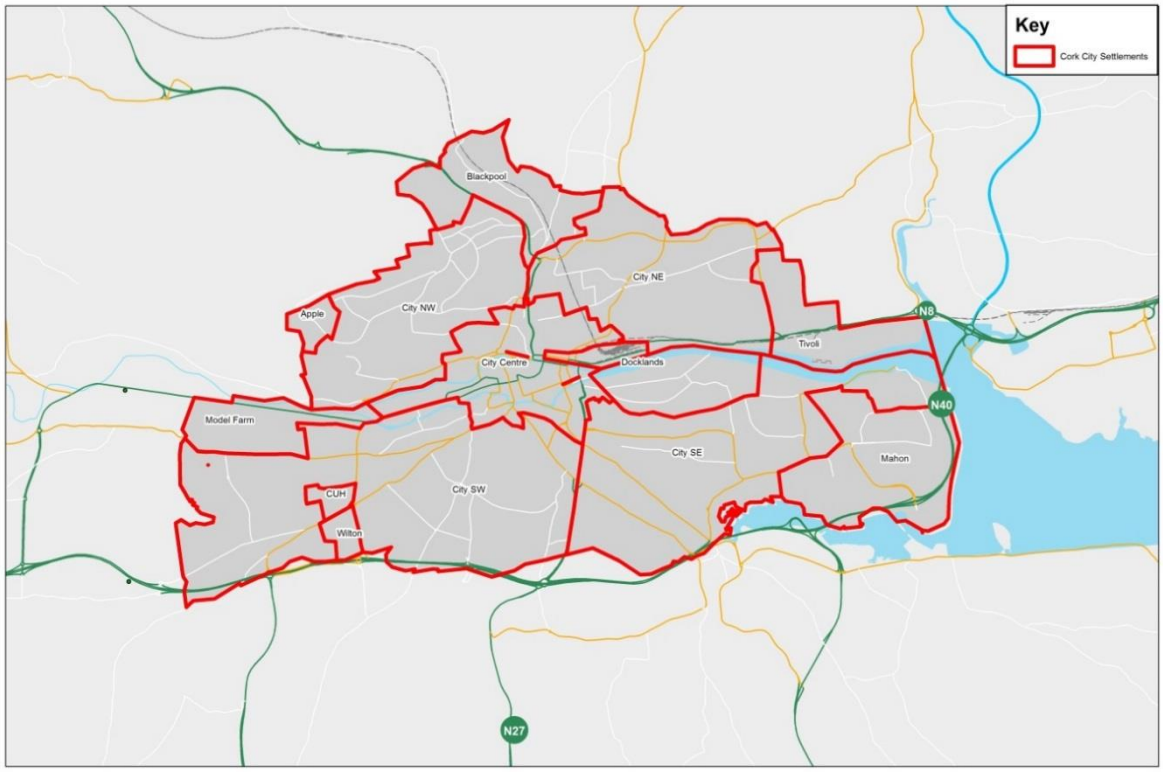


Figure 2-1: City Settlements

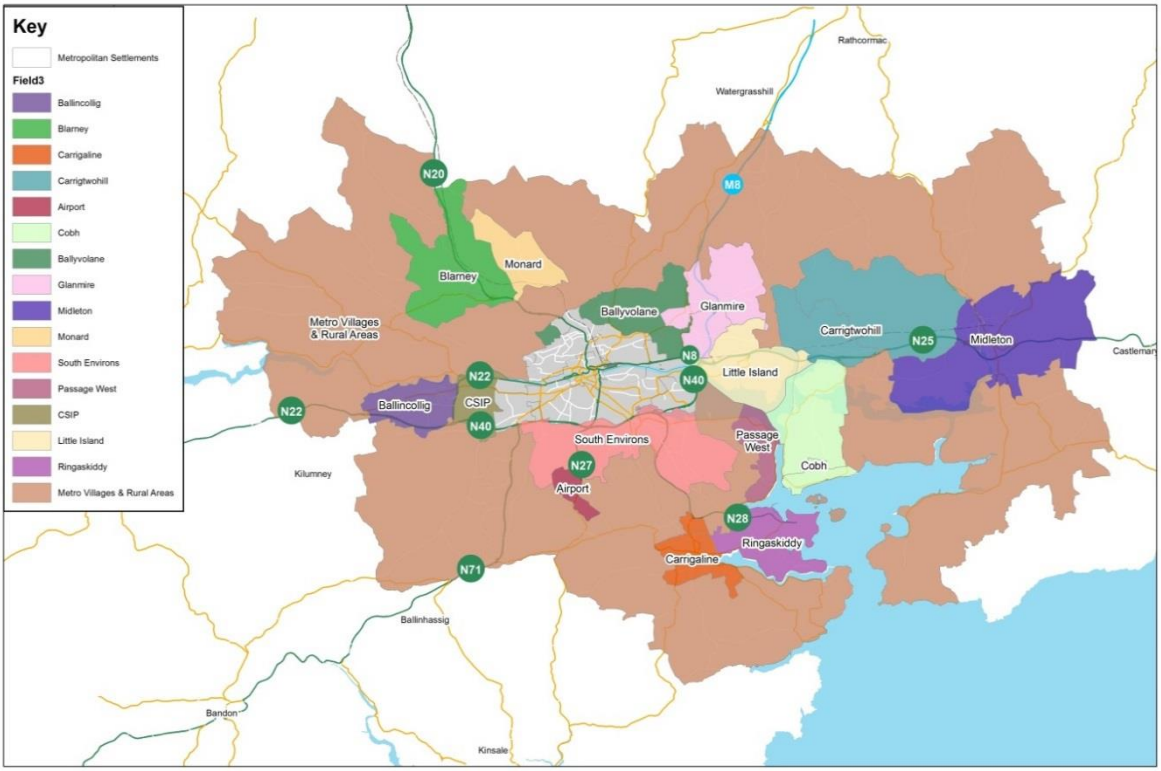


Figure 2-2: Metropolitan Settlements

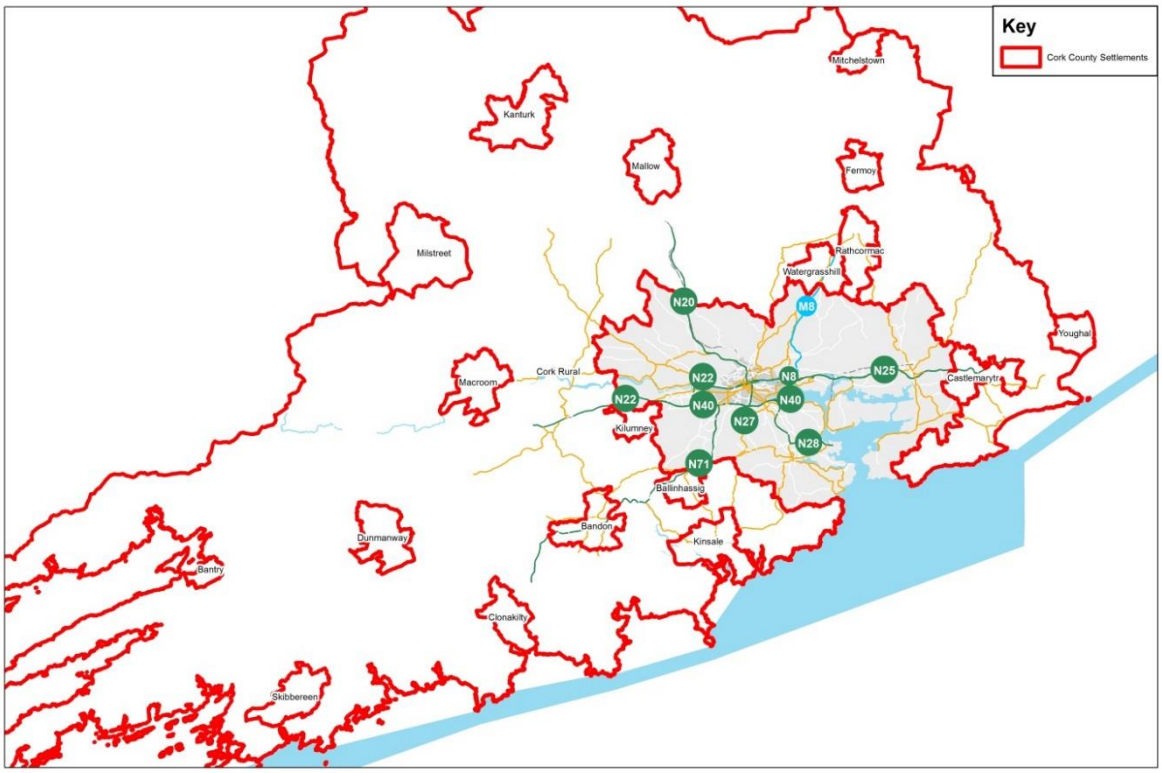


Figure 2-3: County Settlements

The table and figure above shows the breakdown of the settlements for the Cork:

- Cork City – 13 Settlements
- Cork Metropolitan – 16 Settlements
- Cork County – 20 Settlements
- Total 49

2.3 Methodology

The section below discusses the methodology behind the development of the 2036 Baseline Landuse Scenario. Existing Planning Datasheets have been utilised in the development of the 2036 Baseline Landuse Scenario. These existing Planning Datasheets include 2011 Base, 2035 Core Strategy and the 2035 Local Area Plan's Masterplans Datasheet.

2.3.1 Population Methodology

The Future Year 2035 Local Area Plan Masterplans Planning Datasheet was based on the existing Regional Planning Guidelines / Core Strategy distribution, with adjustments at sub-settlement level, to incorporate the various Masterplans expected population, employment and education yields.

The Population Methodology started with the 2035 Planning Datasheet and applied the following adjustments:

1. Proportionally adjusted population growth to 2035 M2 F2 across the City, Metropolitan and County administrative areas;
2. This was applied on a simple, proportional basis, factors were applied at a settlement level growth distribution (settlements as defined in Chapter 2);
3. Proportionally uplifted the population from 2035 M2 F2 to 2036 M2 F2 by extrapolating the growth using the following factors: 0.8% City, 0.8% Metro and 0.2% County;
4. The generated 2036 M2 F2 Planning Datasheet (from step 3) reviewed and revised the distribution of growth forecasts for the non-metropolitan county settlements to more closely match the growth forecasts as set out in the County Development Plan 2014.
   - The County Development Plan future year (2022) growth distribution at the county non-metropolitan settlement level was applied to the growth between the total 2011 and 2036 population at settlements where the largest increase in population was experienced.
   - The smaller rural areas at the county non-metropolitan areas applied a percentage growth rate in line with County Development Plan percentage growth increases.
5. The 2036 M2 F2 Planning Datasheet was generated by starting with the 2035 Planning Datasheet and applying the adjustments listed above which resulted in the development of the population numbers for the 2036 M2 F2 Planning Datasheet.

The regional growth projection M2 F2 is the projection that formed most of the analysis in the CSO release of their "Regional Projections 2016 – 2031". The M2 F2 traditional variant combines a return to net inward migration with steady falling fertility and a return patterns of migration.

2.3.2 Job/Education Methodology

The adjustment to the Job and Education numbers to develop the 2036 Planning Datasheet started with the 2035 Planning Datasheet and applied the following adjustments:

1. The 2036 scenario applied the 2035 Local Area Plan (LAP) Planning Datasheet education numbers at a settlement level for the city, metropolitan and county areas. Adjustments were made to a small number of settlements to ensure that education growth as a percentage of population growth was sensible.
   - An average of the 2011 and 2035 education ratios was applied to ensure that there was not an over provision of education places as the population growth had been constrained to M2 F2.

- For example, settlements applied an average education ratio in order to constrain education places to reflect the reduction in population to M2 F2 levels.

2. Ratios between population and jobs at a settlement level were reviewed for previous planning datasheets;
3. The 2036 employment by settlement applied an average of the 2011 and 2035 employment ratios to the majority of settlements. Manual adjustments at an individual settlement level were made based on a review of each settlement.

    - For example, at the Docklands a 2035 ratio was applied to ensure that the intensification of employment was retained in that settlement for the 2036 Planning Datasheet.
    - It is acknowledged that the 2011 employment numbers by settlement reflect the economic conditions at the time. The 2035 employment numbers reflect an employment growth that assists in the rebalancing of employment.

A further sense check looked at reviewing the employment growth rate was approximately 50% of the overall population growth rates. This sense check demonstrated that the city (43%), metropolitan (50%) and county (44%) is deemed to be appropriate.

2.4 2036 M2 F2 Planning Datasheet Summary

The sections below present population, job and education numbers for the derived 2036 Baseline Land Use Scenario at a high level between Cork City, Cork County Metropolitan Area and the remainder of Cork County. Comparison between the 2036 and the 2011 scenario are also made to present the growth between the two scenarios.

2.4.1 Population

Table 2-2 provide a comparison between the 2011 and the 2036 Planning Datasheets at a county level.

Table 2-2: Population Comparison at City, Metropolitan and County Level

Cork Split	Population		Population Growth	
	2011	2036 M2 F2	2011 to 2036	
Cork City	119,230	142,426	23196	19.45%
Cork Metro	170,509	203,070	32561	19.10%
Cork County*	229,293	242,718	13425	5.85%
Total	**519,032**	**588,214**	69182	13.3%

*Excluding Cork Metropolitan Area

2.4.2 Employment

Table 2-3 provide a comparison between the 2011 and the 2036 Planning Datasheets at a county level.

Table 2-3: Job Comparison at City, Metropolitan and County Level

Cork Split	Job		Job Growth	
	2011	2036 M2 F2	2011 to 2036	
Cork City	64,731	82,731	18001	27.81%
Cork Metro	47,415	61,002	13587	28.65%
Cork County*	44,211	47,946	3735	8.45%
Total	**156,357**	**191,679**	35322	22.6%

*Excluding Cork Metropolitan Area

The level of employment growth may appear high for Cork County, 8.45%, when compared to population growth which is 5.85%. However, the employment growth is sensible when you look at the employment as a

percentage of population. A summary of Planning Datasheets for the *employment as a percentage of population* for Cork County is presented below:

- 2011 Planning Datasheet – 19.3%
- 2035 Masterplan Planning Datasheet – 19.9%
- 2036 M2 F2 Planning Datasheet – 19.8%

This is also similar when comparing Cork City and Cork Metropolitan areas. In addition, as outlined in the methodology, a good rule of thumb is that the employment growth rate should be approximately 50% of the overall population growth rates. The 2036 M2 F2 Planning Datasheet employment growth rate of the overall population growth rates for the City is 43%, Metropolitan area 50% and the County non-metropolitan area is 44%.

2.4.3 Education

Table 2-4 provides a comparison between the 2011 and the 2036 Planning Datasheets at a county and settlement level respectively.

Table 2-4: Education Comparison at City, Metropolitan and County Level

Cork Split	Education		Education Growth	
	2011	2036 M2 F2	2011 to 2036	
Cork City	41,337	48,444	7107	17.19%
Cork Metro	28,175	35,575	7400	26.27%
Cork County*	39,184	42,430	3246	8.28%
Total	**108,696**	**126,449**	17753	16.3%

*Excluding Cork Metropolitan Area

The level of education growth may appear high for Cork County, 8.28%, when compared to population growth which is 5.85%. However, the education growth is sensible when you look at the education as a percentage of population. A summary of Planning Datasheets for the *education as a percentage of population* for Cork County is presented below:

- 2011 Planning Datasheet – 17.1%
- 2035 Masterplan Planning Datasheet – 17.9%
- 2036 M2 F2 Planning Datasheet – 17.5%

2.4.4 Review of Population Distribution

The 2036 Baseline Land Use Scenario population percentage split between City, Metropolitan and County compares well against the percentage split of the 2022 Core Strategy as outlined in the City and County Development Plans. Table 2-5 and Table 2-6 summarise Cork population splits for the following:

- Existing Planning Datasheets
  - 2011 Planning Datasheet;
  - 2035 Local Area Plan Masterplan Planning Datasheet; and
  - 2036 M2 F2.
- 2022 Future Year Percentage Split (obtained from Core Strategy)
- 2035 M2 F2 CSO Population Growth Projections

Table 2-5: Cork Population Split Comparison

Cork Split	2011	2022	2035 LAP	2035 M2 F2	2036 M2 F2
Kerry	145,502	174,378	164,487	164,495	165,286
Cork City	119,230	150,000	149,947	141,498	142,426
Cork Metro	170,509	213,981	223,920	201,768	203,070
Cork County*	229,293	256,731	237,050	242,180	242,718
South West Region	664,534	795,090	775,404	749,941	753,501

*Excluding Cork Metropolitan Area

Table 2-6: Cork Population Split % Comparison

Cork Split %	2011	2022	2035 LAP	2035 M2 F2	2036 M2 F2
Kerry	22%	22%	21%	22%	22%
Cork City	18%	19%	19%	19%	19%
Cork Metro	26%	27%	29%	27%	27%
Cork County*	35%	32%	31%	32%	32%

*Excluding Cork Metropolitan Area

The target percentage population split for 2036 M2 F2 should be similar to the 2022 percentage population split and it comes quite near to this, representing a close alignment with the forecast core strategy split. The percentage split for population validates the distribution of the 2036 Baseline Land Use Scenario at a high level.

2.5 Settlement Level Comparison

The sections below presents population, job and education numbers for the 2036 Baseline Land Use Scenario at a more granular detail, showing the distribution of growth at a settlement level. Comparison between the 2036 and the 2011 scenario are also made to present the growth between the two scenarios.

2.5.1 Population

Table 2-7 provide a comparison between the 2011 and the 2036 Planning Datasheets at a settlement level for population.

Table 2-7: Population Comparison at a Settlement Level

City Settlements	Population		Population Growth	
	2011	2036 M2 F2	2011 to 2036	2011 to 2036 %
City Centre	17393	18664	1271	7%
City NW	18255	19397	1142	6%
City NE	15419	16133	714	5%
City SE	19429	20370	941	5%
City SW	32307	33884	1577	5%
Blackpool	4759	6309	1550	33%
Tivoli	2587	7133	4546	176%
Docklands	1342	11264	9922	739%
Mahon	5761	7192	1431	25%
Wilton	212	222	10	5%
CUH	890	933	43	5%
Model Farm	631	662	31	5%
Apple	245	261	16	7%
Total	**119230**	142426	23196	19%

Metro Settlements	Population		Population Growth	
	2011	2036 M2 F2	2011 to 2036	2011 to 2036 %
Ballincollig	16861	21094	4233	25%
Blarney / Stoneview	5310	9152	3842	72%
Carrigaline	14818	16282	1464	10%
Carrigtwohill	5738	9550	3812	66%
Cobh	12468	13519	1051	8%
Ballyvolane	7565	11703	4138	55%
Glanmire	9706	10946	1240	13%
Midleton	13987	19260	5273	38%
Monard	501	5604	5103	1018%
South Environs	32811	33034	223	1%
Passage West	5603	6332	729	13%
CSIP	1123	1470	347	31%
Little Island	1922	1934	12	1%
Ringaskiddy	1343	1352	9	1%
Airport	354	367	13	4%
Metro Villages & Rural Areas	40399	41471	1072	3%
Total	**170509**	203070	32561	19%

Cork County Settlements	Population		Population Growth	
	2011	2036 M2 F2	2011 to 2036	2011 to 2036 %
Fermoy	7031	7948	917	13%
Kinsale	6500	7191	691	11%
Mallow	12604	15020	2416	19%
Bantry	4440	5103	663	15%
Youghal	8192	9293	1101	13%
Clonakilty	5793	6665	872	15%
Bandon	7615	8553	938	12%
Macroom	4563	5111	548	12%
Mitchelstown	4168	4814	646	15%
Watergrasshill	1319	1359	40	3%
Millstreet	2904	3116	212	7%
Skibbereen	3820	4187	367	10%
Kanturk	3515	3805	290	8%
Dunmanway	2407	2646	239	10%
Rathcormac	2506	2581	75	3%
Castlemartyr	2320	2390	70	3%
Rathluirc	4004	4124	120	3%
Kilumney	1572	1619	47	3%
Ballinhassig	695	716	21	3%
Cork Rural	143325	146478	3153	2%
Total	229293	242718	13425	6%

The population growth distribution between 2011 and 2036 Baseline Land Use Scenario is represented in Figure 2-4.

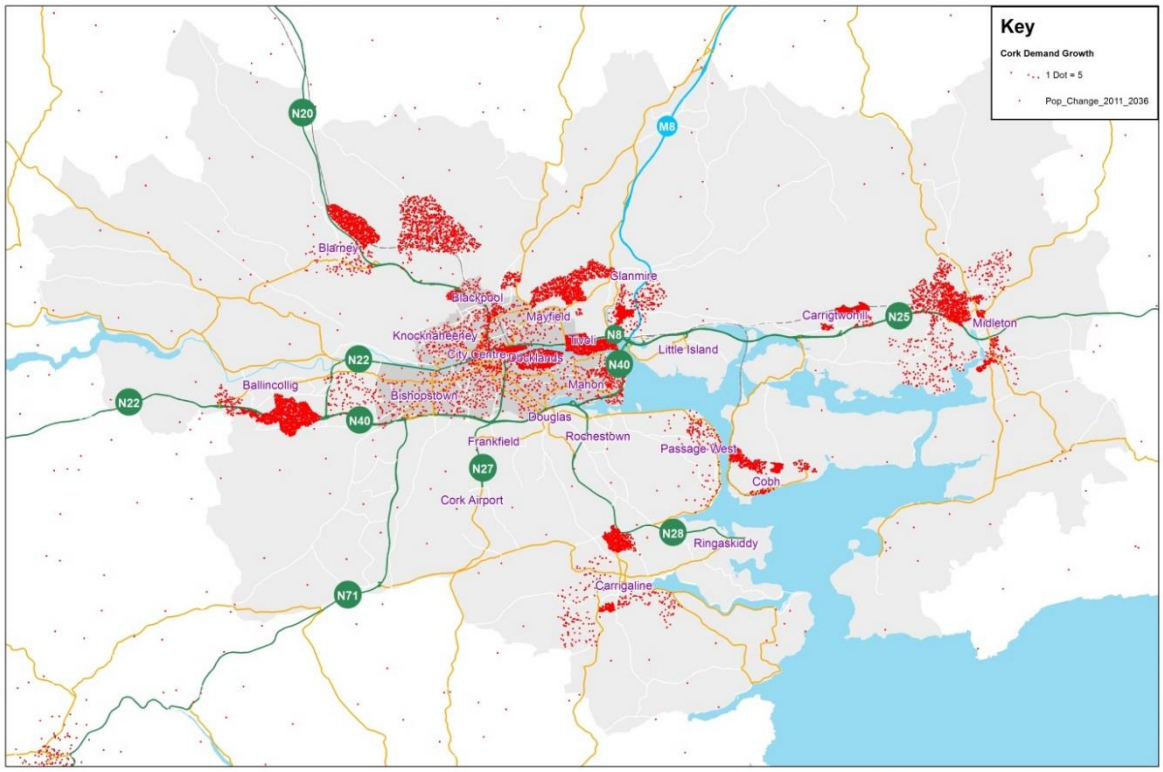


Figure 2-4: Population Growth 2011 to 2036

Settlements experiencing significant population growth include:

- City – Docklands – from 2011 to 2036 **increase 9,922** population;
- City – Tivoli – from 2011 to 2036 **increase 4,546** population;
- City – Blackpool – from 2011 to 2036 **increase 1,550** population;
- Metropolitan – Monard – from 2011 to 2036 **increase 5,103** population;
- Metropolitan – Blarney/Stoneview – from 2011 to 2036 **increase 3,842** population;
- Metropolitan – Carrigtwohill – from 2011 to 2036 **increase 3,812** population;
- Metropolitan – Ballyvolane – from 2011 to 2036 **increase 4,138** population; and
- Metropolitan – Ballincollig – from 2011 to 2036 **increase 4,233** population.

2.5.2 Employment

Table 2-8 provides a comparison between the 2011 and the 2036 Planning Datasheets at a settlement level for employment.

Table 2-8: Job Comparison at a Settlement Level

City Settlements	Jobs		Job Growth	
	2011	2036 M2 F2	2011 to 2036	2011 to 2036 %
City Centre	21251	26913	5662	27%
City NW	2649	3022	373	14%
City NE	3916	4289	373	10%
City SE	3362	3816	454	13%
City SW	10479	11184	705	7%
Blackpool	3475	4367	892	26%
Tivoli	807	2750	1943	241%
Docklands	2441	5053	2612	107%
Mahon	5153	8370	3217	62%
Wilton	1336	1503	167	12%
CUH	3971	4076	105	3%
Model Farm	3381	4127	746	22%
Apple	2508	3260	752	30%
Total	**64731**	82731	18001	28%

Metro Settlements	Jobs		Job Growth	
	2011	2036 M2 F2	2011 to 2036	2011 to 2036 %
Ballincollig	4088	6643	2555	63%
Blarney / Stoneview	810	1215	404	50%
Carrigaline	2225	2700	475	21%
Carrigtwohill	2879	4265	1386	48%
Cobh	1524	1727	203	13%
Ballyvolane	1714	3193	1479	86%
Glanmire	1347	1594	247	18%
Midleton	3485	5500	2015	58%
Monard	36	322	285	782%
South Environs	7275	7500	225	3%
Passage West	344	357	13	4%
CSIP	962	1910	948	99%
Little Island	6108	7188	1080	18%
Ringaskiddy	3343	4546	1203	36%
Airport	3331	4291	959	29%
Metro Villages & Rural Areas	7944	8052	108	1%
Total	**47415**	61002	13587	29%

Cork County Settlements	Jobs		Job Growth	
	2011	2036 M2 F2	2011 to 2036	2011 to 2036 %
Fermoy	2486	2850	364	15%
Kinsale	1886	2118	231	12%
Mallow	4159	5025	866	21%
Bantry	2033	2200	167	8%
Youghal	1629	1874	245	15%
Clonakilty	2880	3360	480	17%
Bandon	2345	2672	327	14%
Macroom	1583	1800	216	14%
Mitchelstown	1376	1500	124	9%
Watergrasshill	568	596	27	5%
Millstreet	1110	1209	100	9%
Skibbereen	1810	2012	202	11%
Kanturk	859	943	84	10%
Dunmanway	748	834	86	12%
Rathcormac	209	218	10	5%
Castlemartyr	230	241	11	5%
Rathluirc	2250	2250	0	0%
Kilumney	112	117	5	5%
Ballinhassig	25	26	1	5%
Cork Rural	15913	16100	187	1%
Total	44211	47946	3735	8%

The job growth distribution between 2011 and 2036 Baseline Land Use Scenario is represented in Figure 2-5**Error! Reference source not found.**.

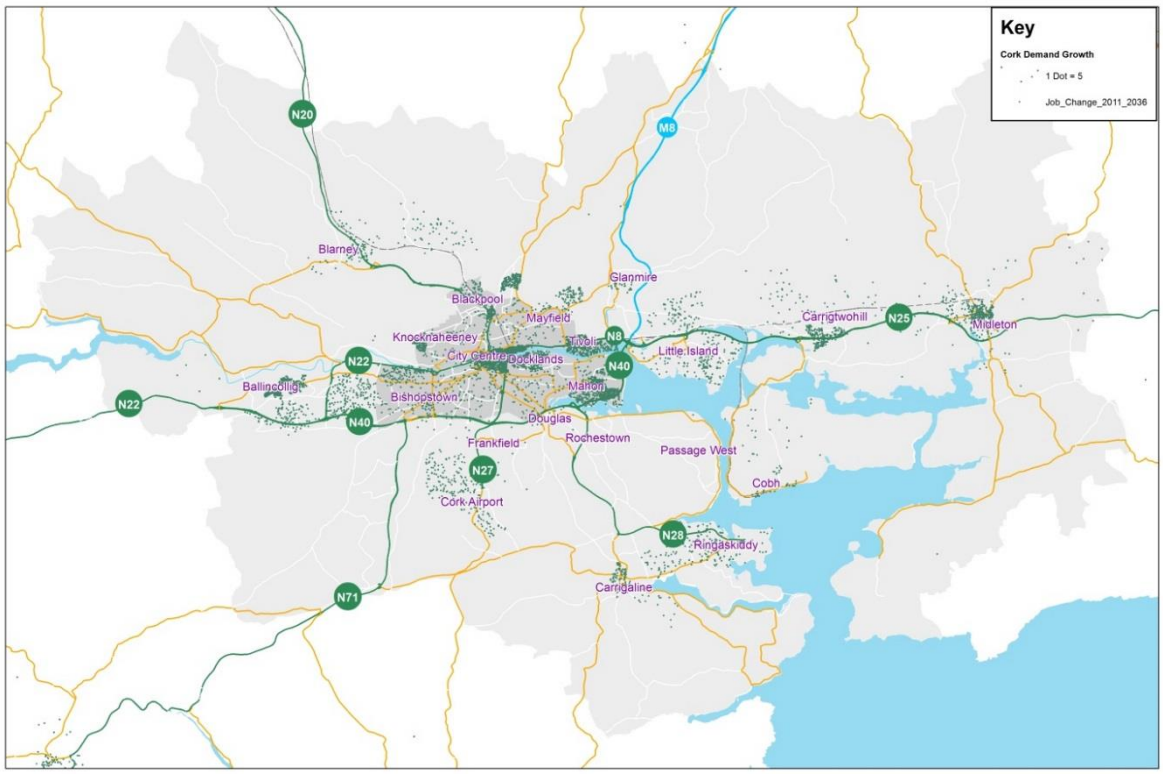


Figure 2-5: Job Growth 2011 to 2036

2.5.3 Education

Table 2-9 provides a comparison between the 2011 and the 2036 Planning Datasheets at a settlement level for education.

Table 2-9: Education Comparison at a Settlement Level

City Settlements	Education		Education Growth	
	2011	2036 M2 F2	2011 to 2036	2011 to 2036 %
City Centre	9397	10673	1276	14%
City NW	2548	2761	213	8%
City NE	1844	1954	110	6%
City SE	4936	5221	285	6%
City SW	20243	24419	4176	21%
Blackpool	210	256	46	22%
Tivoli	175	585	410	234%
Docklands	76	305	229	301%
Mahon	849	1119	270	32%
Wilton	241	255	14	6%
CUH	61	78	17	27%
Model Farm	730	788	58	8%
Apple	27	30	3	11%
Total	**41337**	48444	7107	17%

Metro Settlements	Education		Education Growth	
	2011	2036 M2 F2	2011 to 2036	2011 to 2036 %
Ballincollig	3627	4481	854	24%
Blarney / Stoneview	674	1558	884	131%
Carrigaline	2615	3389	774	30%
Carrigtwohill	1149	2247	1098	96%
Cobh	2036	2281	245	12%
Ballyvolane	1418	2036	618	44%
Glanmire	2432	2873	441	18%
Midleton	3284	4636	1352	41%
Monard	4	787	783	19587%
South Environs	2531	2530	-1	0%
Passage West	837	932	95	11%
CSIP	2	2	0	12%
Little Island	156	161	5	3%
Ringaskiddy	411	430	19	5%
Airport	1	1	0	0%
Metro Villages & Rural Areas	6998	7228	230	3%
Total	**28175**	35575	7400	26%

Cork County Settlements	Education		Education Growth	
	2011	2036 M2 F2	2011 to 2036	2011 to 2036 %
Fermoy	2465	2645	180	7%
Kinsale	1607	1719	112	7%
Mallow	2654	3645	991	37%
Bantry	1209	1293	84	7%
Youghal	1613	1721	108	7%
Clonakilty	1841	1969	128	7%
Bandon	2590	2784	194	7%
Macroom	1198	1291	93	8%
Mitchelstown	1230	1318	88	7%
Watergrasshill	3	3	0	0%
Millstreet	467	499	32	7%
Skibbereen	1300	1396	96	7%
Kanturk	1012	1089	77	8%
Dunmanway	817	875	58	7%
Rathcormac	318	332	14	4%
Castlemartyr	271	283	12	4%
Rathluirc	1171	1253	82	7%
Kilumney	0	0	0	0%
Ballinhassig	137	143	6	4%
Cork Rural	17281	18172	891	5%
Total	39184	42430	3246	8%

The education growth distribution between 2011 and 2036 Baseline Land Use Scenario is represented in Figure 2-6.

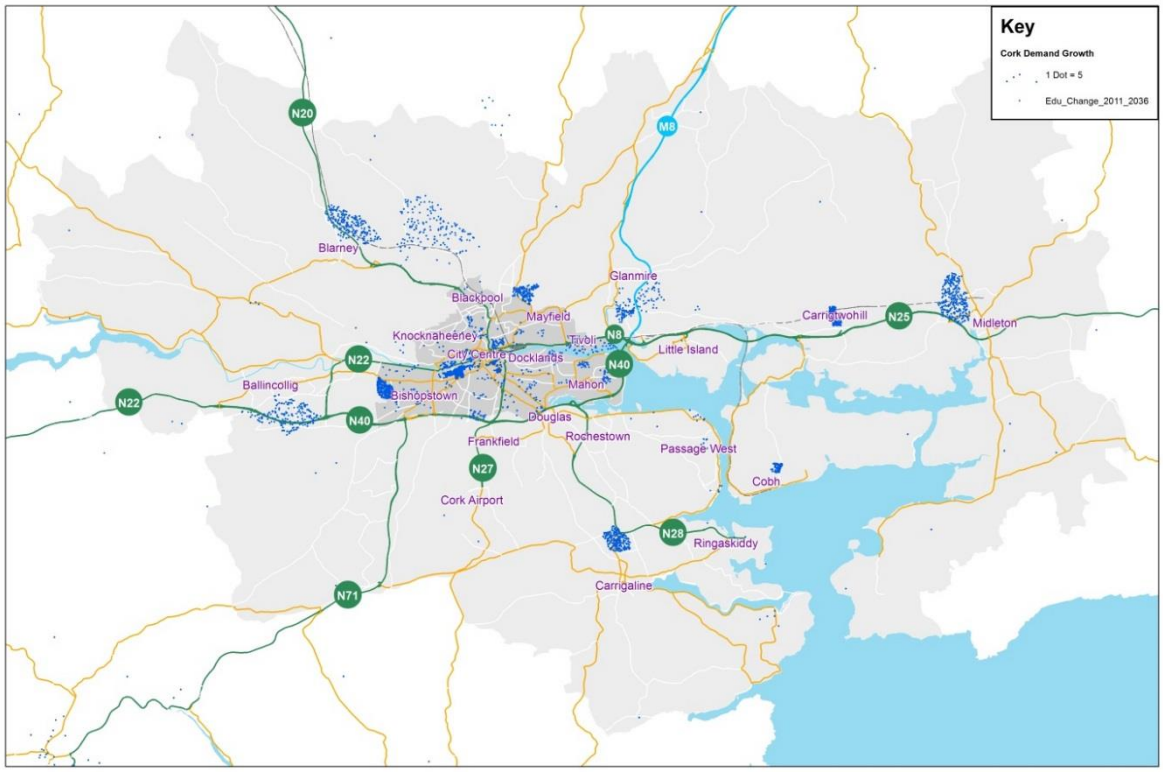


Figure 2-6: Education Growth 2011 to 2036

3 NTA Regional Modelling System

3.1 Introduction

This section describes the NTA Regional Modelling System, outlining its scope, extent, components, functionality and its suitability for use in developing the CMA Transport Strategy. The national remit of the NTA requires a system of regional models to help it deliver on its planning and appraisal needs. The NTA Regional Modelling System comprises five regional transport models covering the Republic of Ireland and centred on the five main cities of Dublin, Cork, Galway, Limerick, and Waterford and are summarised in Table 3-1 below.

Table 3-1: Regional Modelling System

Regional Modelling System	Abbreviation	Counties Covered
Eastern Regional Model	ERM	Louth, Monaghan, Cavan, Longford, Westmeath, Meath, Offaly, Laois, Kildare, Dublin, Wicklow, Carlow & Northern Wexford
South East Regional Model	SERM	Wexford, Kilkenny, Waterford & Tipperary South
South West Regional Model	SWRM	Cork & Kerry
Mid-West Regional Model	MWRM	Limerick, Clare & North Tipperary
Western Regional Model	WRM	Galway, Mayo, Roscommon, Sligo, Donegal & Leitrim

Each regional model has the following key attributes:

- Full geographic coverage of the relevant region;
- A detailed representation of the road network, particularly the impact of congestion on on-street public transport services and include modelling of residents' car trips by time period from origin to destination;
- A detailed representation of the public transport network & services, and can predict demand on the different public transport services within the regions;
- A representation of all major transport modes including active modes (walking and cycling) and includes accurate mode-choice modelling of residents;
- A detailed representation of travel demand, e.g. by journey purpose, car ownership/availability, mode of travel, person types, user classes & socio-economic classes, and representation of four time periods (AM, Inter-Peak, PM and Off-Peak); and
- A prediction of changes in trip destination in response to changing traffic conditions, transport provision and/or policy.

The South West Regional Model (SWRM), which covers Cork County & City, has been used to support the development of the CMA Transport Strategy. Figure 3-1 on the following page illustrates the geographical extent of each of the Regional Models.

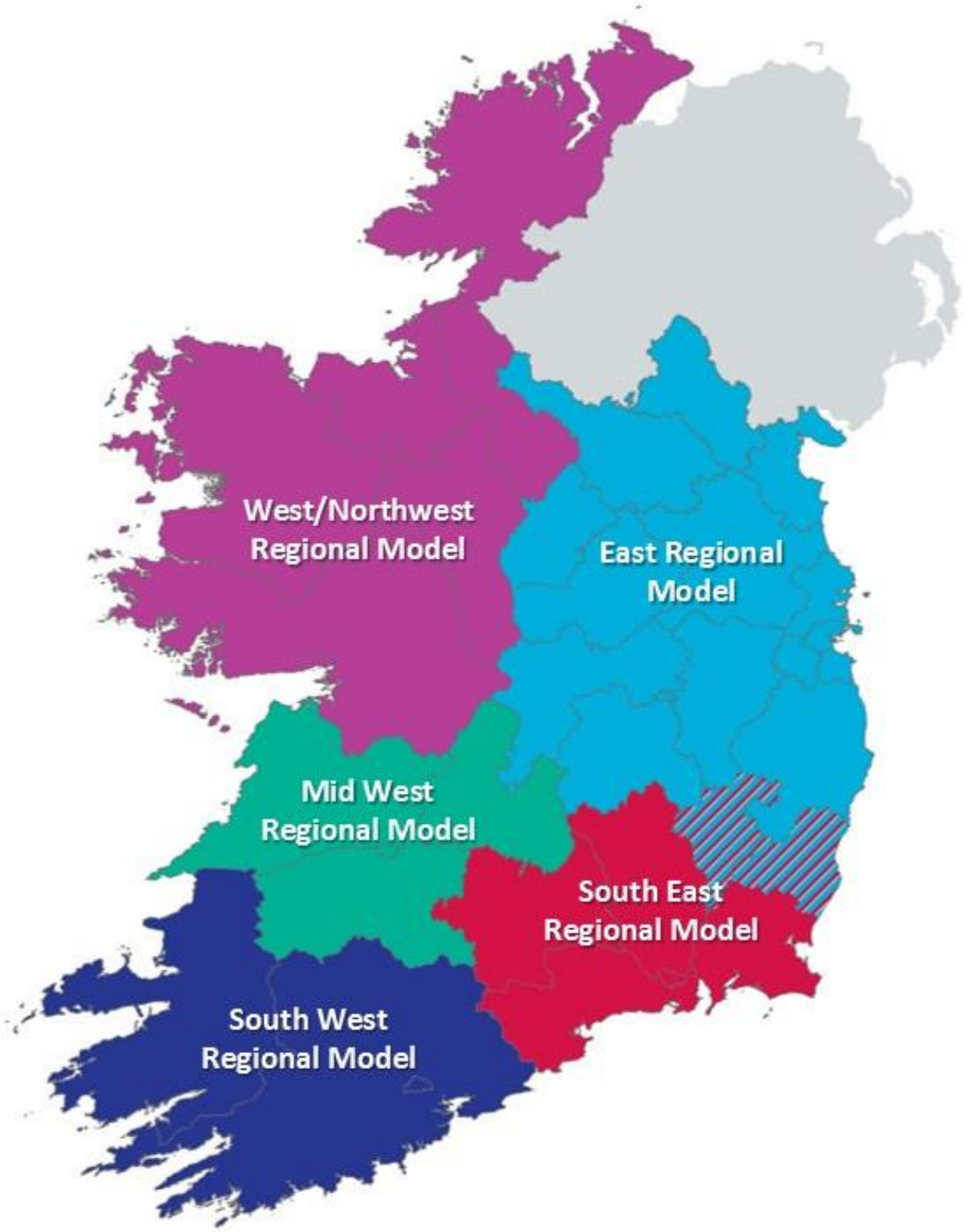


Figure 3-1: Modelling System Regional Model Areas

3.2 Regional Modelling System Dimensions

The regional modelling system features or dimensions are defined in terms of:

- Zone system;
- Modes of travel represented;
- Base year;
- Time-periods; and
- Demand segmentation;

3.2.1 Zone System

The zone system definitions for each of the regional models were based on Census Small Area (CSA) boundaries and Electoral Districts (EDs). The 2011 CSAs are the core base layer for each zoning system. CSAs are the smallest geographic unit of data available with which to define the model zone system. Each CSA is a defined geographic area associated with demographic data (e.g. population, age distribution, employment status), and the work / school travel characteristics of the population (via *Place of Work, School or College - Census of Anonymised Records* (POWSCAR)).

CSAs are subsets of EDs. ED boundaries are commonly used as the unit of geographic information in Ireland and as such it was desirable to maintain a transparent relationship between EDs and the model zone system. Regional Model zones can be smaller or larger than either of these units where required.

The criteria used for developing zone boundaries for the SWRM and other regional models included:

- Population, Employment and Education – maximum values were specified for zone population, number of jobs and persons in education;
- Activity Levels – limits were applied to zone activity levels ensuring that zones with either very low, or very high, levels of trips were not created;
- Intra-zonal Trips – threshold values were applied to the proportion of intra-zonal trips, within each zone, to avoid an underestimation of flow, congestion and delay on the network;
- Land Use – zones were created with homogeneous land use and socio-economic characteristics where possible;
- Zone Size/Shape – thresholds were applied to zone size, and irregularity of shape, to avoid issues with inaccurate representation of route choice;
- Political Geography – as mentioned above, it is possible to aggregate all zones to ED level i.e. zone boundaries do not intersect ED boundaries;
- Special Generators/Attractors – large generators/attractors of traffic such as Airports, Hospitals, shopping centres etc. were allocated to separate zones.

Figure 3-2 shows the SWRM Zone System.

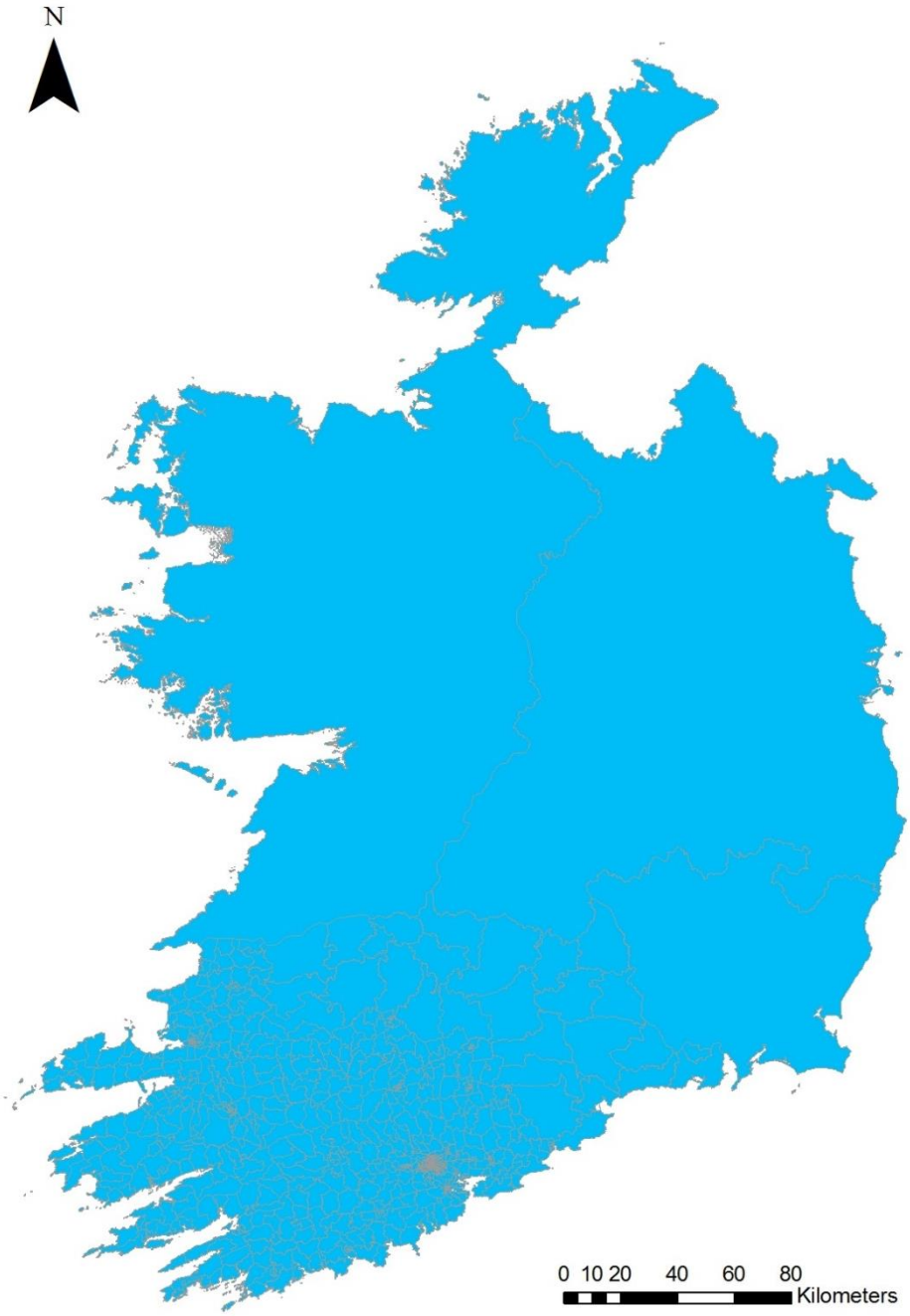


Figure 3-2: SWRM Zone System

The SWRM zone system includes:

- **Total zones: 788**;
- Cork City zones: 148;
- County Cork zones: 421;
- County Kerry zones: 188; and
- External zones: 31

3.2.2 Modes of Travel

The regional model system covers all surface access modes for personal travel and goods vehicles:

- Private vehicles – taxis and cars;
- Public transport – bus, rail, Luas, BRT, Metro;
- Active modes – walking and cycling; and
- Goods vehicles – light goods vehicles and heavy goods vehicles.

3.2.3 Base Year

The base year of each model is 2012 with a nominal month of April. This is largely driven by the date of the Census (POWSCAR) and the National Household Travel Survey (NHTS). It should be noted that the POWSCAR dates to 2011 but the travel patterns are assumed to be broadly the same in 2012.

3.2.4 Time Periods

The model represents an average weekday. The day is split into five time periods considered within each of the regional models, detailed in Table 3-2 below. The periods allow the relative difference in travel cost between time periods to be represented. Representative peak hours are used in the assignment models, which are based on period to peak hour factors derived from survey data for each time period and mode.

Table 3-2: Time Periods

Period	DEMAND MODEL FULL PERIOD	ASSIGNMENT PERIOD
AM Peak	07:00-10:00	Peak hour – based on a Peak Hour factor of 0.393 for cars, 0.393 for active modes and 0.47 for public transport
Morning Inter Peak (IP1)	10:00-13:00	Average hour from full period - based on a Peak Hour factor of 0.33 for cars, 0.33 for active modes and 0.33 for public transport
Afternoon Inter Peak (IP2)	13:00-16:00	Average hour from full period (not assigned)
PM Peak	16:00-19:00	Peak hour - based on a Peak Hour factor of 0.358 for cars, 0.358 for active modes and 0.4 for public transport
Off Peak	19:00-07:00	Free flow assignment

3.3 SWRM Structure

3.3.1 Overarching Structure

As mentioned above, the SWRM is the model used to support the development of the CMA Transport Strategy. All the regional models, including the SWRM, include 3 core modelling processes (i.e. Demand Model, Road Assignment Model and Public Transport Assignment Model) which receive inputs from the National Demand Forecast Model (NDFM) and provide outputs for transport appraisal and secondary analysis. This process is shown in Figure 3-3 below.

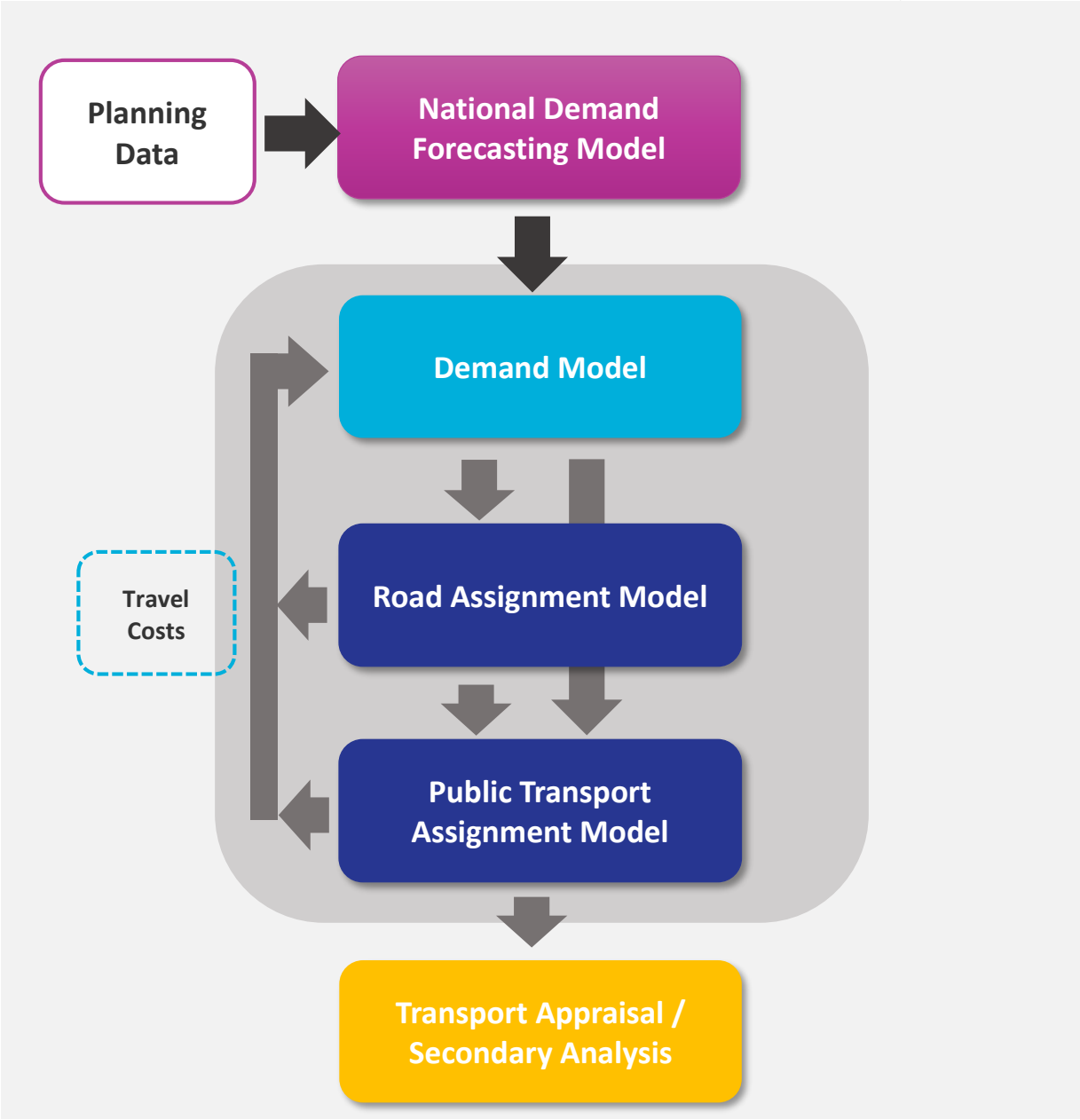


Figure 3-3: Model Structure

3.3.2 Planning Data

The Planning Data referred to above is a national database of 99 demographic and spatial variables for each of the 18,488 CSAs in the state. The main categories of planning data are:

- References and spatial definitions;
- Origin-based person types; e.g. age bands, gender, principal economic status (PES), employment type, and various combinations of categories;
- Destination-based person types; e.g. employment type or education type; and
- Households.

3.3.3 National Demand and Forecasting Model (NDFM)

The ***NDFM*** is a separate modelling system that estimates the total quantity of travel demand generated by and attracted to every Census Small Area (CSA) daily. The level of demand from, and to, each zone (referred to as trip ends) is related to characteristics such as population, number of employees and land-use data as outlined in Section 2.

The NDFM comprises the set of models and tools that are used to derive national levels of trip making, for input to each of the regional models. The NDFM outputs the levels of trip making at the smallest available spatial aggregation (CSA).

The key components of the NDFM are as follows:

- The **Planning Data Adjustment Tool** (PDAT) controls the planning data inputs to the core NDFM system. It is used to amend planning data to represent the combination of general changes over time and the relevant land-use planning scenarios;
- The **Car Ownership/Car Competition Model** estimates the level of car ownership in a CSA, (sub-dividing the number of households in each CSA between 'No Car', 'Cars < Adults' and 'Cars >= Adults' households) i.e. the car competition bands;
- The **Car Availability Model** classifies the set of individual person trips as either 'Car Available' or 'Car-not-available' using calibrated relationships between the three car competition bands and the trip purpose;
- The **National Trip-End Model (NTEM)** converts the planning data into person trips, using calibrated trip rates; and
- The **Regional Modelling System Integration Tool (RMSIT)** estimates the level of trip-making by main mode (car, bus, rail and goods vehicles) between 38 of the main urban settlements in Ireland.

Figure 3-4 shows the system of NDFM models and the key regional model components that the NDFM interacts with.

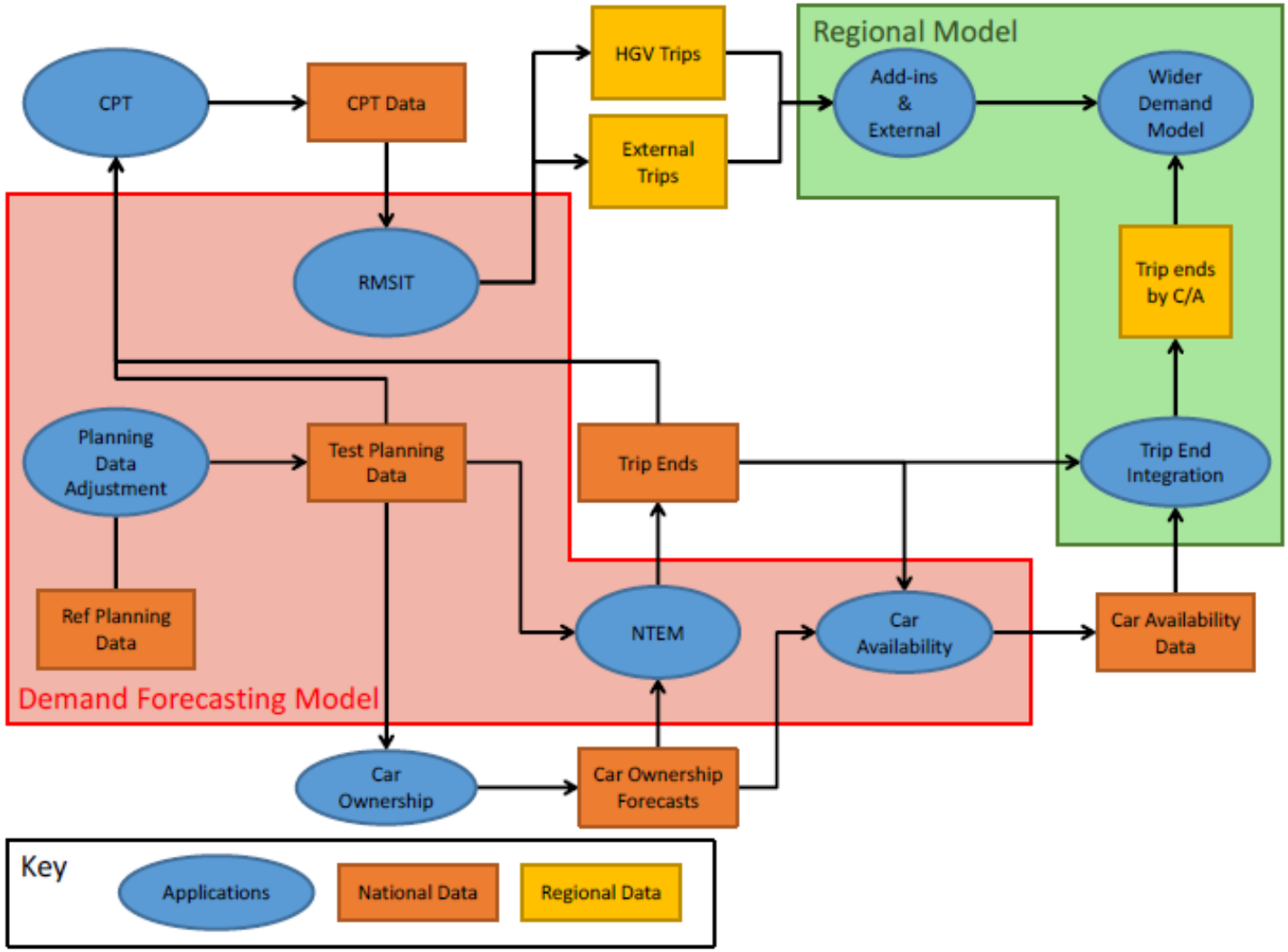


Figure 3-4: NDFM Structure

3.3.4 Demand Segments

Groups of people with similar travel behaviours (for example, commuters who own a car) are represented by distinct demand segments in the regional modelling system. This allows those groups to be treated differently in the regional demand model according to their behaviour.

The NDFM demand segments were derived from the National Household Travel Survey (NHTS) data and *Place of Work, School or College - Census of Anonymised Records* (POWSCAR) data sets. They have been segmenting into 33 distinct classifications as noted below in Table 3-3.

Table 3-3: Demand Segments

No.	Purpose	Car Availability	Third Level of Segmentation
1	Commute	Available	Blue collar
2	Commute	Available	White collar
3	Commute	Not available	Blue collar
4	Commute	Not available	White collar
5	Education	Available	Primary
6	Education	Available	Secondary
7	Education	Available	Tertiary
8	Education	Not available	Primary
9	Education	Not available	Secondary
10	Education	Not available	Tertiary
11	Escort to education	Available	Primary
12	Escort to education	Available	Secondary
13	Escort to education	Available	Tertiary
14	Escort to education	Not available	Primary
15	Escort to education	Not available	Secondary
16	Escort to education	Not available	Tertiary
17	Other	Available	Employed
18	Other	Available	Non-working
19	Other	Not available	Employed
20	Other	Not available	Non-working
21	Shopping - food	Available	Employed
22	Shopping - food	Available	Non-working
23	Shopping - food	Not available	All
24	Visit friends / relatives	Available	Employed
25	Visit friends / relatives	Available	Non-working
26	Visit friends / relatives	Not available	All
27	Employers Business	All	All
28	All	Available	Retired
29	All	Not Available	Retired

No.	Purpose	Car Availability	Third Level of Segmentation
30	One-way business	Available	All
31	One-way business	Not available	All
32	One-way other	Available	All
33	One-way other	Not available	All

3.3.5 Tours

Tours are an important aspect of how Trip Ends are modelled. The main concept is that every person is expected to make a distinct series of trips beginning from their house and ultimately returning home (signalling the end of a tour). The five distinct trip types which may comprise a tour are shown graphically below in Figure 3-5 and include:

- Simple from Home;
- Simple to Home;
- One-way from Home;
- One-way to Home; and
- Non-Home-Based (NHB) trips.

All tours are defined relative to a home or a destination. This corresponds to the concept of productions and attractions where productions are associated with homes and attractions are associated with destinations. The terms productions and attractions are not used when discussing one-way or NHB trips. These are dependent on direction, are not defined to return to a home or a particular attraction, and therefore in these cases the labels origin and destination are used as referring to the start and finish location of such trips.

It is worth noting that trip chains (a tour comprising more than two trips) are modelled as multiple single trips. These consist of an outbound (one way From Home) and an inbound (one-way To Home) as well as any number of intermediate NHB trips. An example of this is shown in Figure 3-5.

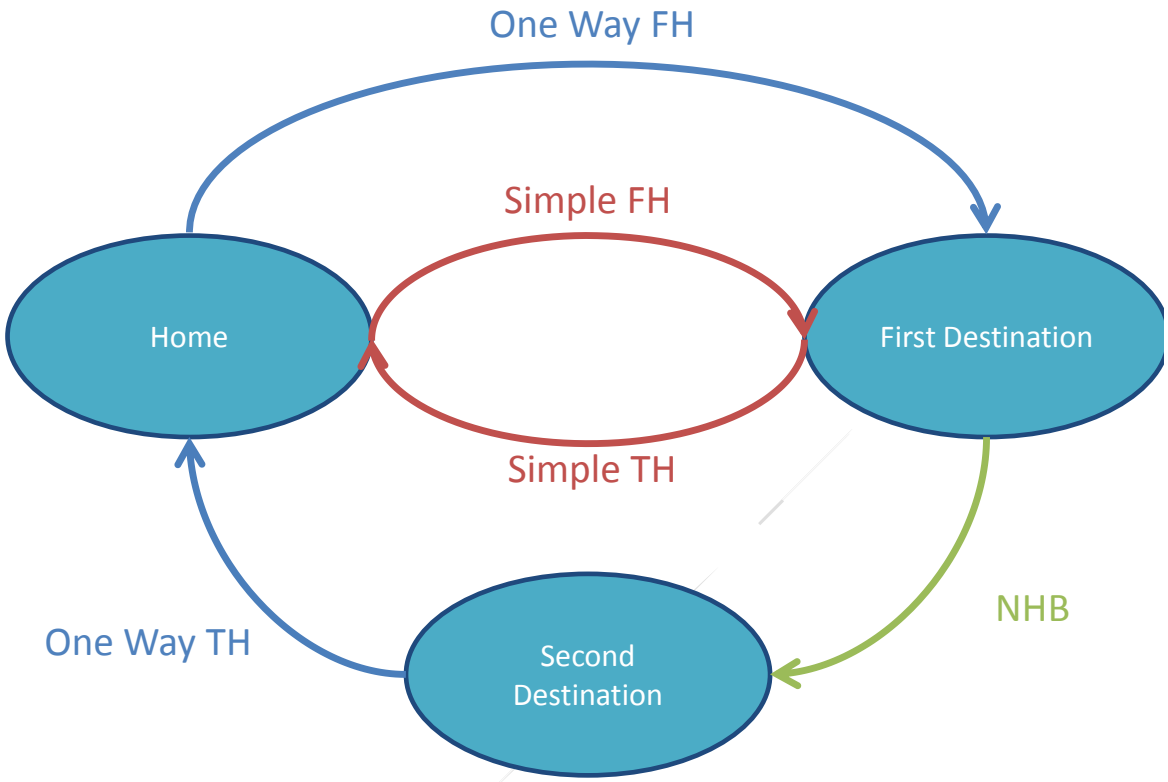


Figure 3-5 Trip Chains

Figure 3-6 shows the most basic relation of origins and destinations with respect to directional trips, comparable to simple tours.

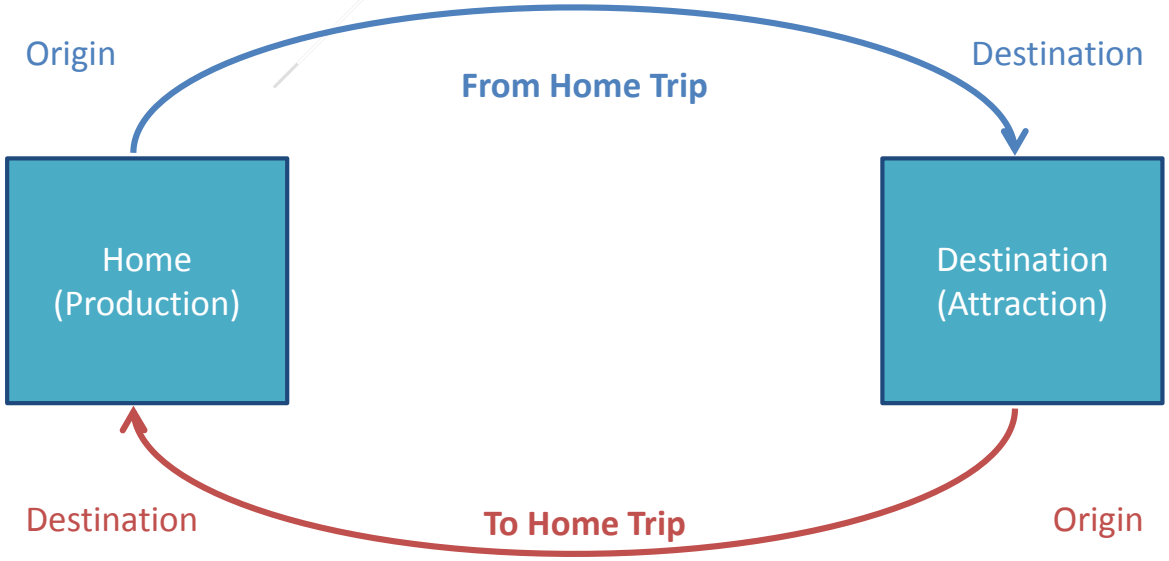


Figure 3-6 PA V OD for Simple Tours

Figure 3-7 below shows the same relationship for trip chains, where it is particularly noted that both ends of a non-home-based tour correspond to attractions.

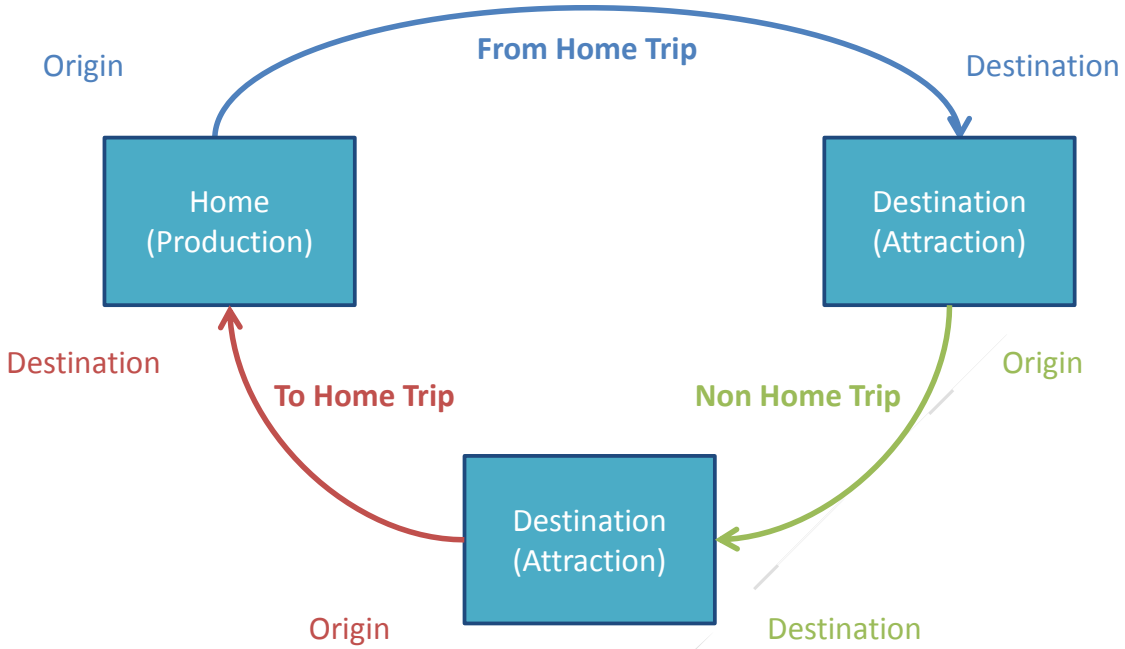


Figure 3-7 PA V OD for Extended Tours

Tours are considered as movements within or from time period to time period as shown in the Tour Grid below in Table 3-4. The tours under the diagonal for the IP1, IP2 and PM time periods (marked in green) are those which are not considered in any calculations while the off-peak tours (marked in red) are considered only in commute demand segments. Time period demand is derived either by summing the rows (From Home) or the columns (To Home).

Table 3-4: Tour Grid

TP Out\ TP In	AM	IP1	IP2	PM	OP
AM	1	2	3	4	5
IP1	6	7	8	9	10
IP2	11	12	13	14	15
PM	16	17	18	19	20
OP	21	22	23	24	25

3.3.6 SWRM Demand Model

The **Demand Model** models travel behaviour and is implemented in Cube Voyager. The demand model processes all-day travel demand from the NDFM through a series of choice models to represent combined mode, time of day, destination and parking decision making. The outputs of the demand model are a set of trip matrices which are assigned to the Road and Public Transport models to determine the route-choice and generalised costs.

The demand model consists of several components that interact in a sequential manner between the trip end model and the assignment models. It includes the following distinct components:

- Macro Time of Day;
- Mode Choice;
- Destination Choice;
- Parking; and

- Tours and One-Way.

A simple representation of the model structure is shown in Figure 3-8.

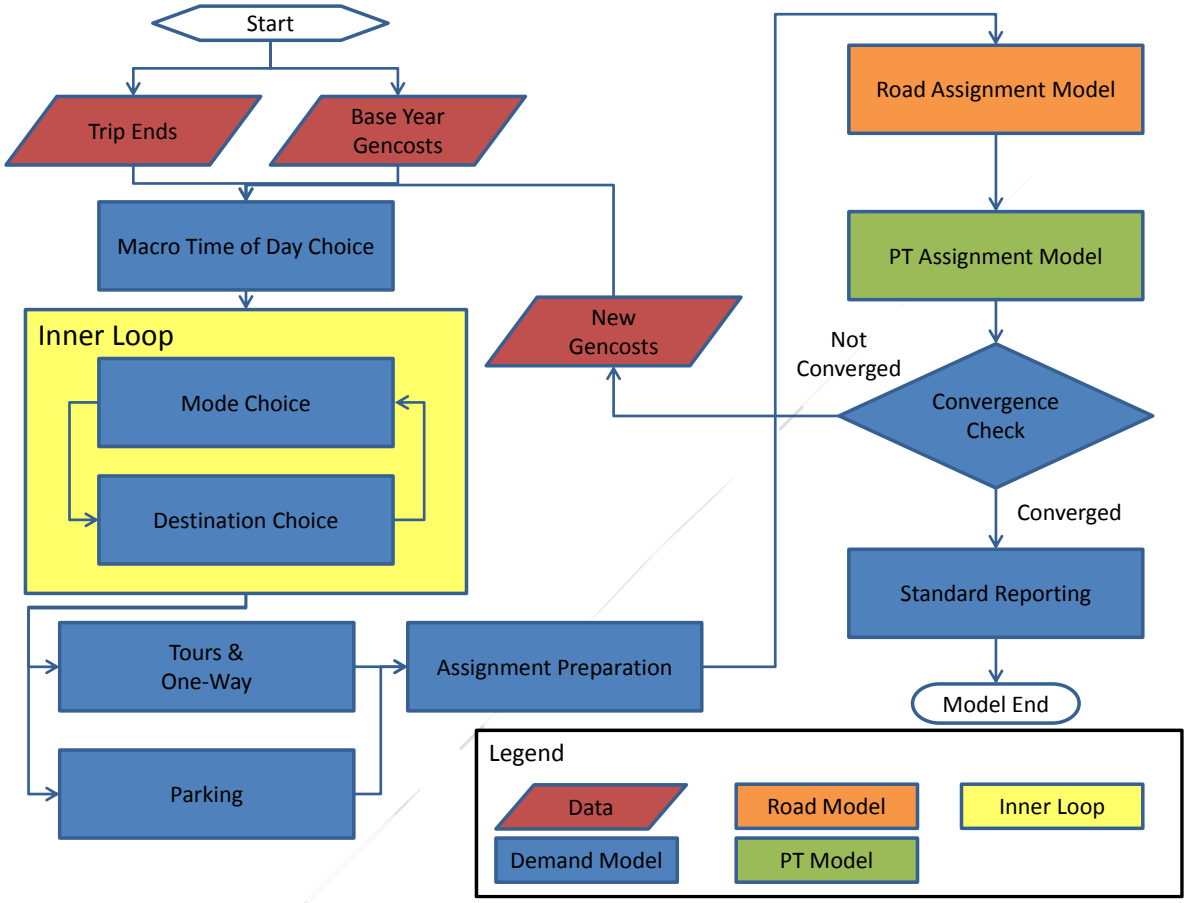


Figure 3-8: Demand Model Structure

3.3.7 SWRM Road Assignment Model

The **Road Assignment Model** (RDAM) is implemented in SATURN and includes capacity restraint whereby travel times are recalculated in response to changes in assigned flows. The main purpose of the RDAM is to assign road users to routes between their origin and destination zones. The cost of travel is then calculated by the RDAM for input to the demand model and economic appraisal.

The inputs to the Road Assignment model from the demand model are the road assignment matrices from the assignment preparation stage.

The outputs from the Road Assignment model for the demand model processes consist of generalised costs skims by time period and assigned road networks in CUBE Voyager format which are passed on to the PT model.

In addition to these requirements for demand model processes, there are a series of standard SATURN outputs that are produced for use in the specific interrogation of the road networks for scheme and/or scenario assessment.

3.3.8 SWRM Public Transport Assignment Model

To generate costs to update the choice model processes, a PT assignment must be undertaken to establish new generalised costs. The **Public Transport Assignment Model** (PTAM) is implemented in Voyager and is used to allocate PT users to services between their origin and destination zones. The model includes a representation of the public transport network and services for existing and planned modes within the modelled area. The model includes:

- Rail;
- DART;
- Luas;
- Metro.
- Urban Bus;
- Inter-Urban Bus; and
- Bus Rapid Transit (BRT).

The outputs of the PT assignment model fall into two categories, those required by the demand model, and those produced for reporting and analysis purposes.

The outputs from the Public Transport Assignment model for the demand model processes consist of the assigned networks which are passed on to active mode assignment as the starting point for their network build procedure, and generalised cost skim matrices by user class for each of the assigned time periods that feed back into the main Mode and Destination choice demand model loop. An overview of the PT model process is shown below in Figure 3-9.

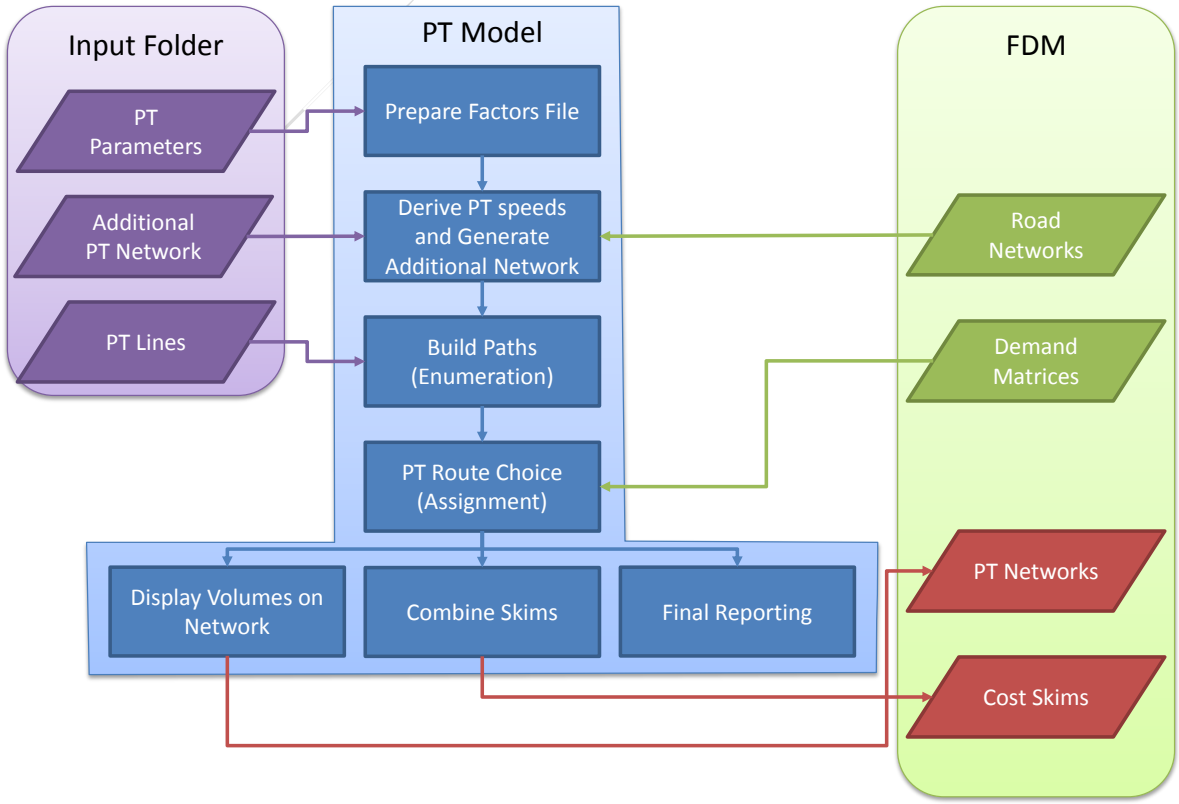


Figure 3-9: PT Model Process

3.3.9 SWRM Active Modes Model

The Regional Modelling System represents active modes (i.e. walking and cycling) within the demand model to improve the realism of travel choices. To generate costs to update the choice model processes, an **active modes assignment** must take place to establish new generalised costs. This active mode assignment assumes no crowding or delays.

The inputs for the active assignment model are the output CUBE format PT networks, the demand model produced assignment matrices and separate input pedestrian only links and cycle lanes. The outputs of this process include an assigned network with walk and cycle flows by user class, and a set of generalised cost skims. The active assignment is a CUBE-based lowest cost path assignment model with no junction modelling based purely on distance and a constant speed by mode.

Walk speeds are taken as 4.8 kph for all user classes while cycle speeds are set to 12 kph as default except in specified cases as indicated by the cycle data network input. Improvements to cycling mode provision are included through associating improvements to cycling Quality of Service to increases in service user speeds.

3.4 Suitability of South-West Regional Model in Developing the Strategy

3.4.1 Model Calibration and Validation

It is important that a strategic transport model is appropriately calibrated and validated in line with best practice guidelines. The SWRM has been subject to a comprehensive calibration and validation process whereby a substantial amount of observed data has been incorporated into both the demand model and the assignment models as presented in Table 3-5.

Table 3-5: Observed data used for model calibration and validation

Demand Model	Assignment Models
Tour proportions	Road traffic volumes
Generalised cost distributions	Road journey times
Travel distance distributions	Road trip length distribution
Modal share	Public transport in-vehicle time factors
Journey time distribution	Public transport fares and ticket types
	Public transport passenger flows
	Public transport boardings and alightings
	Public transport journey times
	Public transport interchange/transfers

The calibration and validation process ensures that the SWRM accurately reflects existing conditions and 'costs' associated with travel. This allows changes in the forecasting of transport demand and strategic transport infrastructure schemes and appropriate transport policies to be modelled and tested using the SWRM.

3.4.2 Use of SWRM for Strategic Transport Planning

The model has many strengths and features that make it the ideal tool to aid the strategic planning process. The SWRM has been developed from first principles making best use of the most recently

available data (POWSCAR and NHTS) to replicate travel choices and transport network conditions as accurately as possible.

Several distinct journey purposes and characteristics including car availability, employment status, and education level are considered within the model to evaluate travel choices more accurately. This carries through to forecasting whereby specific person type demand can be forecast to derive appropriate trip distributions and future year travel conditions.

The model utilises a tour-based approach which allows for more accurate mode choice modelling and consideration of travel costs, particularly with respect to the inclusion of parking charges.

Four main modes of travel: private car, public transport, walking, and cycling are included in the model. Each mode has been calibrated individually, for each journey purpose, to replicate observed trip cost distributions.

The use of SATURN software in the road model allows for explicit junction modelling to be included in the model which improves typical network representation in congested areas over a link-based approach. Link speeds and delays are transferred to the public transport model which allows journey times of on-street modes (Bus, BRT) to reflect perceived traffic conditions rather than a strict timetable.

The model covers the CMA region plus surrounding counties, and takes full account of travel within, into and out of the CMA area.

As the model is also used as the basis for scheme evaluation, the transport networks represented contain a level of detail beyond that which would be normally required for its use as a strategic transport planning tool.

To account for the availability of parking facilities in Cork City Centre, both a free workplace parking model and a parking constraint model have been implemented to re-evaluate mode choice based on whether parking was available at the travellers' ultimate destination.

3.4.3 Summary

The South West Regional Model provides a comprehensive representation of travel patterns across the Cork Metropolitan Area and is a suitable tool for the testing and appraisal of the Strategy. The limitations of strategic transport models are recognised and fully understood. The SWRM is considered the appropriate tool for fulfilling the NTA's requirements in terms of its planning and appraisal needs.

4 Modelled Scenario Comparison

4.1 Introduction

This section of the report outlines a comparison of the characteristics of the demand between the two 2036 modelled scenarios, the Do-Minimum Scenario and the Idealised Network Scenario. An overview of each scenario is provided below.

4.1.1 Do-Minimum Scenario

This scenario represented the committed future transport network, i.e. the base 2012 transport network with committed road improvements in place. This included the following schemes;

- M28 Cork to Ringaskiddy: As part of the 2030 cork TEN-T network this scheme is assumed to be in place by 2036;
- Dunkettle Interchange Upgrade: As included in the Government's *'Building on Recovery: Infrastructure and Capital Investment 2016-2021';* and
- Cork City Centre Movement Strategy: The first phases of this strategy has been implemented with the full delivery expected prior to 2036.

4.1.2 Idealised Network Scenario

The Idealised Network scenario facilitates an unconstrained analysis of potential public transport demand on key corridors in the CMA. In modelling the idealised network, it has been assumed that each corridor on the network will operate with optimal characteristics in terms of frequency, capacity, coverage, interchange opportunity, directness & speed. This will ensure that public transport represents a highly attractive mode for those travelling along the corridor. In adopting this approach, it ensures that the maximum potential for public transport use on each corridor can be ascertained, although this may never be achieved in reality.

4.2 Transport Demand Characteristics

4.2.1 Profile of Demand throughout the Day

In total, there are approximately 990,000 trips originating within the CMA over the 24-hour period in both the 2036 Do Min and 2036 Idealised Scenarios which represents a 21% increase compared to the 2012 base year model. The percentage breakdown of demand between the five modelled periods is approximately equal in both scenarios and is presented below in Figure 4-1. The busiest periods in terms of total demand are the AM morning peak and the Afternoon Inter peak.

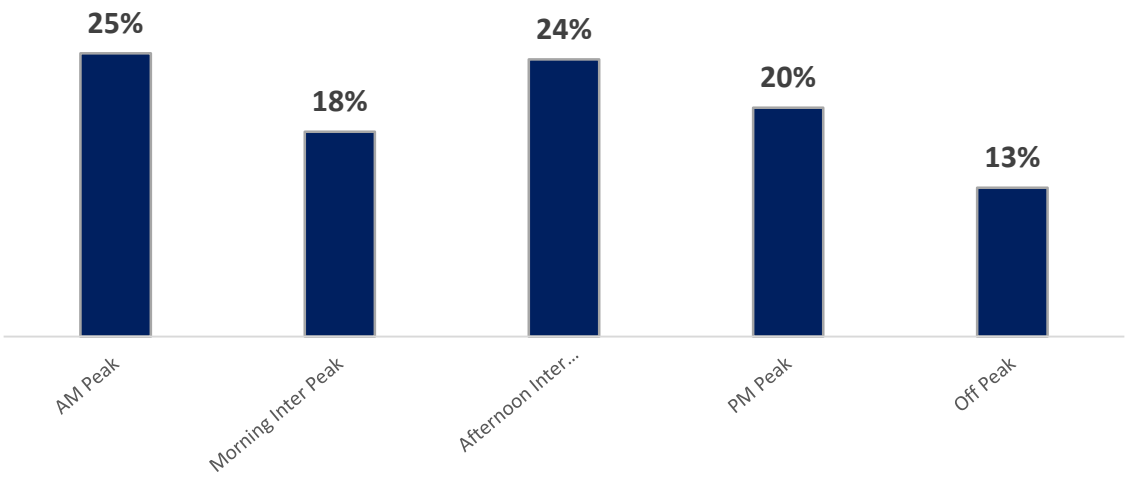


Figure 4-1: Percentage of Demand by Time Period

4.2.2 Breakdown of Trip Purposes

The breakdown of demand between trip purposes is approximately equal in both scenarios and is shown in Figure 4.2. The figure outlines the breakdown of demand between trip purposes by each peak period for both scenarios. The trip purposes defined are 'Food Shopping', 'Education' (including accompanying escort trips), 'Commute' trips and 'All Other Purposes'. The other purposes include visiting friends or relatives, leisure trips, business trips and non-food related shopping trips. All trips made by those in retirement are also classed as 'Other' trip purpose.

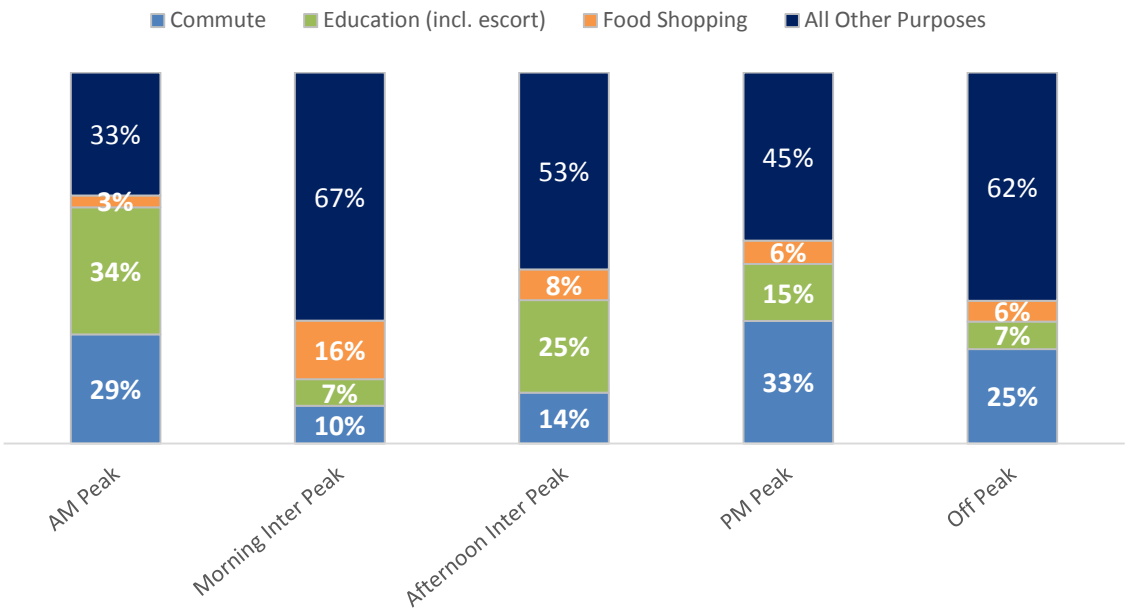


Figure 4-2: Percentage of Demand by Trip Purpose per Time Period

The figure above shows that trips for commuting and education account for 63% of all morning peak trip and 48% of evening peak trips. Other trip purposes dominant during the off and inter peaks and accounts for 50% of all day demand. Commuting to work and education accounts for 42% of all weekdays trips within Metropolitan Cork. The breakdown over the 24-hour period is shown below for both scenarios.

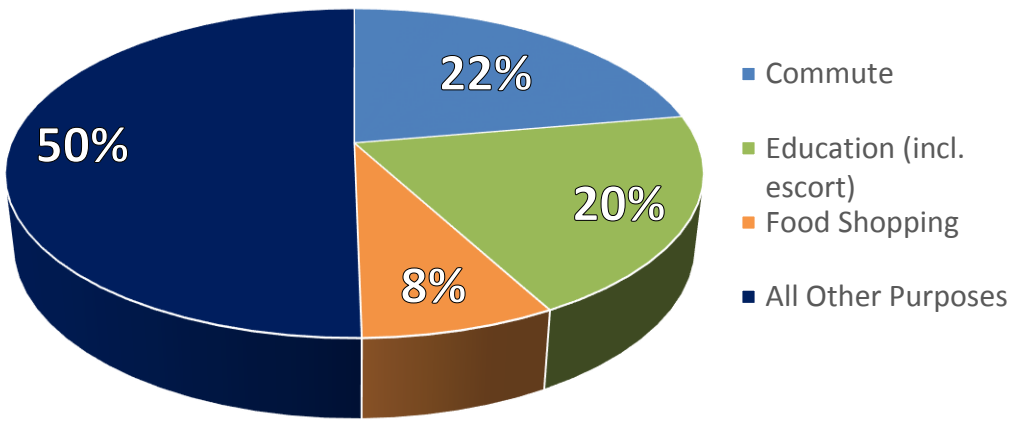


Figure 4-3: Percentage of 24-Hour Demand by Trip Purpose

4.2.3 Overall Mode Share Comparison

The mode shares for the 24-hour period for both scenarios are shown below in figure 4.4. The graph shows a significantly reduced car mode share in the Idealised Network scenario, reducing from 70% to 52% respectively, with uplifts in the public transport and walking mode shares. The chart below also shows a drop in the cycling mode share in the Idealised scenario. This is due to the high frequency and coverage of the unconstrainted public transport network attracting would be cycling trips.

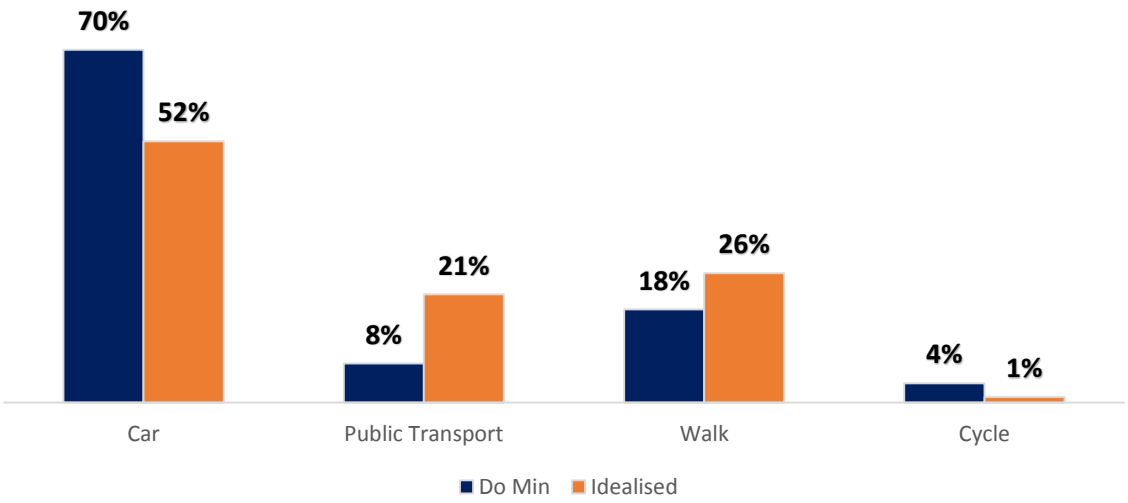


Figure 4-4: Cork Metropolitan 24-Hour Mode Share Split Comparison

4.2.4 Mode Share by Trip Purpose Comparison

The mode share by trip purpose is outlined in Tables 4.1 and 4.2 for the Do Minimum & Idealised Network Scenario. As before the tables show a drop in the car mode share particularly for education trips. However, despite the considerable public transport capacity in the Idealised Network and significant increased frequency and speeds the commute car mode share does not meet the Smarter Travel target of 45%.

Table 4.1: Cork Metropolitan Area Do Min Mode Share by Trip Purpose

Purpose	Road	PT	Walk	Cycle
Commute	74.1%	2.6%	21.4%	1.9%
Education	60.8%	12.7%	25.3%	1.2%
All Other Purposes	75.9%	4.1%	19.1%	0.9%

Table 4.2: Cork Metropolitan Area Idealised Mode Share by Trip Purpose

Purpose	Road	PT	Walk	Cycle
Commute	54.9%	21.1%	22.6%	1.3%
Education	24.8%	41.8%	32.4%	0.9%
All Other Purposes	56.1%	11.2%	31.9%	0.8%

4.2.5 Mode Share by Area

The 24-hour mode share comparison for the City and County Metropolitan Urban and Rural Areas are presented in Figure 4.5 for both scenarios. The bar chart shows the most significant decrease in car mode share is for trips originating in the County Metropolitan Area which includes areas such as Ballincollig, Blarney, Monard, Carrigtwohill, Cobh, Midleton & Glanmire amongst others. There is also an uplift in the level of walking across all areas in the Idealised scenario, though the cycle mode share reduces due to the increased PT offering.

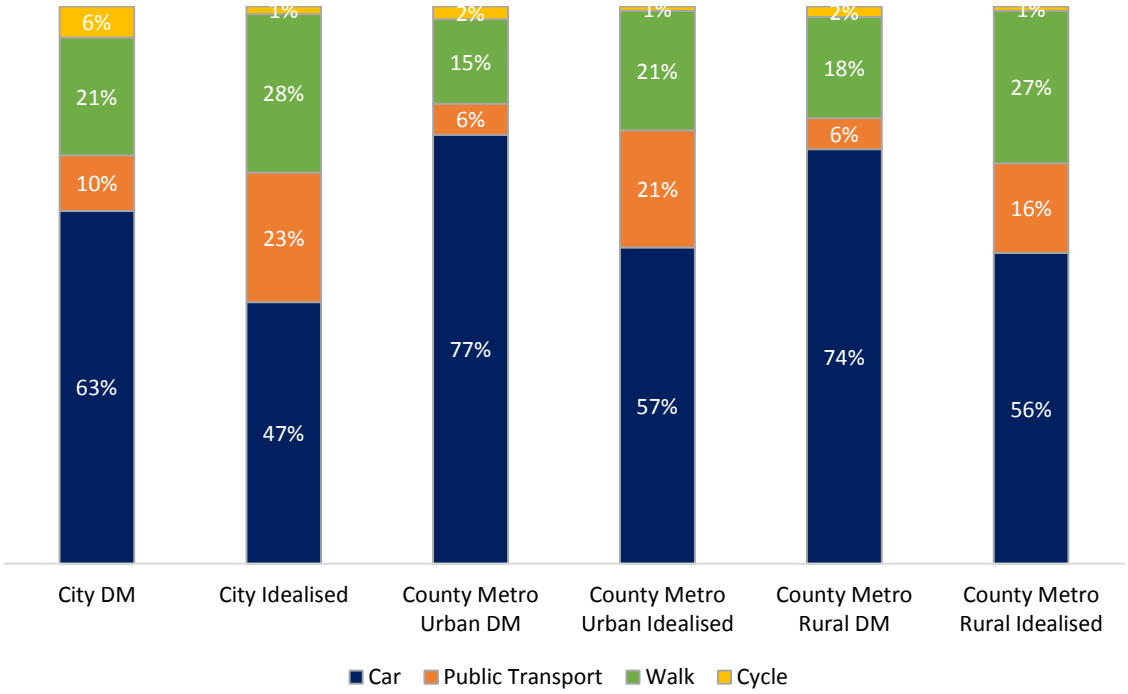


Figure 4-5: Cork Metropolitan 24-Hour Mode Share Split by Area

A more detailed breakdown of the car mode share by SWRM zone is shown in Figures 4.6 & 4.7 which illustrate the car more share in the Do-Minimum and Idealised Network Scenarios respectively. Though the Do-Minimum car mode share is reduced compared to the Base year figures presented in the Baseline Conditions Report, particularly within the City, much of the County Metropolitan Area zone are above 75% car mode share.

In Figure 4.7, the car mode share in the Idealised Network Scenario shows significant improvements across much of the CMA. The car mode share along the railway line in areas such as Carrigtwohill, Midleton, Blarney, Cobh and Tivoli are considerably lower when compared to the Do-Minimum Scenario. There are also significant improvements in Ballincollig, Carrigaline, Passage West and Glanmire.

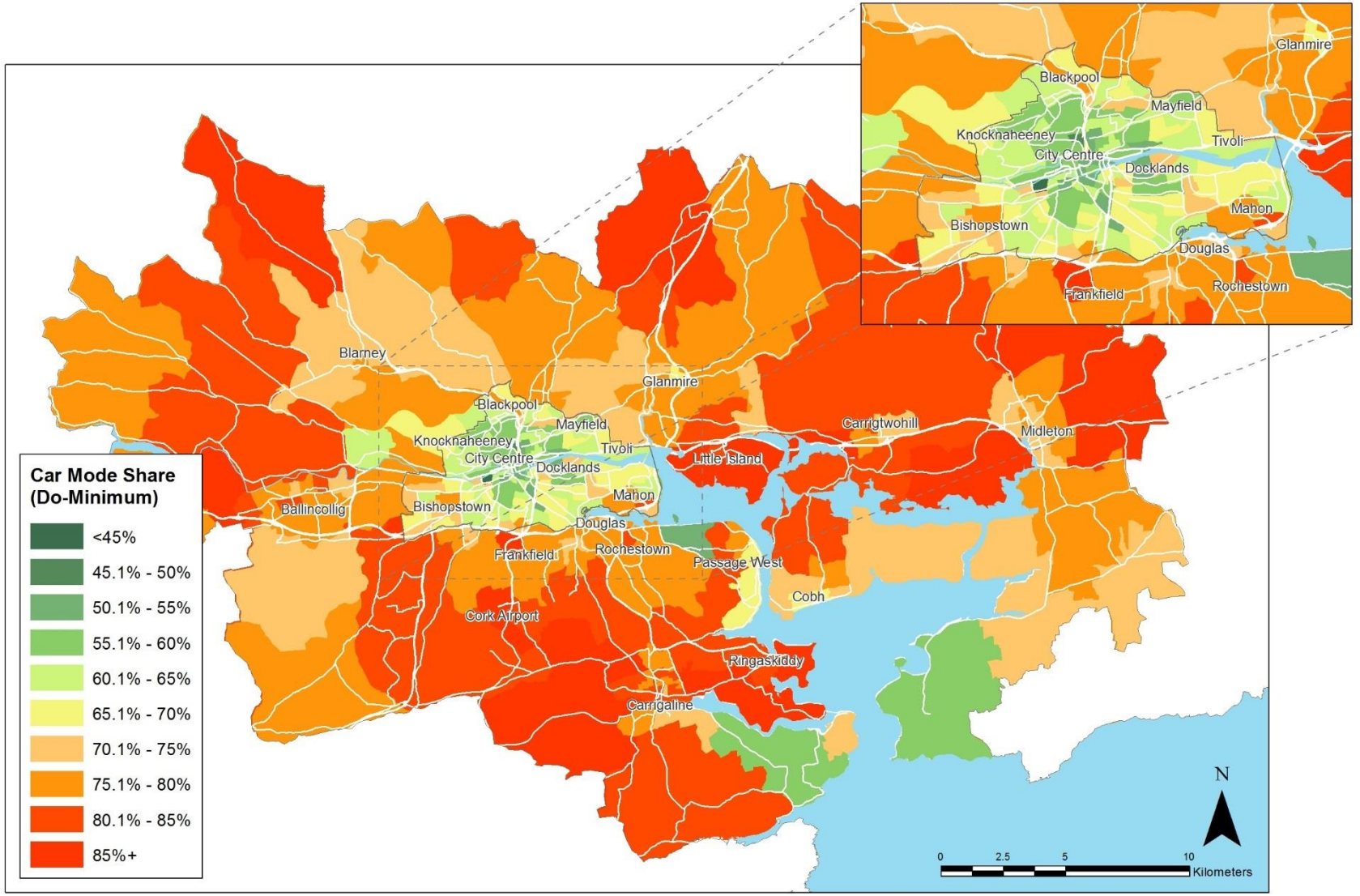


Figure 4-6: Cork Metropolitan 24-Hour DM Car Mode Share by SWRM Zone

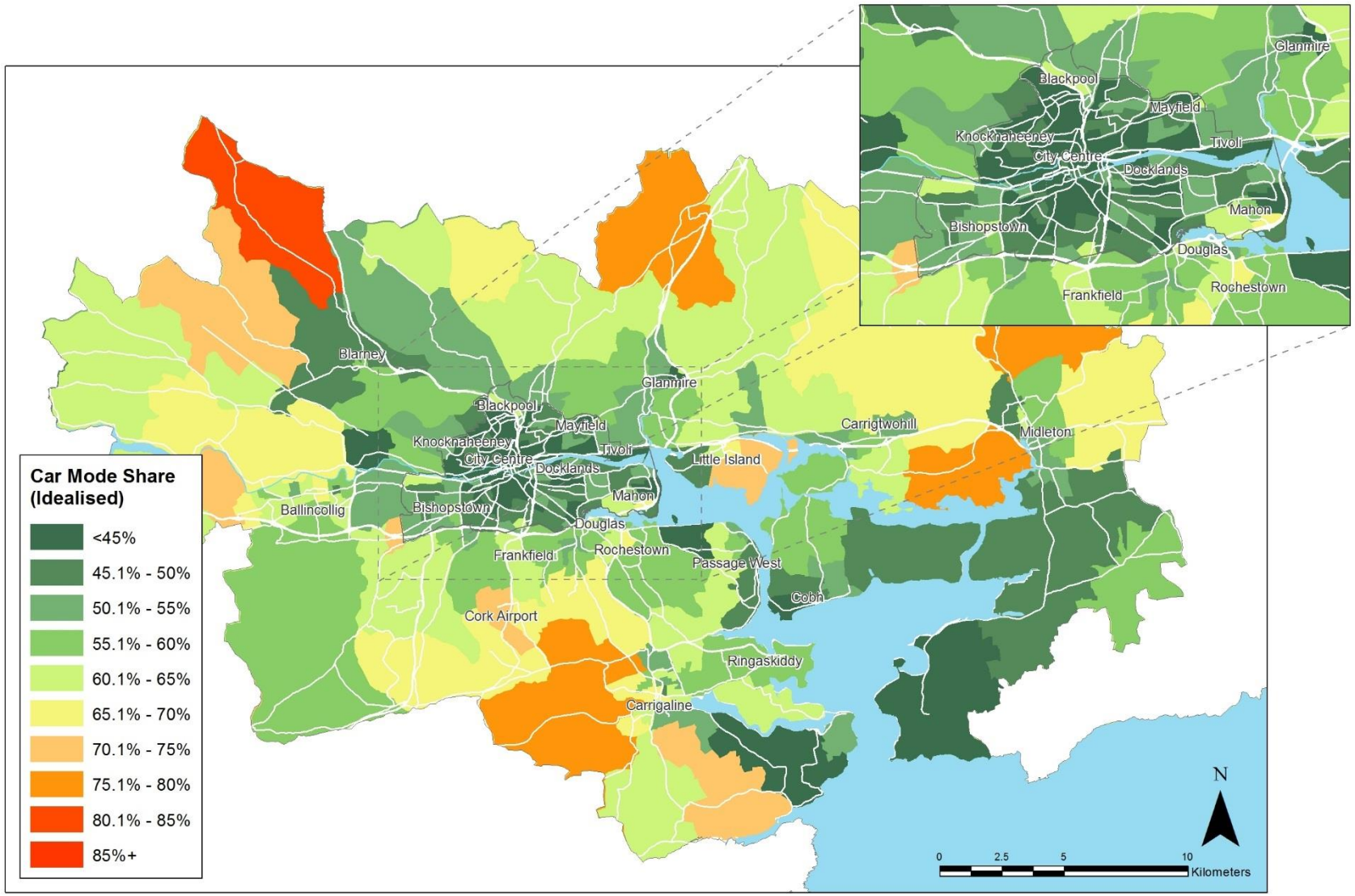


Figure 4-7: Cork Metropolitan 24-Hour Idealised Car Mode Share by SWRM Zone

4.2.6 Mode Share by Time Period

Figures 4.8 & 4.9 show the mode shares for the Cork Metropolitan Area by time period for the Do-Minimum and Idealised Network Scenario. The figures show the most significant decreases in car mode share occurs in the AM and PM Peaks with reductions of 22% & 21% respectively. This is due to both significant increases in the public transport mode share and associated walking trips.

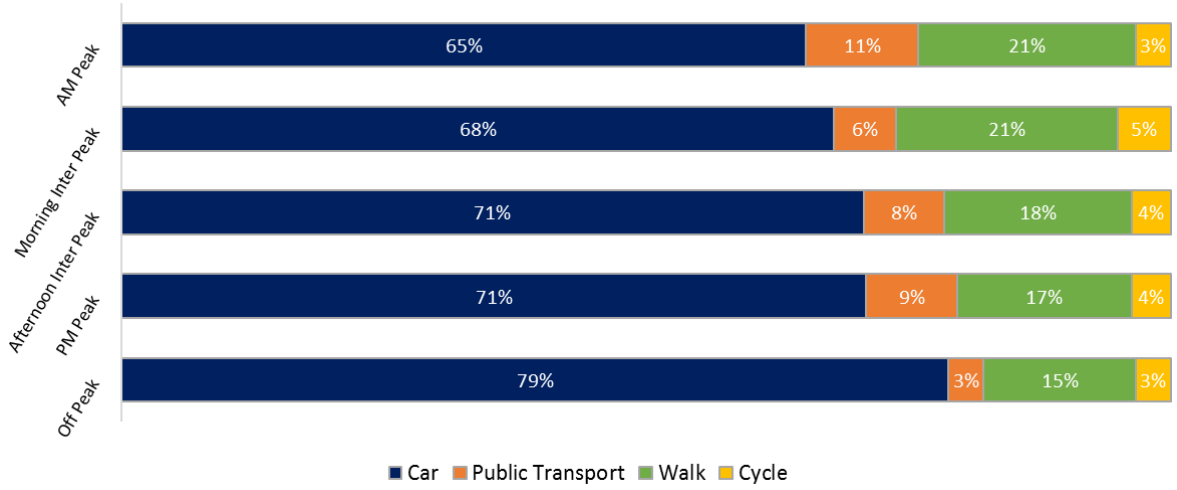


Figure 4-8: Do-Minimum Scenario Mode Shares by Time Period

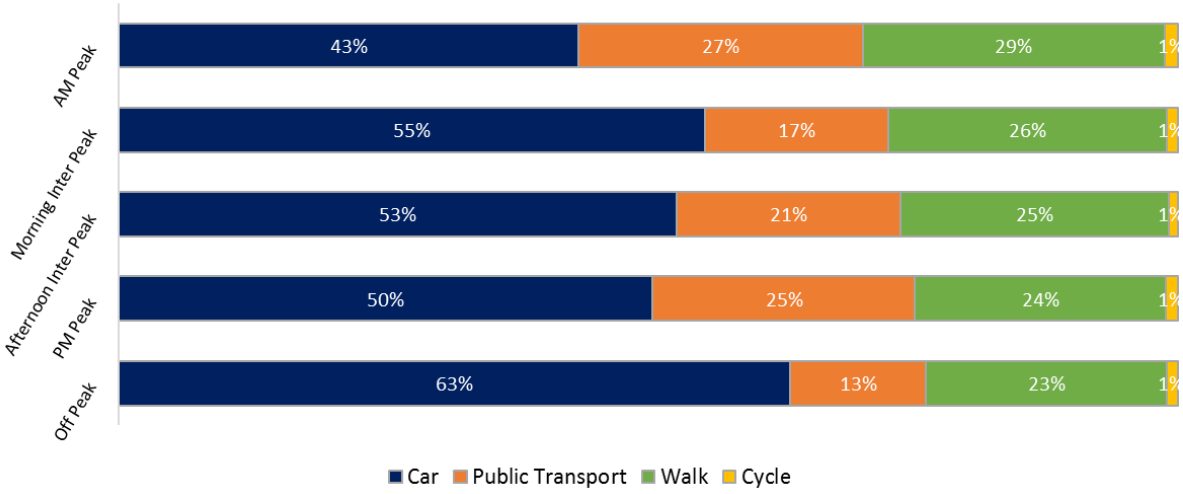


Figure 4-9: Idealised Network Scenario Mode Shares by Time Period

4.3 Transport Demand Movement Patterns

4.3.1 Sector to Sector Comparison Analysis

The movements between defined sectors was also extracted from the SWRM for the 24-Hour Period. Tables 4.3-4.6 summarise this information at an aggregated county level. Tables 4.3 & 4.4 show the proportion of demand from the city, county metropolitan area and county that travel to each of the other areas over the 24-hour period. Tables 4.5 & 4.6 show the demand in absolute figures. The tables show a marginal reduction in the proportion of internal trips in the idealised network scenario with an increase in the number of trips travelling between sectors. This is largely due to the increased level of accessibility modelled in the Idealised Network Scenario.

Table 4.3: Cork Metropolitan 24 hour Do Min Destination Demand by Sector

Origin/ Destination	City	County Metro	County
City	64.9%	27.5%	7.6%
County Metro	26.7%	62.5%	10.9%
County	5.3%	7.9%	86.8%

Table 4.4: Cork Metropolitan 24 hour Idealised Destination Demand by Sector

Origin/ Destination	City	County Metro	County
City	62.5%	28.4%	9.1%
County Metro	27.7%	61.5%	10.8%
County	6.4%	7.9%	85.7%

Table 4.5: County Level Total 24 Hour Do Min Demand

24-hour Demand	City	County Metro	County	Total Origin Demand
City	314,124	133,161	36,691	483,976
County Metro	135,251	316,962	55,268	507,481
County	32,363	48,707	533,867	614,937
Total Destination Demand	481,738	498,830	625,826	1,606,394

Table 4.6: County Level Total 24 Hour Idealised Demand

24-hour Demand	City	Metro (excl. City)	County	Total Origin Demand
City	301,352	137,217	43,791	482,360
Metro (excl. City)	139,924	310,732	54,741	505,397
County	39,176	48,878	526,805	614,859
Total Destination Demand	480,452	496,827	625,337	1,602,616

A map of the defined sectors is provided in Figure 4-10 and sector to sector demand is presented in Tables 4.7 – 4.10 in a matrix format which outlines the key origin-destination movements for both scenarios within the Cork Metropolitan Area for the AM peak and 24-hour periods respectively. It should be noted that the sector system is based on the SWRM zone system and some larger zones have been included as part of settlements though they cover large greenfield areas as well.

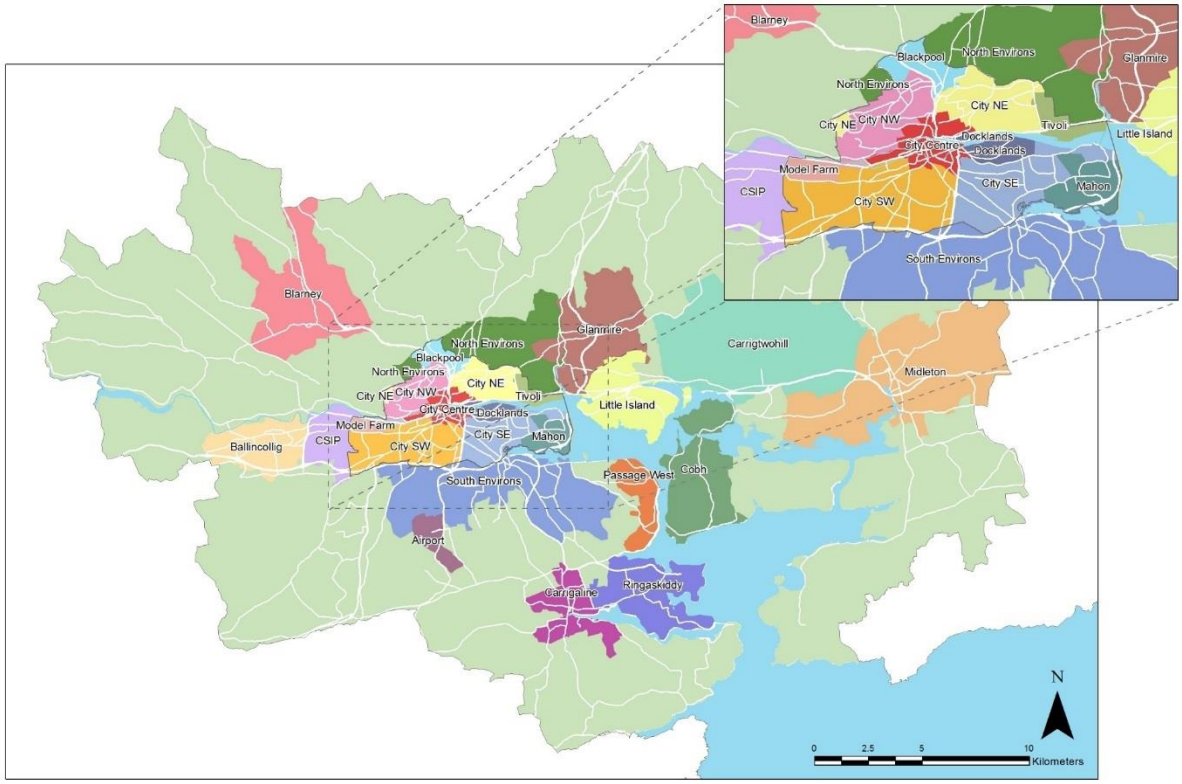


Figure 4-10: Sector System used for Origin-Destination Analysis

As indicated by previous tables, the OD matrices show a reduction in the number of internal trips in the Idealised Network Scenario as people travel further by public transport due to the increased destination choice and accessibility. It is also possible to travel further by car in the Idealised Network Scenario as journey times by road are reduced due to the decreased levels of congestion resulting from the drop-in car mode share across the CMA.

Table 4.7 Sector to Sector Do Min AM Peak Demand

AM Peak Sector to Sector Demand			Destination																							
			Cork City										Cork County Metropolitan Area														
			City Centre	City NW	City NE	City SE	City SW	Blackpool	Tivoli	Docklands	Mahon	Model Farm	CSIP	Ballincollig	Glanmire	Little Island	Airport	Blarney	Ringaskiddy	Carrigtwohill	South Environs	Passage West	North Environs	Cobh	Carrigaline	Midleton	Metro Rural
Origin	Cork City	City Centre	6338	1283	978	953	3294	455	224	743	371	179	60	334	142	99	96	141	49	75	797	54	414	59	145	92	660
		City NW	2943	3080	603	342	1616	525	91	264	152	139	36	216	74	48	38	184	16	30	258	14	393	21	38	37	540
		City NE	2451	610	2019	368	840	344	370	376	245	57	20	91	206	121	45	73	23	73	242	18	835	43	44	79	329
		City SE	2436	295	338	2930	1750	122	128	606	1432	90	49	219	75	119	157	30	118	67	1328	89	155	38	235	65	353
		City SW	4518	852	453	1149	10791	235	101	442	454	717	225	1030	92	106	232	111	95	76	1690	83	209	54	243	91	1006
		Blackpool	926	683	289	110	357	452	48	98	52	29	9	46	46	25	15	107	6	15	81	5	289	10	14	17	266
		Tivoli	909	176	664	156	317	128	532	237	199	27	12	37	125	147	34	22	26	64	121	10	295	27	27	51	137
		Docklands	1830	260	330	1053	917	106	143	792	519	51	24	108	60	73	74	24	43	47	411	25	134	23	71	46	174
		Mahon	594	90	132	774	433	33	68	197	1829	25	14	82	72	85	39	13	45	57	393	52	88	41	107	63	179
		Model Farm	114	31	12	19	480	7	3	10	8	70	12	69	3	3	3	7	3	3	38	3	7	2	7	3	64
	Cork County Metropolitan Area	CSIP	101	29	12	25	311	8	3	10	16	61	74	205	4	5	10	8	5	4	51	3	7	2	9	4	72
		Ballincollig	907	257	106	263	2383	76	31	110	216	483	351	6808	34	76	161	102	72	40	583	28	71	20	91	38	1151
		Glanmire	600	149	391	137	330	125	219	134	246	25	18	62	2283	465	54	25	57	198	194	20	886	66	63	135	407
		Little Island	119	25	55	43	84	14	36	24	53	5	3	22	106	360	9	5	12	109	67	11	77	56	27	98	113
		Airport	40	7	7	24	58	3	3	9	10	3	2	20	5	3	57	2	5	4	64	5	5	3	30	5	39
		Blarney	609	467	175	73	428	292	29	70	52	62	31	224	30	26	23	2126	10	14	76	4	155	6	13	13	816
		Ringaskiddy	56	7	9	48	78	3	5	12	34	5	3	20	10	12	17	2	398	9	107	48	11	10	189	11	86
		Carrigtwohill	279	47	109	76	226	34	95	63	152	16	11	40	147	426	33	8	37	2797	122	16	127	231	41	736	485
		South Environs	2483	306	291	2397	3768	117	119	408	1049	264	146	622	147	294	642	43	591	154	4793	302	215	76	1002	131	1006
		Passage West	230	26	36	228	311	12	18	42	180	22	15	60	27	57	57	5	262	30	362	1071	36	68	217	26	262
		North Environs	1236	522	847	192	483	279	296	185	186	36	15	65	715	231	36	71	35	115	171	19	1888	52	52	99	462
		Cobh	369	58	123	107	262	33	79	65	174	18	11	45	88	385	34	7	90	557	142	152	114	5001	54	393	594
		Carrigaline	553	60	71	491	730	28	38	97	333	54	36	139	55	122	342	12	879	62	904	156	74	34	4890	54	771
		Midleton	406	67	149	107	324	44	98	81	221	22	15	61	129	507	45	10	51	1117	178	22	151	294	61	7512	900
		Metro Rural	2490	1124	661	668	3008	706	186	329	582	388	193	1534	477	529	427	833	483	747	1151	157	878	430	1222	1860	9446

Table 4.8 Sector to Sector Do Min 24 Hour Demand

24 Hour Sector to Sector Demand			Destination																								
			Cork City										Cork County Metropolitan Area														
			City Centre	City NW	City NE	City SE	City SW	Blackpool	Tivoli	Docklands	Mahon	Model Farm	CSIP	Ballincollig	Glanmire	Little Island	Airport	Blarney	Ringaskiddy	Carrigtwohill	South Environs	Passage West	North Environs	Cobh	Carrigaline	Midleton	Metro Rural
Origin	Cork City	City Centre	32781	8949	7226	7085	17086	3174	2151	5521	2308	578	358	2986	1629	517	322	1683	239	874	7224	682	3337	1052	1650	1392	6929
		City NW	8865	9795	2336	1262	5154	2320	469	1068	576	307	134	1098	469	155	95	1201	54	187	1373	110	1525	211	275	307	3107
		City NE	7115	2300	6737	1445	2735	1388	1624	1382	891	127	67	495	1124	337	102	529	72	397	1305	151	2721	414	344	603	2103
		City SE	7309	1284	1476	8518	5378	539	543	2555	3810	190	136	1101	487	320	304	245	268	339	6065	536	795	373	1287	515	2039
		City SW	16913	5168	2760	5256	36711	1432	800	2590	2077	1746	907	6409	936	430	539	1231	336	699	10233	834	1501	785	2052	1116	7686
		Blackpool	3188	2316	1407	539	1435	1933	340	476	228	72	40	327	361	83	37	771	24	120	538	51	1014	124	126	181	1904
		Tivoli	2404	522	1797	584	883	377	1507	671	576	52	29	177	587	311	66	119	59	273	572	70	1080	221	176	338	695
		Docklands	5518	1060	1394	2545	2626	467	629	2793	1328	106	64	492	399	206	143	202	95	241	1681	144	676	235	367	355	1074
		Mahon	2531	598	949	3880	2128	237	550	1356	6392	71	70	737	708	301	102	165	162	512	2975	517	691	572	975	766	1783
		Model Farm	698	340	143	204	1906	82	51	114	82	228	108	853	56	20	17	127	16	41	519	48	86	46	115	64	720
	Cork County Metropolitan Area	CSIP	371	140	70	138	931	42	27	65	73	104	267	915	41	19	23	77	15	31	360	34	49	31	87	47	456
		Ballincollig	3074	1157	512	1086	6521	343	161	491	738	811	917	22254	267	209	299	750	168	226	2666	236	372	226	606	351	4813
		Glanmire	1738	494	1207	493	981	381	557	410	702	54	42	284	6274	847	103	145	114	552	828	121	2460	362	320	612	1642
		Little Island	639	175	386	341	496	94	311	225	320	20	21	233	864	1235	31	69	51	821	714	134	544	728	311	1020	1128
		Airport	316	93	99	291	538	35	61	137	95	13	22	298	98	23	216	45	36	66	1069	97	74	69	551	96	733
		Blarney	1655	1193	541	241	1222	778	103	203	161	119	75	738	136	65	46	6467	25	58	344	30	421	52	82	88	2758
		Ringaskiddy	331	65	89	298	413	29	60	107	190	18	18	197	120	52	49	29	1231	90	1133	464	102	171	1638	138	938
		Carrigtwohill	1016	208	450	360	773	133	274	265	531	41	33	254	574	841	74	64	89	7727	716	119	509	1506	291	3412	2149
		South Environs	7348	1392	1331	6013	10453	536	530	1673	2927	495	360	2746	788	657	1103	351	1045	653	17362	1239	948	641	3550	931	4477
		Passage West	702	112	157	537	856	52	63	146	516	46	34	246	115	124	102	31	436	106	1263	3300	148	434	712	156	751
		North Environs	3467	1567	2813	788	1551	1055	989	685	656	81	48	377	2376	503	79	433	89	466	957	148	6025	409	352	626	2355
		Cobh	1078	217	435	368	803	127	208	235	560	43	32	236	348	712	73	53	161	1419	662	442	415	16816	288	1674	1981
		Carrigaline	1758	288	365	1306	2169	130	162	376	987	111	88	651	307	287	573	87	1540	266	3632	711	359	286	15297	403	3672
		Midleton	1448	317	637	509	1144	187	316	358	747	60	47	366	585	994	104	90	127	3190	964	160	633	1695	406	26923	5118
		Metro Rural	6856	3126	2150	1996	7669	1933	623	1063	1750	683	448	4795	1561	1075	748	2771	866	2003	4422	740	2319	1958	3577	5033	30699

Table 4.9 Sector to Sector Idealised AM Peak Demand

AM Peak Sector to Sector Demand			Destination																							
			Cork City										Cork County Metropolitan Area														
			City Centre	City NW	City NE	City SE	City SW	Blackpool	Tivoli	Docklands	Mahon	Model Farm	CSIP	Ballincollig	Glanmire	Little Island	Airport	Blarney	Ringaskiddy	Carrigtwohill	South Environs	Passage West	North Environs	Cobh	Carrigaline	Midleton	Metro Rural
Origin	Cork City	City Centre	6029	1198	900	933	3003	438	197	695	388	169	62	366	173	116	108	168	74	100	868	70	409	93	178	127	683
		City NW	2655	2663	569	413	1678	487	95	253	195	167	43	271	106	63	49	175	34	52	347	30	398	44	75	68	543
		City NE	2178	593	1842	420	896	335	306	331	284	72	24	148	224	132	53	90	36	90	296	29	754	65	71	108	357
		City SE	2349	359	376	2650	1732	150	135	559	1242	104	49	263	108	122	150	64	143	85	1313	111	214	61	259	93	414
		City SW	4236	946	498	1134	9950	270	114	454	488	595	210	1026	140	125	232	149	107	108	1671	98	285	90	272	138	1003
		Blackpool	837	569	271	138	409	411	49	94	70	37	11	73	55	31	19	92	14	24	109	10	258	19	27	30	247
		Tivoli	779	197	567	168	337	133	495	204	233	32	14	49	120	156	36	29	28	71	135	11	289	38	32	63	144
		Docklands	1702	265	316	879	900	113	132	725	462	64	26	148	92	81	68	44	53	57	403	39	168	41	85	65	218
		Mahon	610	125	158	652	477	46	80	189	1597	34	16	105	75	72	38	28	49	57	373	55	110	48	109	71	198
		Model Farm	98	34	13	21	412	8	4	11	10	59	11	66	5	3	3	7	2	4	37	3	9	4	8	5	56
	Cork County Metropolitan Area	CSIP	104	32	15	30	262	9	4	12	18	45	70	180	6	6	10	9	5	5	48	3	12	4	10	6	68
		Ballincollig	1048	302	144	312	2173	90	43	135	235	416	329	6483	57	85	145	101	69	56	536	34	113	36	105	60	1103
		Glanmire	679	180	390	189	445	120	174	153	242	41	22	94	2007	417	60	41	54	183	203	23	725	83	69	155	384
		Little Island	109	28	50	45	96	14	28	23	46	6	3	26	87	292	7	9	8	91	57	9	70	51	24	96	100
		Airport	42	9	8	21	54	3	3	8	10	3	2	16	4	3	56	3	4	4	51	4	5	3	22	5	32
		Blarney	668	400	178	133	527	245	37	80	79	66	28	214	45	42	32	1842	23	31	114	12	144	20	32	32	693
		Ringaskiddy	72	12	11	50	85	5	4	13	31	6	3	21	8	9	15	4	392	7	91	43	10	12	160	8	72
		Carrigtwohill	346	72	113	106	315	40	79	75	147	27	15	62	121	418	37	21	35	2497	131	22	126	276	47	739	447
		South Environs	2681	458	371	2081	3571	163	133	431	1011	264	135	646	170	250	595	104	525	156	4611	278	292	100	901	157	1020
		Passage West	300	51	48	239	350	19	19	54	170	26	14	71	28	44	54	15	269	32	329	931	44	83	192	33	224
		North Environs	1101	480	784	257	577	252	280	177	225	51	18	112	631	227	42	77	38	120	200	26	1703	71	67	124	444
		Cobh	461	97	132	146	398	47	99	95	181	37	18	80	111	338	43	28	127	557	166	155	137	4355	72	529	516
		Carrigaline	684	109	99	479	806	43	38	111	319	64	36	168	59	101	298	30	789	59	823	131	92	41	4790	60	689
		Midleton	492	99	160	144	447	58	96	101	217	36	19	91	140	491	51	27	47	1055	188	28	165	361	68	7219	851
		Metro Rural	2611	1070	692	790	3049	672	183	351	618	355	177	1420	428	537	420	703	411	733	1128	156	804	406	1068	1661	9847

Table 4.10 Sector to Sector Idealised 24 Hour Demand

24 Hour Sector to Sector Demand			Destination																								
			Cork City										Cork County Metropolitan Area														
			City Centre	City NW	City NE	City SE	City SW	Blackpool	Tivoli	Docklands	Mahon	Model Farm	CSIP	Ballincollig	Glanmire	Little Island	Airport	Blarney	Ringaskiddy	Carrigtwohill	South Environs	Passage West	North Environs	Cobh	Carrigaline	Midleton	Metro Rural
Origin	Cork City	City Centre	31492	8307	6709	6868	16185	2992	1924	5185	2338	542	372	3229	1766	527	347	1821	302	987	7612	811	3156	1254	1867	1545	7112
		City NW	8256	8800	2267	1411	5339	2117	501	1048	678	342	145	1192	532	179	113	1079	82	242	1670	158	1478	289	374	379	3004
		City NE	6618	2240	6413	1525	2857	1343	1448	1295	967	147	77	607	1119	338	112	546	88	410	1453	172	2550	437	390	625	2120
		City SE	7109	1440	1566	7957	5310	607	557	2294	3435	210	141	1163	554	319	296	354	308	375	5751	576	908	431	1280	561	2192
		City SW	16173	5335	2884	5182	34554	1545	837	2598	2145	1515	832	6128	1093	453	538	1363	351	812	9887	876	1671	967	2116	1268	7618
		Blackpool	3008	2114	1359	603	1546	1806	353	479	268	83	45	376	371	92	45	696	35	138	642	69	947	154	160	212	1836
		Tivoli	2165	558	1613	597	916	391	1460	618	643	61	33	203	524	311	70	137	59	263	600	70	1052	259	174	345	687
		Docklands	5192	1047	1314	2282	2622	472	578	2613	1260	123	72	572	455	212	135	246	111	265	1700	177	701	295	395	395	1155
		Mahon	2566	709	1032	3491	2212	279	615	1290	5847	84	75	774	685	265	101	224	165	485	2939	521	741	568	969	737	1828
		Model Farm	664	373	162	224	1666	92	59	132	94	206	90	776	76	21	16	129	16	53	511	51	107	70	126	80	675
	Cork County Metropolitan Area	CSIP	384	150	80	142	860	46	32	72	77	85	263	872	49	19	22	70	15	36	339	33	57	40	86	52	425
		Ballincollig	3356	1245	628	1158	6285	391	188	580	779	735	873	21919	314	218	277	689	161	259	2540	243	455	275	628	392	4601
		Glanmire	1868	555	1196	563	1142	387	493	467	687	74	50	327	5856	797	109	176	105	515	829	117	2235	398	309	634	1537
		Little Island	640	197	381	341	523	104	308	231	288	22	21	240	810	1055	28	96	40	812	640	113	530	678	276	1029	1132
		Airport	344	110	110	284	538	43	65	130	94	13	20	275	103	20	216	59	31	69	1017	93	82	79	494	100	725
		Blarney	1791	1079	557	343	1358	704	119	245	214	121	68	684	167	90	60	5958	44	92	459	50	407	94	124	129	2463
		Ringaskiddy	405	95	105	339	434	40	60	124	194	18	17	189	111	42	44	48	1232	81	1044	478	101	224	1512	123	825
		Carrigtwohill	1134	268	460	404	903	153	262	289	513	55	39	288	531	827	78	102	80	7235	703	125	495	1560	282	3361	2089
		South Environs	7786	1696	1489	5698	10127	644	560	1703	2894	489	338	2600	792	586	1044	475	957	636	17101	1171	1037	670	3273	918	4385
		Passage West	839	161	178	576	903	70	63	179	517	49	33	251	111	105	97	53	455	112	1194	3029	154	466	632	164	692
		North Environs	3284	1516	2636	900	1719	980	962	707	710	100	57	457	2164	493	86	416	89	456	1042	154	5913	433	364	633	2216
		Cobh	1271	297	456	429	993	158	244	297	558	67	41	283	378	656	84	99	217	1464	690	472	437	15559	304	1899	1819
		Carrigaline	2012	391	414	1306	2252	165	160	412	985	123	88	670	297	254	514	131	1422	255	3355	631	371	303	15491	393	3354
		Midleton	1611	393	657	564	1318	221	321	404	732	78	53	408	605	998	109	135	112	3153	954	169	639	1929	398	26602	4822
		Metro Rural	7132	3027	2174	2160	7673	1868	614	1155	1806	641	416	4607	1459	1080	741	2447	756	1951	4346	681	2183	1792	3275	4746	32883

5 Corridor Analysis

5.1 Overview

To facilitate analysis of travel demand within the CMA, the area was divided into several corridors based on the national and regional transport networks around a central city centre core. This section of the report provides a comparison of overall demand from each corridor and an analysis of the demand characteristics and distribution for each corridor using outputs from the SWRM 2036 idealised network model run.

These corridors are primarily used to describe radially-based trips, which represents the most dominant trip pattern within the CMA. The corridors and the settlements within each corridor are follows:

- Corridor A: Ballyvolane, Mayfield & Montenotte;
- Corridor B: Sallybrook, Glanmire & Tivoli;
- Corridor C: Whitegate, Midleton, Carrigtwohill, Cobh, Glounthaune & Little Island;
- Corridor D: Crosshaven, Carrigaline, Ringaskiddy, Monkstown, Passage West, Rochestown, Douglas, Ballinlough, Mahon, Blackrock & Docklands;
- Corridor E: Airport, Frankfield & Togher;
- Corridor F: Ballincollig, CSIP, CIT, Bishopstown, Model Farm & UCC; and
- Corridor G: Blarney, Monard, Fairhill, Blackpool & Knocknaheeney.

The corridors have been subdivided into smaller segments based on inner and outer sectors which allow for the greater understanding of movements along the corridor and orbital trips between corridors. The city core, sectors, corridors and segments are shown in Figure 5.1. The segments are named based on their corridor letter and sector number (i.e. Segment B1 lies with corridor B and sector 1).

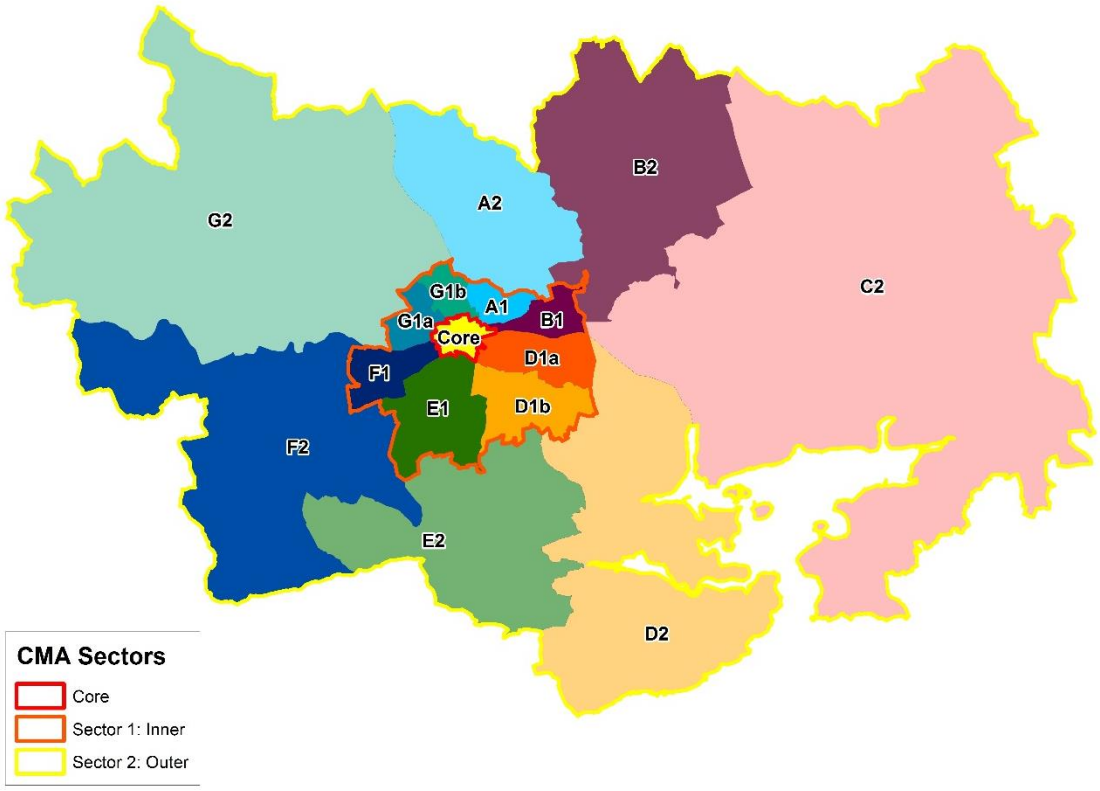


Figure 5.1 CMA Corridor & Segments

5.2 Corridor Comparison

5.2.1 Population & Employment

The total 2036 population & employment figures by corridor is shown in Figure 5.2 as modelled in the 2036 planning sheet. The Figure shows Corridor D has the highest population followed by Corridor C. Corridor E, F & G also have a significant residential population. Employment is highest within the City Core followed by Corridor D, C & F.

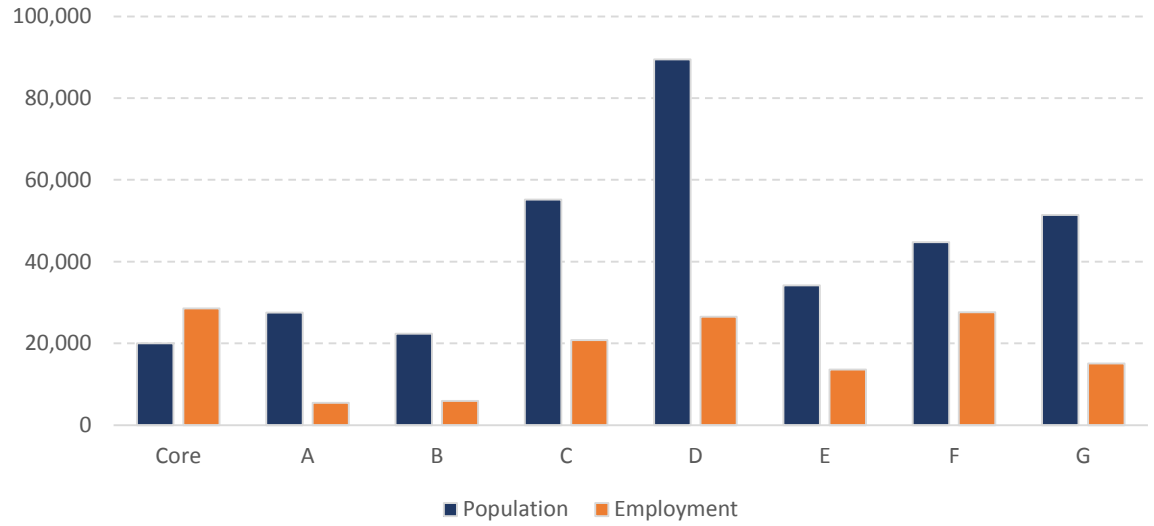


Figure 5.2 2036 Employment & Population by Corridor (2036 Planning Sheet)

5.2.2 Total Demand

The total all day demand originating within each corridor has been extracted from the idealised SWRM model run and is shown in the graph in Figure 5.3, which also provides a breakdown of corridor demand by segment.

The graph shows the greatest demand originates within Corridors C, D & F and the core city centre. A significant proportion of demand within Corridors D & F is within Sector 1, the inner sector in segments D1a, D1b & F1. There are also reasonable levels of demand within Corridor E & G. Lower levels of demand are observed along corridors A & B though this is due to the rural nature of Sector 2 within these corridors. Within the inner sector 1 there is demand in segments A1 and B1.

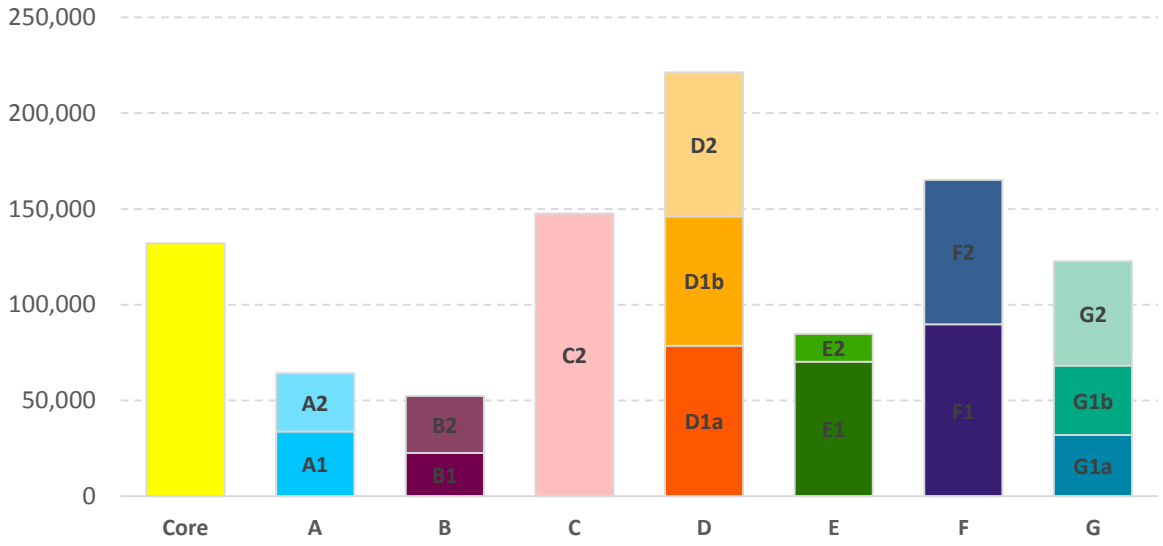


Figure 5.3 All Day Demand Originating within each Corridor

The all-day demand by segment is also illustrated in Figure 5.4. As shown, the greatest demand originates along an east-west corridor through the City Centre. There is also significant demand along the N20 & N28 corridors and to the immediate North & South of the City.

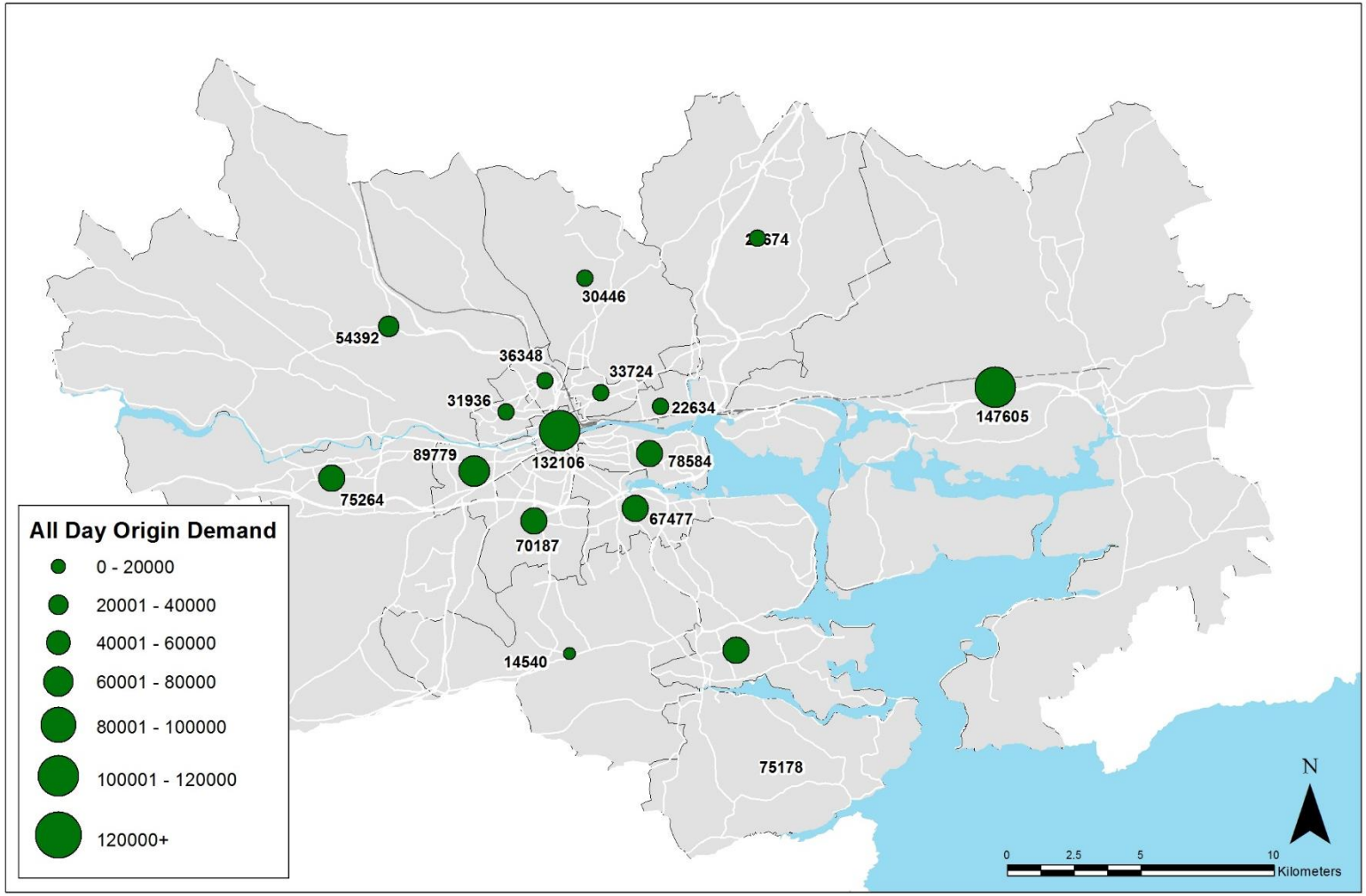


Figure 5.4 All Day Demand Originating within each Segment

5.2.3 Mode Share

The mode share for each corridor and the core centre segment have been extracted from the SWRM and are presented in Figure 5.5. The figure shows a lower car mode share within the core city centre segment followed by Corridors A, B & G. The highest walking mode shares are also observed in segments A, G and the core city centre. The car mode share within the other corridors are comparable ranging between 53.6%-54.9%.

Figure 5.5 Corridor Mode Share-24 hour

The mode share for each corridor has also been disaggregated to each segment as shown below in Figure 5.6. The graph shows the generally lower car shares within the Sector 1 segments except for Segment D1b which also covers the more suburban areas of Frankfield, Grange, Douglas & Rochestown. Segment C2 has the lowest car mode share of the Sector 2 segments which is reflective of the heavy rail line serving this corridor.

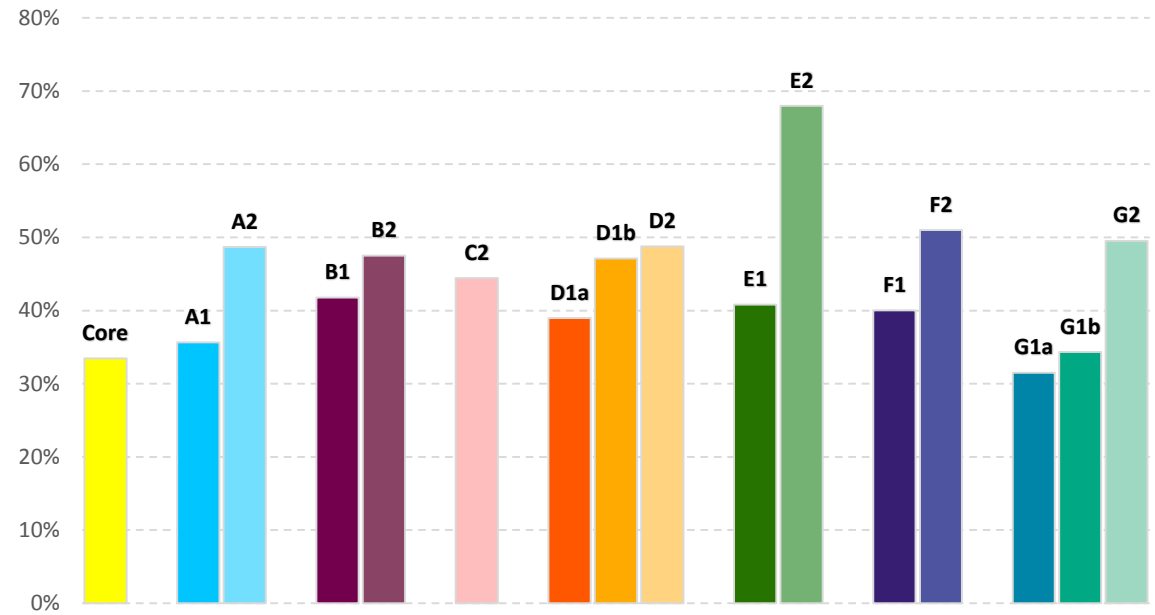


Figure 5.6 Segment Car Mode Share-24 hour

5.2.4 Cork Metropolitan Origin & Destination Patterns

Origin-Destination (OD) matrices were developed for all trips between each segment for all time periods, modes and trip purposes. The matrices for the 24 hour and AM peak for both the total demand, PT demand and Road demand are presented in Table 5.1-5.6.

24-Hour Demand

The 24-hour total demand OD matrix in Table 5.1 shows strong demand to the city core centre from most areas particularly from the south of the city from segments D1a, D1b, E1 & F1. There is also high demand between D1a & D1b, E1 & D1b, and F1 & E1. In the outer sector, there is considerable demand between F1 & F2, D1a, D1b & D2, and from all segments to & from the City Core.

The overall pattern of demand is similar in the 24-hour public transport demand OD matrix shown in Table 5.2 with a higher proportion of demand to and from C2 along the rail line. Although the segments to the north of the city are smaller in size and demand there is strong public transport demand from the segments included in Corridor G.

The road demand OD matrix presented in Table 5.3 shows strong levels of demand between E1, D1a, D1b, F1, D2 and F2. This movement represent orbital movements largely catered for by the N40. There is also considerable demand originating within corridors C2 & G2. Despite the PT offering assumed in the idealised network which predominantly caters for radial trips to the city, the city core remains one of the most popular destination for car trips.

AM Morning Peak Demand

In the AM Peak, the highest total demand is from D1a and E1 to the Core, between E1 & F1 and from F2 to F1. The highest public transport demand is from D1a, D1b, E1 & C2 to the Core City and from F2 to F1. Overall the pattern of demand illustrates the strong east-west connection linking Corridor F, E, D & C through the Core Centre. The destination patterns along individual corridors including those with lesser demand are discussed in Sections 5.3- 5.10. In terms of road demand, there is a large number of trips between the corridors encompassing the N40 particularly from F2 & E1 to F1.

Table 5.1 Segment to Segment 24-hour Total Demand

24_Tot_Sec	Segment No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Segment No.	Segment	Core	A1	B1	D1a	D1b	E1	F1	G1a	G1b	A2	B2	C2	D2	E2	F2	G2
1	Core	34449	6065	3058	10121	7781	10604	9463	5996	6298	3343	2320	5463	3956	975	4486	5161
2	A1	5906	5550	1716	2205	1287	1457	1609	1189	2108	2420	1230	1802	706	171	689	1198
3	B1	3268	1881	2575	2106	959	846	966	542	894	1417	1398	2168	637	150	468	542
4	D1a	10608	2321	2067	20953	7995	4770	4222	1476	1782	1558	1629	4510	4245	751	2478	1521
5	D1b	7860	1321	923	7876	15291	6061	4593	1085	1222	874	920	2947	6450	1392	2671	1254
6	E1	10783	1494	819	4720	6110	13820	8942	1886	1755	877	776	2346	3012	1338	3696	1758
7	F1	9722	1672	928	4137	4584	8794	21722	3226	2032	1186	1017	3129	3014	990	7951	3766
8	G1a	5939	1214	510	1426	1074	1862	3184	4981	2757	854	432	851	553	169	1203	2164
9	G1b	6431	2163	840	1763	1242	1761	2029	2769	5449	1582	801	1253	652	181	954	2984
10	A2	3530	2515	1351	1543	894	895	1220	881	1629	6442	2071	1936	637	149	566	1307
11	B2	2420	1311	1385	1624	953	786	1041	447	825	2102	8427	3392	818	197	561	561
12	C2	5832	1957	2163	4611	3135	2446	3294	906	1304	1982	3387	93287	3540	611	1938	1243
13	D2	4253	759	625	4324	6657	3085	3201	579	663	643	811	3448	35193	1962	1949	818
14	E2	962	170	139	720	1364	1295	982	165	172	140	186	554	1859	2191	856	292
15	F2	4671	721	456	2487	2687	3671	8084	1261	979	558	548	1838	1846	869	29953	3260
16	G2	5142	1246	506	1486	1236	1712	3706	2178	3013	1302	552	1193	776	299	3170	19503

Table 5.2 Segment to Segment 24-hour Public Transport Demand

24_Tot_Sec	Segment No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Segment No.	Segment	Core	A1	B1	D1a	D1b	E1	F1	G1a	G1b	A2	B2	C2	D2	E2	F2	G2
1	Core	4675	1155	662	2492	2144	2269	2166	1094	1171	642	701	2311	1566	209	1510	1344
2	A1	1087	477	225	515	343	363	475	264	350	323	225	531	244	42	255	255
3	B1	637	239	237	517	248	245	318	180	228	204	292	840	197	37	181	180
4	D1a	2563	543	524	2617	1509	1084	1193	510	556	378	429	1252	1250	125	684	522
5	D1b	2105	351	251	1466	2019	1228	1063	341	395	251	237	731	1890	182	533	430
6	E1	2247	373	248	1051	1231	1597	1387	436	495	246	239	758	842	168	764	456
7	F1	2163	492	324	1155	1072	1396	2683	743	539	344	342	1168	780	114	2006	716
8	G1a	1044	269	174	488	335	430	730	523	454	201	131	379	259	37	381	329
9	G1b	1153	362	221	546	398	497	536	458	649	245	186	499	298	50	313	535
10	A2	636	332	200	369	253	247	343	205	244	298	300	511	202	32	196	231
11	B2	671	230	294	414	234	236	335	131	184	302	724	883	195	40	175	159
12	C2	2315	559	862	1240	750	777	1190	396	513	521	887	14986	840	142	602	529
13	D2	1519	247	198	1194	1867	825	767	262	292	197	194	805	4557	149	426	349
14	E2	181	40	35	112	173	158	100	35	46	29	38	127	142	58	89	58
15	F2	1463	261	185	662	531	761	1995	385	311	195	177	581	431	95	3238	403
16	G2	1186	247	167	477	401	425	662	312	504	217	151	480	330	59	376	1456

Table 5.3 Segment to Segment 24-hour Road Demand

24_Tot_Sec	Segment No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Segment No.	Segment	Core	A1	B1	D1a	D1b	E1	F1	G1a	G1b	A2	B2	C2	D2	E2	F2	G2
1	Core	11300	2419	1422	4356	3613	4114	3975	2184	2294	1923	1382	3052	2222	666	2626	3098
2	A1	2423	1780	731	1016	628	606	713	509	905	1221	772	1222	425	113	384	780
3	B1	1637	829	662	890	515	408	487	239	461	691	629	1253	410	104	268	314
4	D1a	4711	1072	840	8279	4185	2563	2341	577	733	876	1056	3125	2672	568	1710	854
5	D1b	3763	646	475	4154	6487	3286	2957	461	530	499	630	2138	4008	1003	2059	712
6	E1	4369	624	380	2565	3326	5355	4441	689	668	459	481	1553	2066	956	2637	1019
7	F1	4215	745	445	2312	2938	4279	8048	1238	921	682	624	1933	2178	806	4919	2577
8	G1a	2244	527	216	562	461	675	1222	1540	1127	493	262	456	270	109	706	1387
9	G1b	2430	934	417	731	545	666	918	1122	1783	949	533	732	326	113	572	2005
10	A2	2141	1293	648	884	520	479	720	515	997	2526	1222	1331	416	110	349	858
11	B2	1532	844	612	1074	668	498	658	276	563	1239	2715	2285	613	154	378	378
12	C2	3422	1346	1220	3246	2310	1635	2078	493	771	1360	2268	43843	2216	462	1332	704
13	D2	2581	473	398	2827	4246	2163	2381	293	345	427	607	2162	14651	1629	1512	456
14	E2	703	115	96	559	997	940	823	109	111	104	146	421	1553	784	739	225
15	F2	2888	409	252	1748	2082	2622	5089	761	602	342	364	1252	1404	745	13146	2580
16	G2	3376	848	298	888	740	1034	2642	1444	2097	875	381	706	436	230	2549	6128

Table 5.4 Segment to Segment AM Peak Total Demand

AM_Tot_Sec	Segment No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Segment No.	Segment	Core	A1	B1	D1a	D1b	E1	F1	G1a	G1b	A2	B2	C2	D2	E2	F2	G2
1	Core	6545	774	347	1402	958	1484	2207	850	1017	408	226	547	426	171	526	511
2	A1	1938	1587	384	570	312	392	586	302	628	738	243	371	154	55	174	213
3	B1	1118	604	797	620	206	232	382	168	302	323	269	498	127	55	110	104
4	D1a	3408	502	463	6148	1917	1281	1545	344	489	292	262	756	868	233	535	271
5	D1b	2596	291	233	2438	4290	1946	1754	254	344	201	181	643	1962	587	659	256
6	E1	3366	321	184	1240	1455	4011	3500	447	459	190	138	440	633	446	873	330
7	F1	1875	200	106	572	567	1271	6638	434	296	131	94	292	311	167	1139	418
8	G1a	1919	291	114	392	271	492	1193	1455	950	234	87	179	139	48	287	406
9	G1b	1824	406	141	387	250	394	633	620	1483	331	114	203	125	49	184	422
10	A2	1216	754	472	466	228	262	502	249	539	1899	678	574	161	55	156	340
11	B2	864	411	551	527	249	256	445	137	286	575	2824	1119	217	84	168	125
12	C2	1773	454	641	1215	644	654	1298	226	382	410	713	26257	866	208	457	260
13	D2	1388	166	158	1298	1671	985	1260	144	198	138	150	674	10702	666	493	184
14	E2	260	28	20	153	209	308	357	30	36	20	19	78	451	654	164	35
15	F2	1448	156	115	671	585	992	3314	305	262	126	98	371	388	306	9008	581
16	G2	1867	364	163	493	348	516	1562	770	1163	407	145	339	229	119	1074	6024

Table 5.5 Segment to Segment AM Peak Public Transport Demand

AM_Tot_Sec	Segment No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Segment No.	Segment	Core	A1	B1	D1a	D1b	E1	F1	G1a	G1b	A2	B2	C2	D2	E2	F2	G2
1	Core	952	152	99	399	296	359	567	169	195	92	83	284	223	58	222	153
2	A1	464	153	83	187	126	141	249	89	132	131	73	173	95	20	102	83
3	B1	267	72	86	182	67	82	167	68	86	54	64	209	58	19	58	47
4	D1a	1046	160	178	875	501	390	624	150	197	123	131	359	459	58	257	151
5	D1b	971	115	110	554	743	484	594	109	156	102	81	243	832	92	219	139
6	E1	900	110	90	347	408	565	684	133	170	87	70	214	293	79	285	132
7	F1	537	67	49	174	155	231	911	115	94	50	40	131	114	26	335	97
8	G1a	425	80	54	176	123	158	359	171	168	84	44	116	102	18	148	108
9	G1b	412	84	56	156	109	151	237	124	202	73	44	118	88	22	99	129
10	A2	319	119	97	152	94	101	205	68	101	127	126	201	82	16	83	81
11	B2	346	90	158	178	95	107	208	50	82	113	299	360	86	23	82	60
12	C2	1078	186	394	491	270	314	693	139	207	171	283	5230	378	76	245	179
13	D2	693	81	86	430	568	317	435	81	115	76	64	218	1768	57	166	112
14	E2	57	8	8	24	36	32	47	6	11	7	6	23	53	25	22	9
15	F2	635	76	71	218	166	248	1073	114	110	69	51	168	153	45	1198	121
16	G2	630	93	79	208	168	187	408	117	217	96	58	185	151	33	174	590

Table 5.6 Segment to Segment AM Peak Road Demand

AM_Tot_Sec	Segment No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Segment No.	Segment	Core	A1	B1	D1a	D1b	E1	F1	G1a	G1b	A2	B2	C2	D2	E2	F2	G2
1	Core	1717	277	129	517	357	478	670	270	325	198	114	248	181	94	254	247
2	A1	663	453	130	205	105	122	194	109	240	311	123	187	51	30	60	94
3	B1	505	263	173	226	90	96	158	66	151	164	124	269	63	34	48	46
4	D1a	1240	174	108	2272	802	572	683	102	159	106	103	371	343	158	260	88
5	D1b	1036	109	78	1236	1692	998	983	87	120	73	91	386	979	411	424	94
6	E1	1123	101	52	608	666	1434	1502	126	137	64	58	219	319	290	520	126
7	F1	667	72	36	295	321	584	2066	139	112	56	47	158	189	125	622	217
8	G1a	602	109	33	115	75	128	316	408	338	105	35	60	31	23	112	171
9	G1b	555	159	50	122	74	105	207	236	435	160	57	80	33	22	72	197
10	A2	650	367	180	229	103	115	245	140	327	770	356	334	75	38	68	151
11	B2	458	256	193	313	142	136	223	77	183	350	854	666	129	60	84	61
12	C2	673	258	228	693	356	332	599	83	170	227	396	11178	326	130	210	80
13	D2	658	76	65	787	978	644	811	58	77	59	84	372	4119	569	325	69
14	E2	187	17	11	121	149	245	298	21	23	12	13	55	355	233	137	24
15	F2	737	70	39	437	403	682	1913	166	138	53	46	202	233	253	3687	384
16	G2	1078	236	75	257	158	277	1040	541	826	270	83	153	76	83	839	1630

5.3 Core Centre

5.3.1 Overview

The core city centre segment covers most of the centre island and city centre to the immediate north and south of the island. The main transport interchange points, Parnell Place Bus Station and Kent Train Station, are both located within the segment as are several large retail and employment centres.

5.3.2 Activity Density

The activity gross density (combined population, education and employment density) has significant implications for the economic viability of infrastructure, service provision and potential for sustainable mode share. To assess the viability of serving demand along each corridor by public transport the activity density has been mapped for the 2036 landuse scenario. The approximate 2036 activity density within the Core Segment is presented in Figure 5.8 and shows significant density within the city.

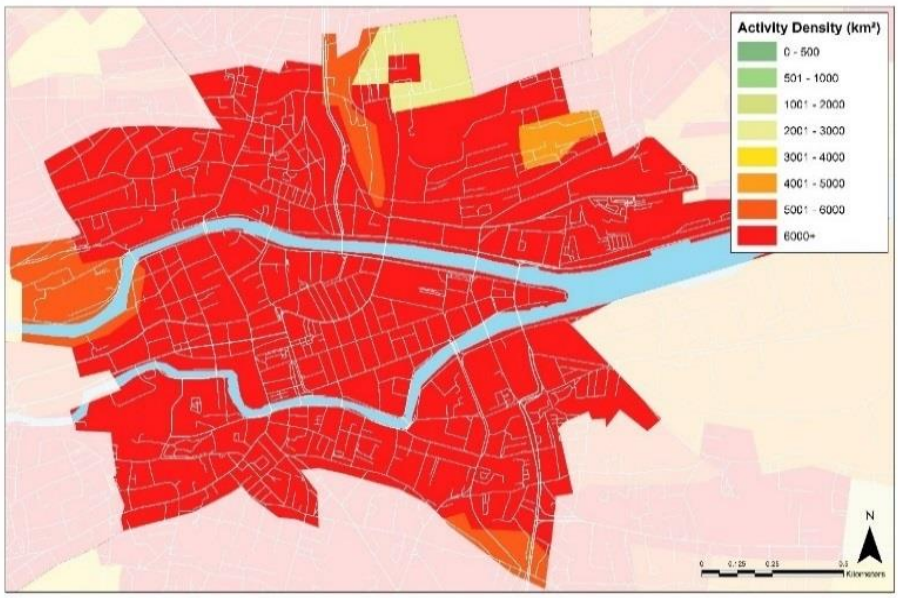


Figure 5.7 Core Segment Activity Density

5.3.3 Mode Share

As previously shown in Figure 5.5 the city core has the lowest car mode share of 42.2% and significant public transport and walking mode shares of 26.4% & 30.2% respectively. The cycle mode share is considerably lower at just 1.2% as many cycling trips are catered for by the unlimited capacity of the Idealised Network. The 24-hour mode share at a SWRM zonal level has been mapped for the core city centre as shown in Figure 5.9

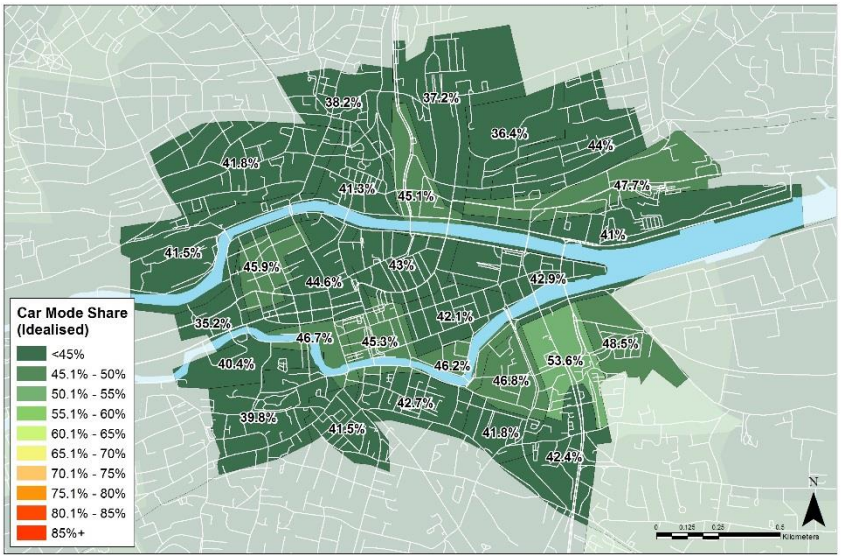


Figure 5.8 Core Segment Mode Share by Zone

5.3.4 Distribution of Demand

The destination segment of all trips originating with the core was extracted for the 24-hour & AM peak period and is presented below in Figures 5.10 & 5.11 respectively, showing both total demand and public transport demand. Figure 5.10 illustrates the high internal demand within the core centre for both total and public transport trips over the 24-hour period. Outside of the city centre the highest total demand is to segments within the inner sector particularly E1, D1a & F1. In terms of public transport demand the most popular destination segments outside the core are E1, D1a, D1b, F1 & C2.

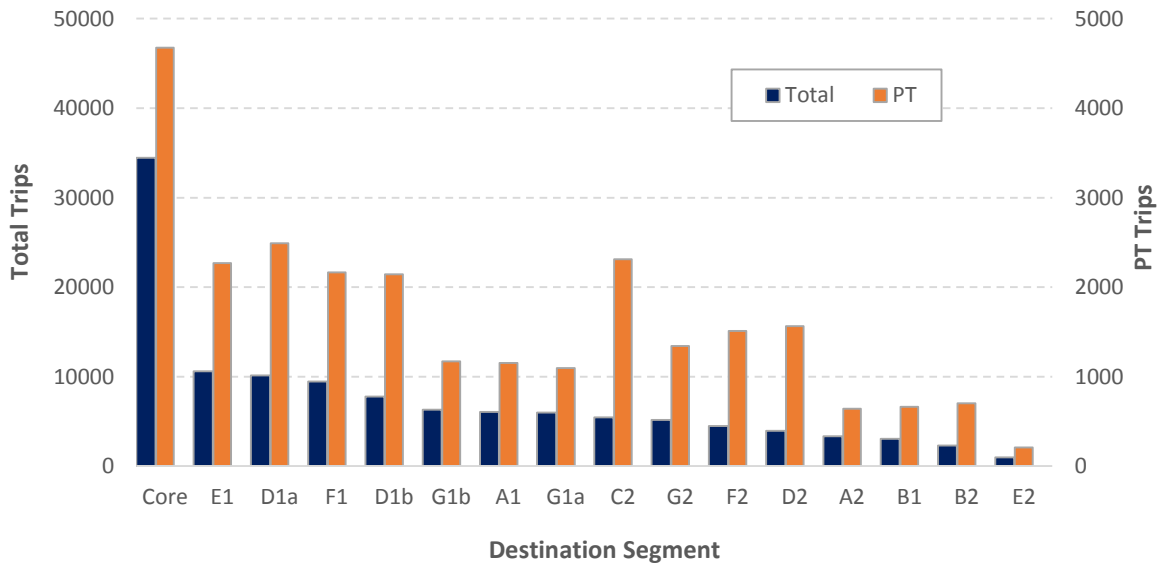


Figure 5.9 Destination Segments of all 24-hour Total and PT demand originating within the Core Corridor

In the AM peak, the highest total and public transport demand travelling outside of the core goes to F1 which includes several major trip attractors including CIT, CUH and UCC. Other key trip attractors for public transport demand are E1, D1a, D1b & C2. Demand is less to the north of the city centre however there is considerable combined demand for all segments included in Corridor G (G1a, G1b & G2). The lowest demand, total and public transport, is to E2 which is very rural in nature though it does contain the airport.

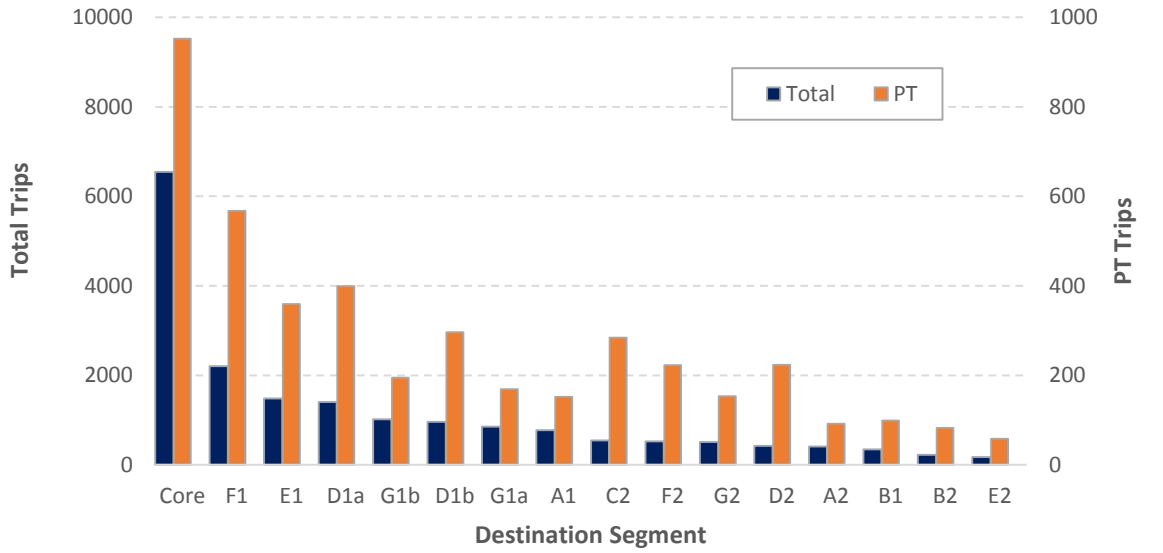


Figure 5.10 Destination Segments of all AM Peak Total and PT demand originating within the Core Corridor

5.4 Corridor A

5.4.1 Overview

Corridor A, which includes segments A1 & A2, covers the area to the North-East of the City and includes Mayfield, Ballyvolane, the Glen and Dublin Hill. The main radial routes into the city are along Ballyhooly Road, Old Youghal Road and Middle Glanmire Road which converge onto Summerhill Road north of Kent Station. The area is also served by the N20 to the west and orbital movements are catered for by the North Ring Road.

5.4.2 Activity Density

The 2036 activity density within the corridor A is shown in Figure 5.11 and shows some areas of significant density adjacent to the city core and in areas such as Mayfield & Dublin Hill. The northern section of corridor beyond Dublin Hill is predominantly low density and rural in nature.

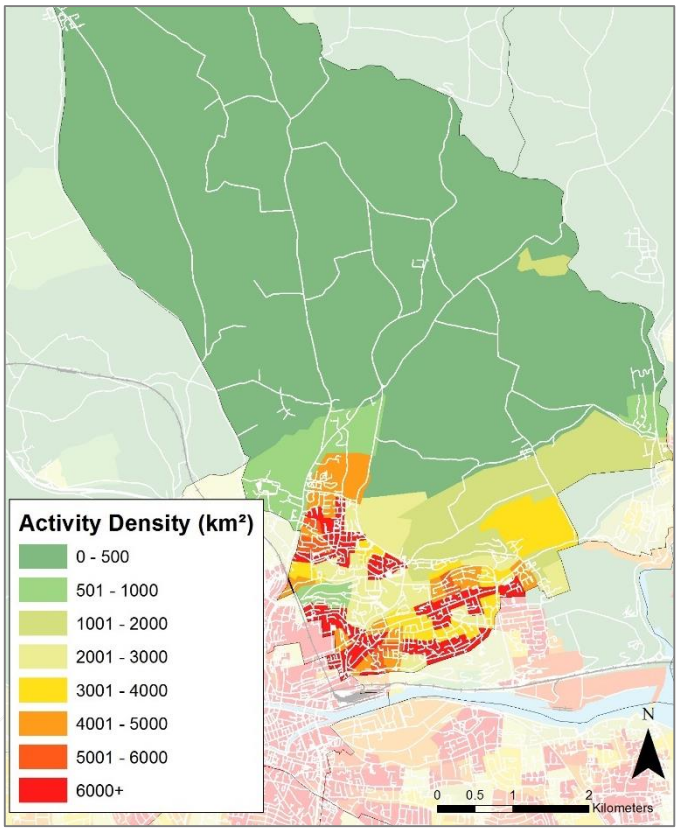
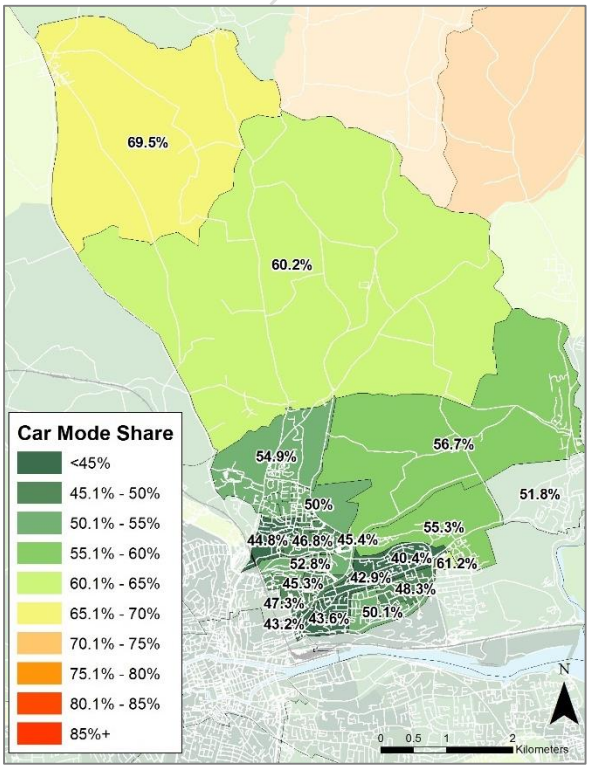


Figure 5.11 Corridor A Activity Density

5.4.3 Mode Share



As shown previously in Figures 5.5 & 5.6, Corridor A has one of the lowest car mode share. The 24-hour mode share by SWRM zone for the corridor is shown in Figure 5.13 to the left. The map shows decreasing car mode share closer to the city centre with car mode shares of between 40%-50% observed in areas such Mayfield, Montenotte, and the Glen.

To the north the car mode shares increase to between 50%-57% around Dublin Hill and Ballyvolane Urban Expansion Area. Further North around White's Cross the car mode share increases further to above 60%.

As mentioned previously the car mode shares presented are from the Idealised Network which includes for an optimal, unconstrained public transport network. In reality, many of the routes in corridor A are narrow with restricted carriageway widths with limited existing opportunity for improved PT priority.

Figure 5.12 Corridor A 24-Hour Idealised Car Mode Shares

5.4.4 Distribution of Demand

The distribution of total and public transport demand in the 24-hour and AM peak periods is shown below in Figure 5.14 & 5.15. Over the day the most popular destination segments are the Core City and internally within Corridor A. There is also considerable demand to G1b, D1a & C2 as well as Corridor B. The highest public transport demand is to the Core followed by C2, D1a and cross city to F2.

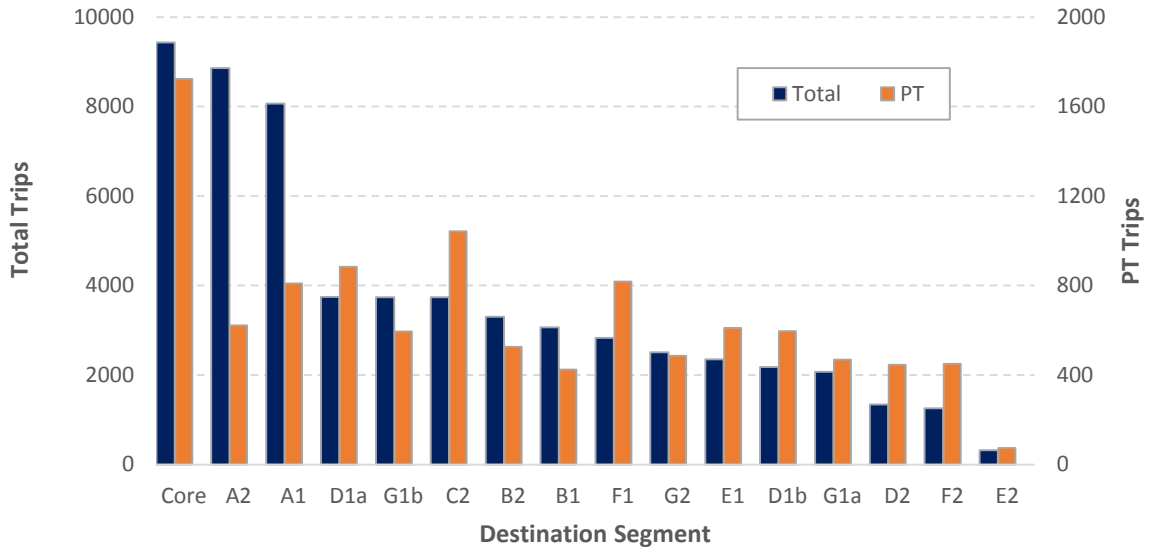


Figure 5.13 Destination Segments of all 24-hour Total and PT demand originating within Corridor A

In the AM peak, there is again high internal corridor demand and demand to the Core followed by demand to G1b, which covers Blackpool, F1, D1a and C2. There is a higher public transport demand proportionally to F1 as well as D1a and C2.

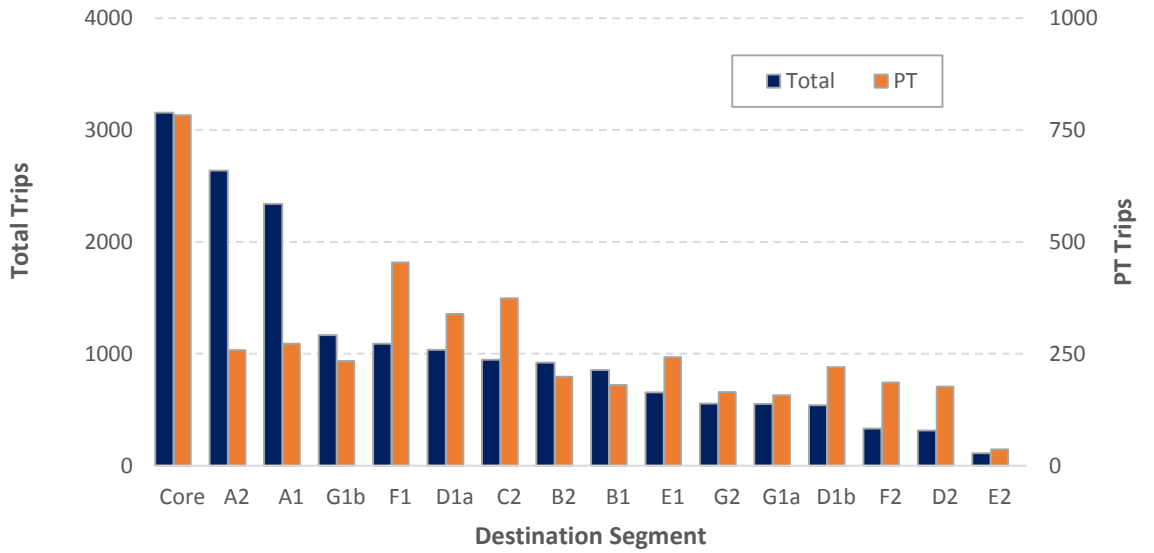


Figure 5.14 Destination Segments of all AM Peak Total and PT demand originating within Corridor A

5.5 Corridor B

5.5.1 Overview

Corridor B, which includes segments B1 & B2, is located to the North-West of the city and encompasses the M8/N8 corridor. The corridor covers areas such as Glanmire, Sallybrook, Tivoli Docks & Estate and is served by heavy rail to the south. There is significant growth in areas such as Tivoli Docks in the 2036 assumed land use scenario.

5.5.2 Population & Employment Density

To assess the viability of serving demand along corridor B by public transport the activity density has been mapped for the idealised scenario. The approximate density within the corridor is shown in

Figure 5.15 and shows some areas of significant density at the edge of the corridor adjacent to the city. The higher activity density within Tivoli Docks supports the opening of the new rail station at this location.

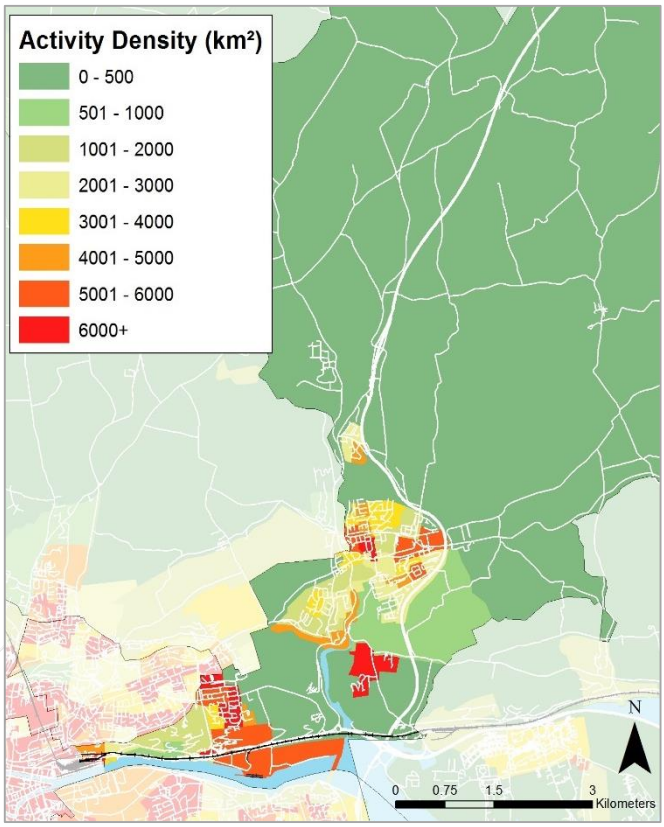


Figure 5.15 Corridor B Activity Density

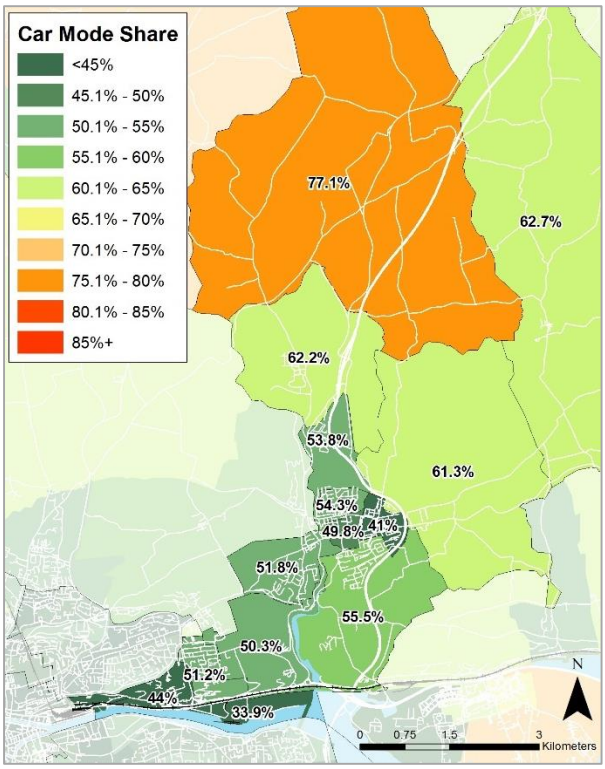


Figure 5.16 Corridor B 24-Hour Idealised Car Mode Shares

5.5.3 Mode Share

As shown previously in Figure 5.5, Corridor B has a car mode share of approximately 52% though this varies considerably throughout the corridor. Figure 5.16 shows the car mode share for Corridor B at a SWRM zone level. The car mode share to the south of the corridor at Tivoli Docks & Estate and within Glanmire tow centre are between approximately 35% & 50%. The newly developed Tivoli Docks has a particularly low car mode share of just 33.9%.

There are slightly higher car mode shares modelled in Lower Glanmire & Ballinglanna & Dunkettle. Significantly higher car mode shares are observed further north in more rural locations with good accessibility to the M8.

5.5.4 Distribution of Demand

The distribution of total and public transport demand in the 24-hour and AM peak periods is shown below in Figure 5.17 & 5.18 for trips originating in Corridor B. The highest proportion of 24-hour total demand travels within B2 followed by the Core and C2. There is also considerable demand to B1 and D1a directly south of Corridor B. The highest 24-hour public transport demand is to Corridor C which is linked to Corridor B by heavy rail. There is also significant public transport demand to segments D1a, internally to B2, F1 and the city Core.

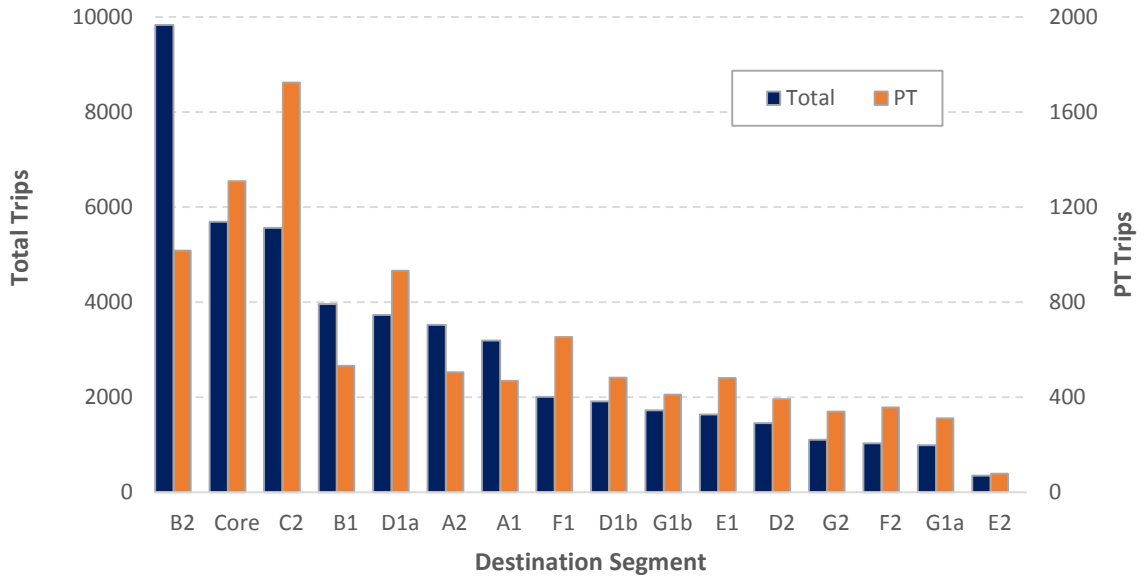


Figure 5.17 Destination Segments of all 24-hour Total and PT demand originating within Corridor B

In the AM morning peak, the distribution of demand is broadly similar to the all-day distribution with a higher proportion of public transport demand travelling to F1 and D1a.

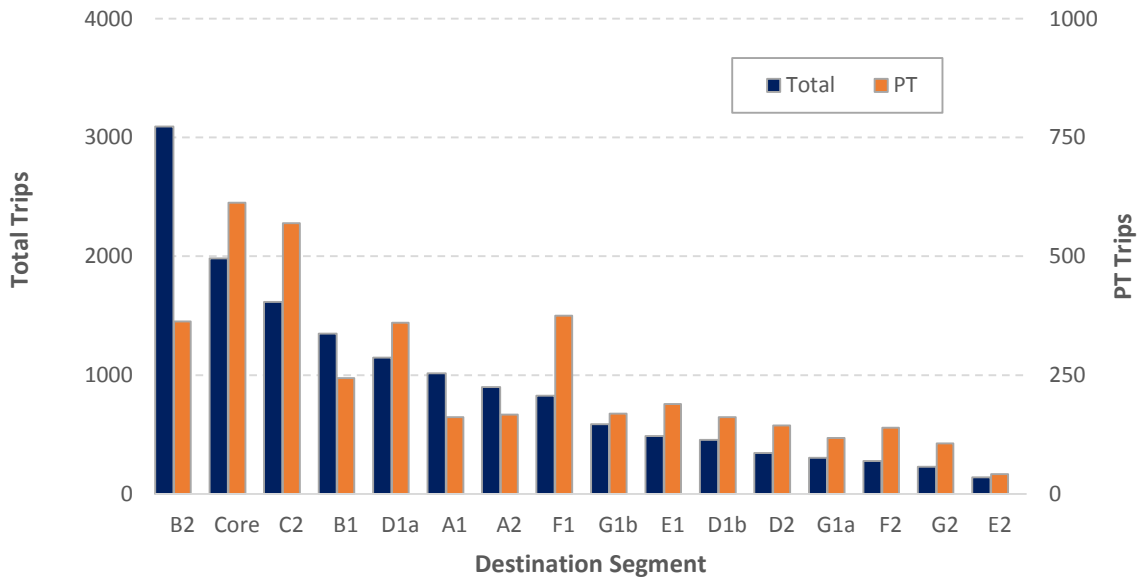


Figure 5.18 Destination Segments of all AM Peak Total and PT demand originating within Corridor B

5.6 Corridor C

5.6.1 Overview

Corridor C covers the major metropolitan towns directly to the east of Cork City such as Carrigtwohill, Midleton, Glounthaune, Cobh & the employment centre of Little Island. The corridor has good access to both the national road network and the Cork suburban rail network with stations in most towns. There is considerable development for the corridor including residential development at Water-Rock and Carrigtwohill and enterprise development in Little Island and Fota Business Park.

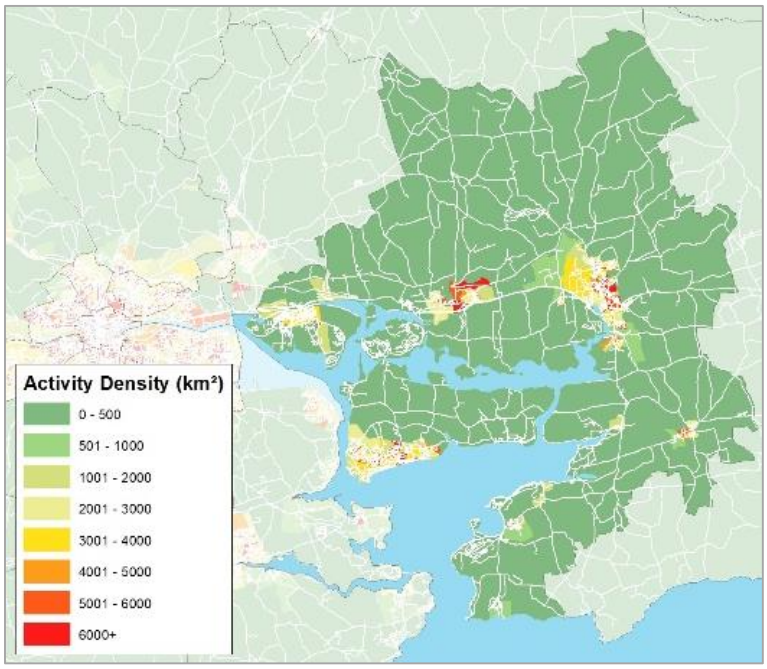


Figure 5.19 Corridor C Activity Density

5.6.2 Population & Employment Density

As before to assess the viability of serving demand along corridor C by public transport the activity density has been mapped for the Idealised Network scenario. The approximate density within the corridor is shown in Figure 5.19 and shows some areas of higher density within Carrigtwohill, Cobh and Midleton. Overall, however, the density of the corridor and towns is lower though the catchment of heavy rail will be greater than other public transport options.

5.6.3 Mode Share

As shown in Figure 5.6, C2 has the lowest car mode share of all segments contained within the 'Outer Sector' of the CMA, which is reflective of the high capacity existing railway line. Figure 5.20 shows the car mode share by SWRM and reflects the impact of the rail line on mode shares within the corridor with lower car mode shares modelled in the towns served by rail such as Carrigtwohill, Cobh & Midleton. Little Island though close to the rail line has a higher car mode share due to the strategic employment traffic attracted to the site due to its proximity to the N25, M8 & N40.

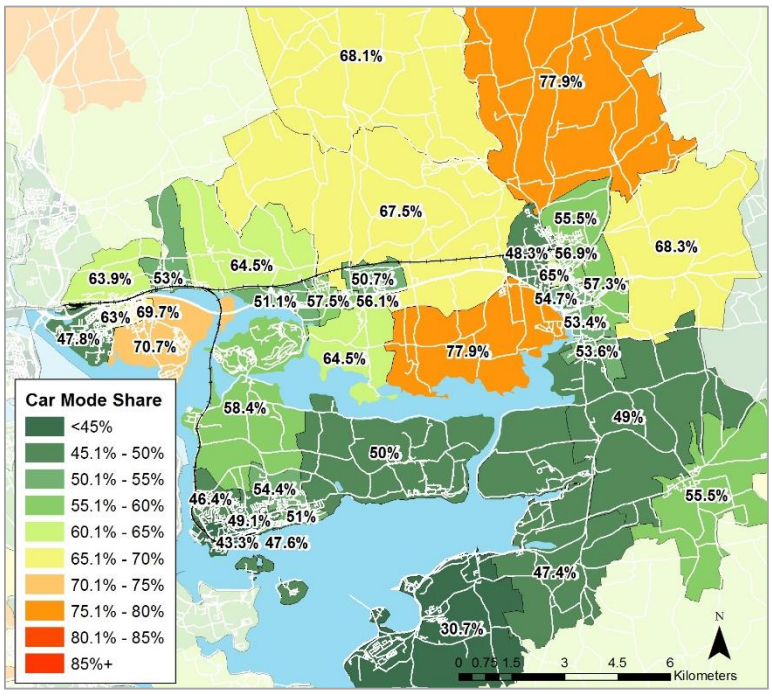


Figure 5.20 Corridor C 24-Hour Idealised Car Mode Shares

5.6.4 Distribution of Demand

The distribution of total and public transport demand in the 24-hour and AM peak periods is shown below in Figure 5.21 & 5.22 for trips originating in Corridor C. Overall both figures show the high level of demand, both total and public transport, which is internal to Corridor C. Over the 24-hour period there is high demand to the Core & D1a, however this is eclipsed by the proportion of internal demand. There is a marginally higher proportion of public transport demand travelling externally with the highest proportion travelling to the Core, F1 & D1a.

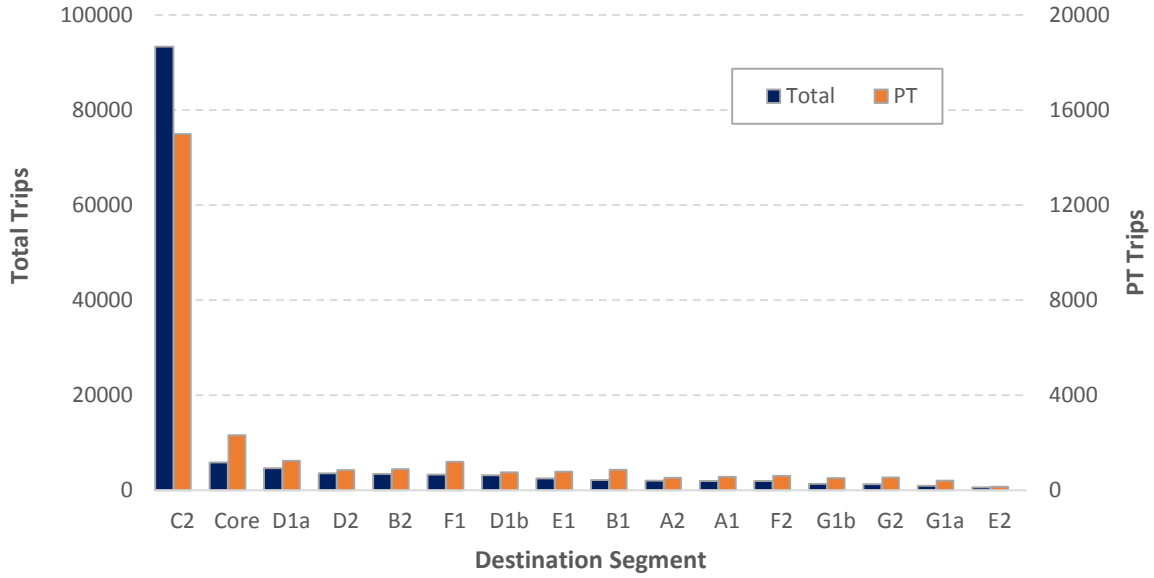


Figure 5.21 Destination Segments of all 24-hour Total and PT demand originating within Corridor C

There is a similar distribution of demand in the AM peak with a slightly higher proportion of external public transport demand. There is greater public transport demand proportionally to F1 which again highlights the strong east-west connection within the CMA.

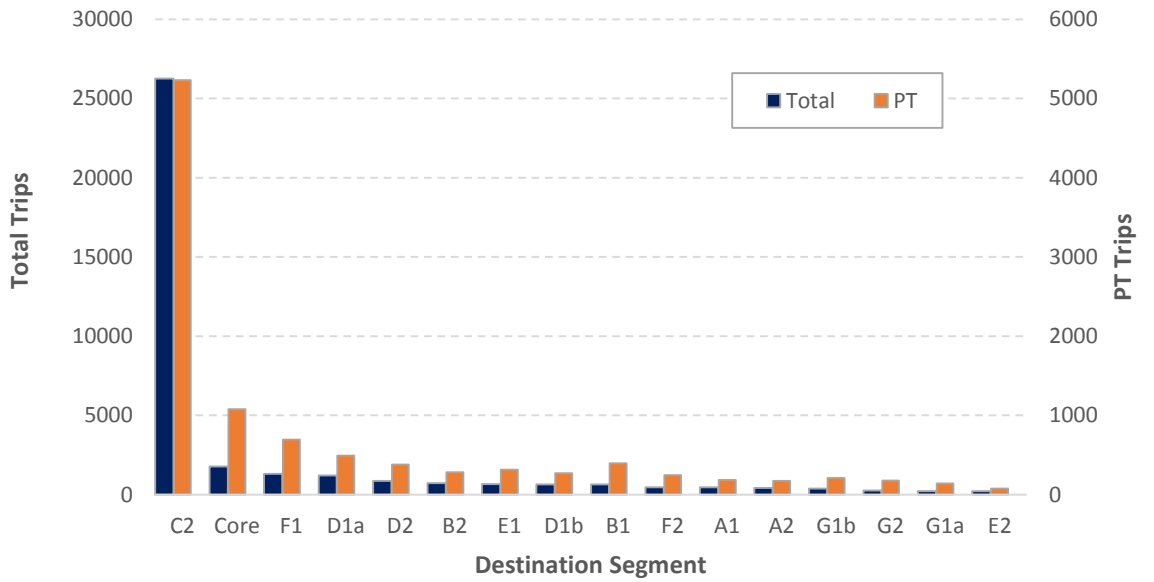


Figure 5.22 Destination Segments of all AM Peak Total and PT demand originating within Corridor C

5.7 Corridor D

5.7.1 Overview

Corridor D is the largest of the Corridors in terms of population and covers several large existing residential areas such as Douglas, Grange, Rochestown, Carrigaline & Passage West and redevelopment areas in the Docklands & Mahon which are assumed to grow significantly in the 2036 landuse scenarios. The Corridor is served by the N28, M40 with several radial routes into the City Core.

5.7.2 Population & Employment Density

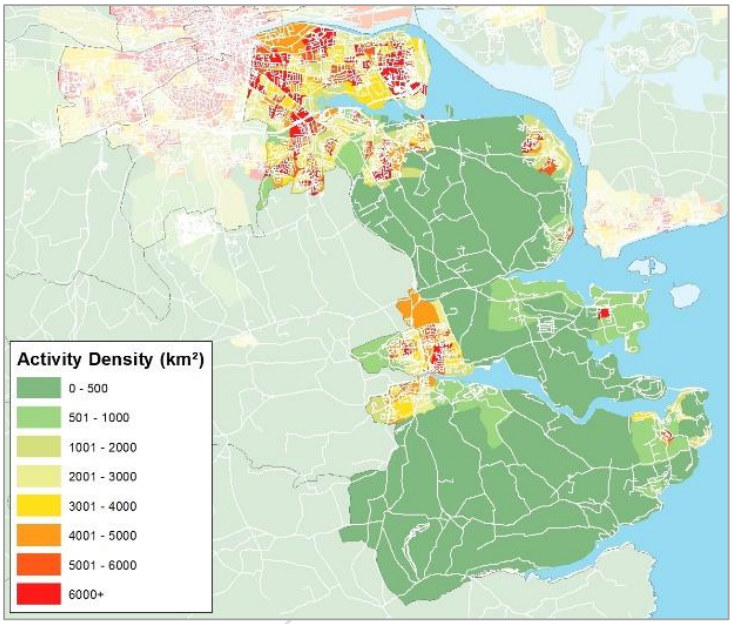


Figure 5.23 Corridor D Activity Density

To assess the viability of serving demand along corridor D by public transport the activity density has been mapped for the idealised scenario. The approximate density within the corridor is shown in Figure 5.23 for Corridor D. The map shows significant activity density within the city areas of the corridor particularly around Docklands and Mahon.

Within the county there is high density in parts of the south city environs, Carrigaline and Passage west, though there are large gaps in density between these areas at the south city environs.

5.7.3 Mode Share

Overall the car mode share for Corridor D in the Idealised Network Scenario is approximately 54% as outlined in Figure 5.5. Figure 5.24 show a breakdown of the car mode share by SWRM zone for Corridor D.

The map shows lower car mode shares, <50%, within the city sections of the corridor particularly within the Docklands increasing slightly south of Mahon. Car mode shares around the south fringes range from 52%-66%. Car mode shares in parts of Passage West and Carrigaline remain low, though zones to the west of Carrigaline have a higher car mode share closer to 70%.

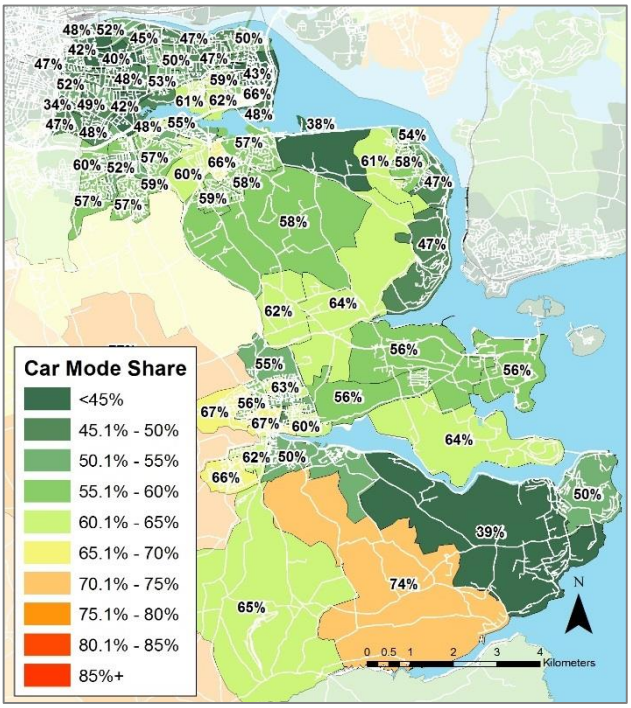


Figure 5.24 Corridor D 24-Hour Idealised Car Mode Shares

5.7.4 Distribution of Demand

The distribution of total and public transport demand in the 24-hour and AM peak periods is shown below in Figure 5.25 & 5.26 for trips origination in Corridor D. Over the day the three internal segments of the corridor are the most popular destination choice for total demand followed by the Core, E1, F1 & C2. There is a similar distribution for public transport demand only over the 24-hour period with a slightly higher proportion of trips travelling to the city core and external to Corridor D.

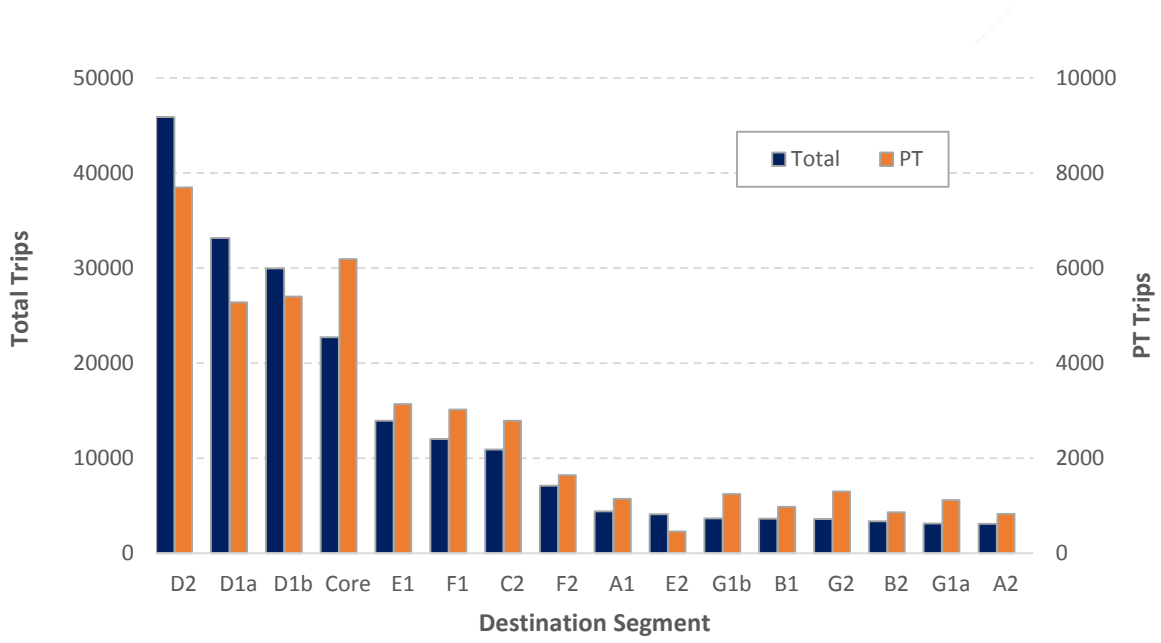


Figure 5.25 Destination Segments of all 24-hour Total and PT demand originating within Corridor D

In the morning peak, there is a similar pattern of distribution for demand from Corridor D with a higher proportion of trips travelling to the Core and F1 by public transport.

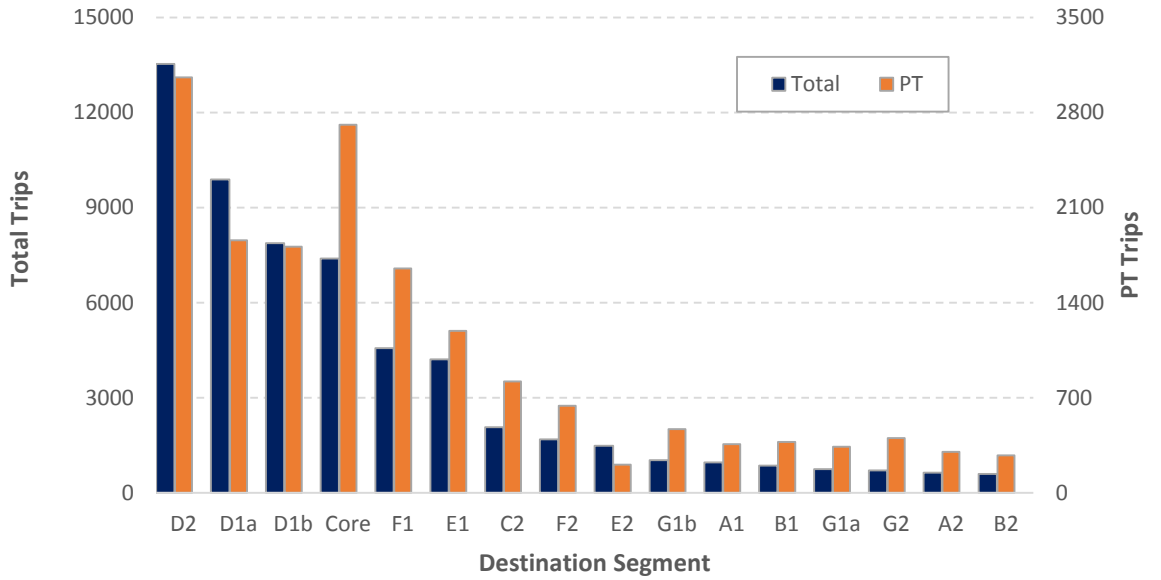


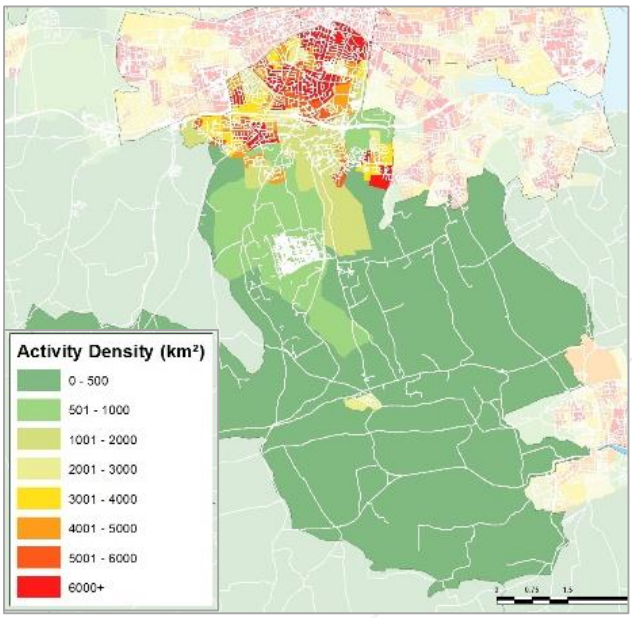
Figure 5.26 Destination Segments of all AM Peak Total and PT demand originating within Corridor D

5.8 Corridor E

5.8.1 Overview

Corridor E covers the South-West of the City encompassing Togher, Ballyphehane, Frankfield and the Airport to the South. The corridor is served by the N27, N40 and Togher Road/Pouladuff Radial Roads into the City.

5.8.2 Population & Employment Density



To assess the viability of serving demand along corridor E by public transport the activity density has been mapped for the idealised scenario. The approximate density within the corridor is shown in Figure 5.27 and shows some areas of significant density at the edge of the corridor adjacent to the city.

There are also some small areas of high density south of the N40 at Wilton and Frankfield. The remainder of the lands to the south of the corridor are low in activity density. Though these lands include the Airport which is also a major employer and other trips attractor and is zoned for employment expansion in the future.

Figure 5.27 Corridor E Activity Density

5.8.3 Mode Share

Corridor E has one of the higher overall car mode shares in the CMA as outlined in Figures 5.5 & 5.6. Segment E2 in particular has the highest car mode share of any of the individual segments assessed. A more detailed breakdown of the Idealised Network car mode shares for Corridor E is presented in Figure 5.28.

The map illustrates the contrast in car mode shares between the Northern and Southern Areas of the corridor. Within the City section the car mode shares vary between 40%-50%. Just south of the N40 the mode shares increase to between 54%-64%. The areas to the south including the Airport have a car mode share of approximately 70% or greater as illustrated in the map.

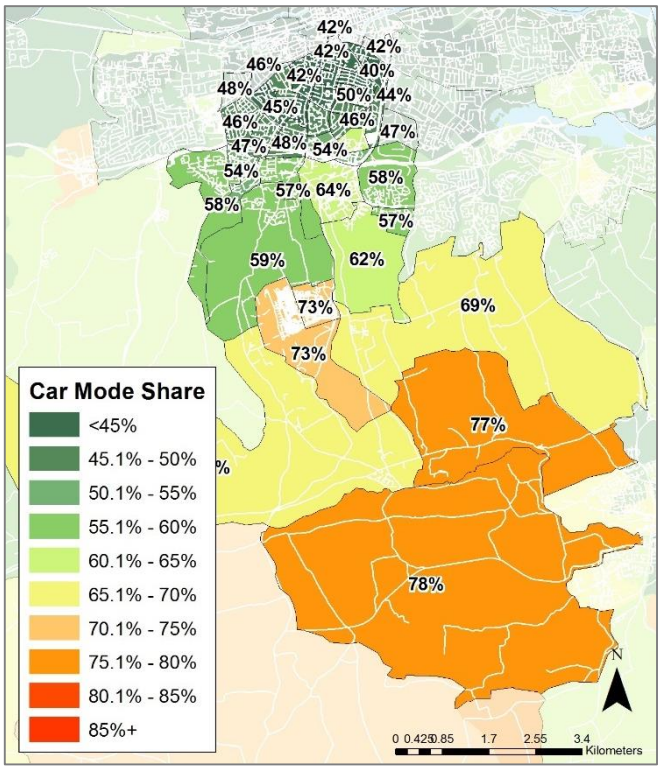


Figure 5.28 Corridor E 24-Hour Idealised Car Mode Shares

5.8.4 Distribution of Demand

The distribution of total and public transport demand in the 24-hour and AM peak periods is shown below in Figure 5.25 & 5.26 for trips originating in Corridor E. Over the day the highest demand travel internally to segment E1, to the Core and to neighbouring F1 followed by all segments within Corridor D. The profile of distribution of 24-hour public transport demand is similar with higher proportions of demand travelling to the Core & C2.

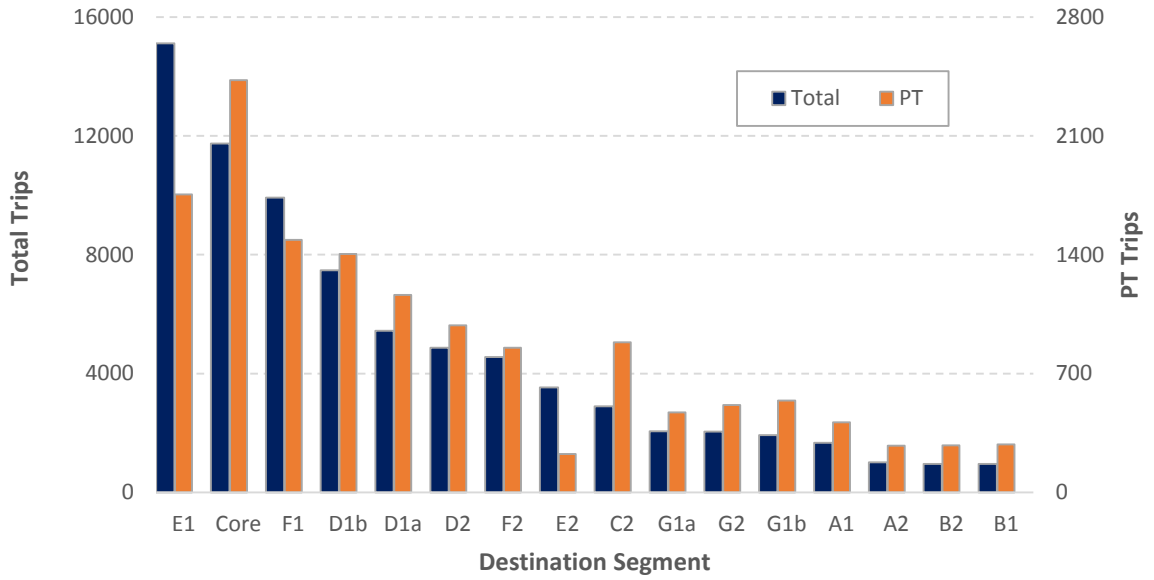


Figure 5.29 Destination Segments of all 24-hour Total and PT demand originating within Corridor E

In the morning, there is a similar pattern of total demand with a slightly higher proportion travelling to F1 than the core, though demand by public transport is still greater to the Core. There is also a higher proportion of demand to D2 & F2 and less to C2.

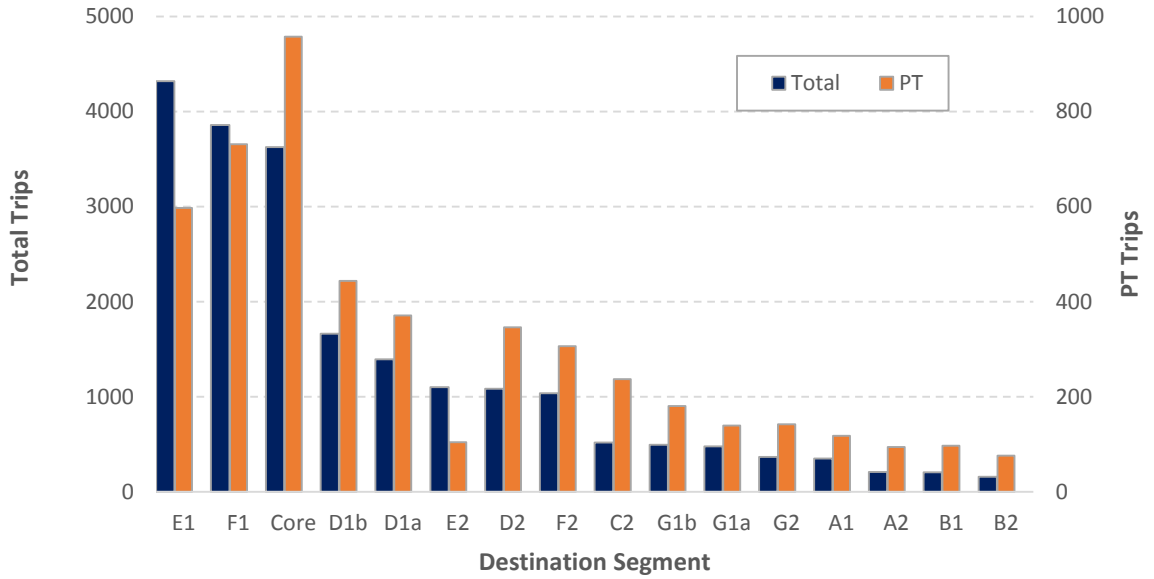


Figure 5.30 Destination Segments of all AM Peak Total and PT demand originating within Corridor E

5.9 Corridor F

5.9.1 Overview

Corridor F directly to the east covers an area that includes UCC, CIT, CUH, Bishopstown, CSIP & Ballincollig within its boundaries. The Corridor is served by the N22 & N40 national road with Bishopstown & Model Farm Road also providing radial connections to the city. It has been assumed there is significant growth in the Corridor by 2036 which includes residential expansion at Ballincollig South UEA and employment growth in CSIP.

5.9.2 Population & Employment Density

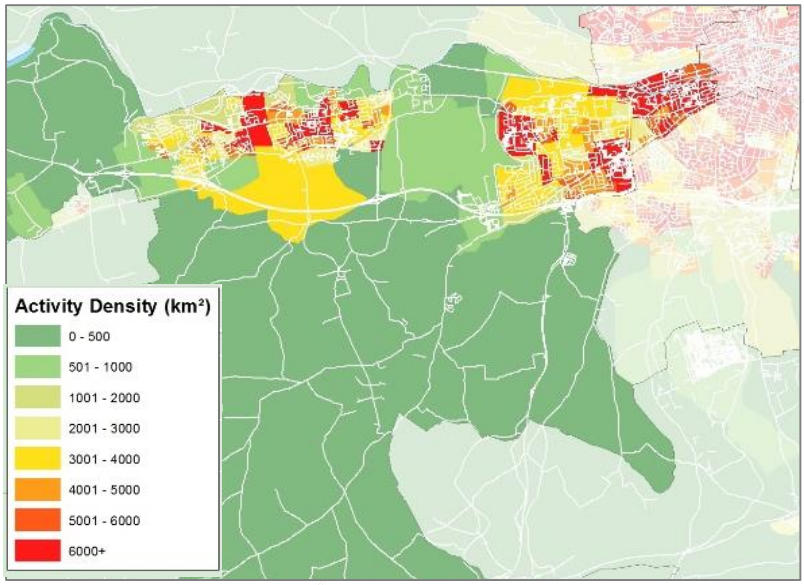


Figure 5.31 Corridor F Activity Density

The approximate combined activity density within the corridor is shown in Figure 5.31 and shows some areas of significant density at the edge of the corridor adjacent to the city and surrounding the University. There is also significant activity density either side of Bishopstown Road where the Hospital & Wilton Shopping Centre are located. Further west there are areas of high density in Ballincollig town centre & medium density in the UEA development lands.

5.9.3 Mode Share

The combined mode share for all 24-hour demand originating within Corridor F is approximately 54.9% as outlined in Figure 5.5. Figure 5.32 shows a breakdown by SWRM zone of the car mode shares per zone included in Corridor F.

The map shows a gradual increase in car mode share as you move westwards from the City towards Ballincollig. Within the City the car mode share varies between 40%-60% with the lowest car mode share modelled for the zone covering UCC.

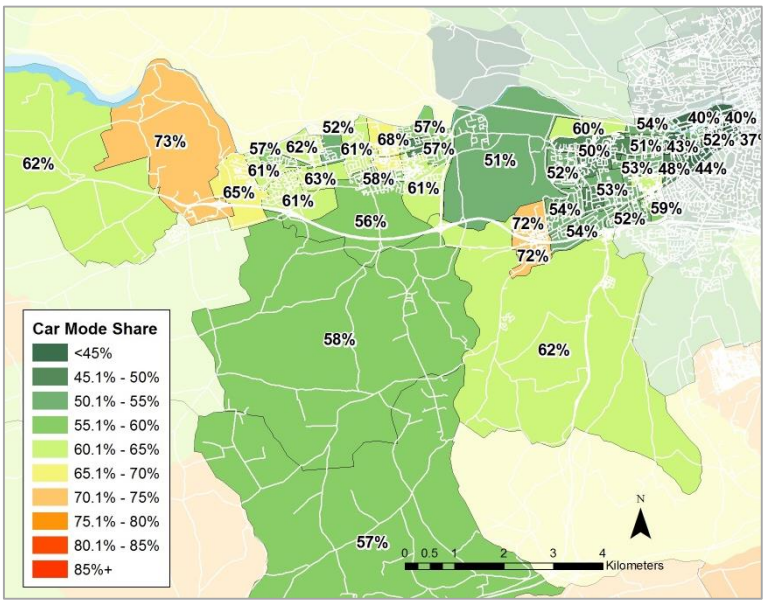


Figure 5.32 Corridor F 24-Hour Idealised Car Mode Shares

Within Ballincollig car mode shares range from 52%-68% with the newly developed Urban Expansion Area modelled with a mode share of 56%.

5.9.4 Distribution of Demand

The distribution of total and public transport demand for trips originating in Corridor F for the 24-hour & AM morning peak is presented below in Figures 5.33 & 5.34 respectively. The 24-hour chart shows the highest demand, total and public transport within Corridor F, to both F2 & F1, followed by travel eastwards towards the City Core and E1. The distribution of public transport demand is similar with a higher proportion of demand to D1a and C2.

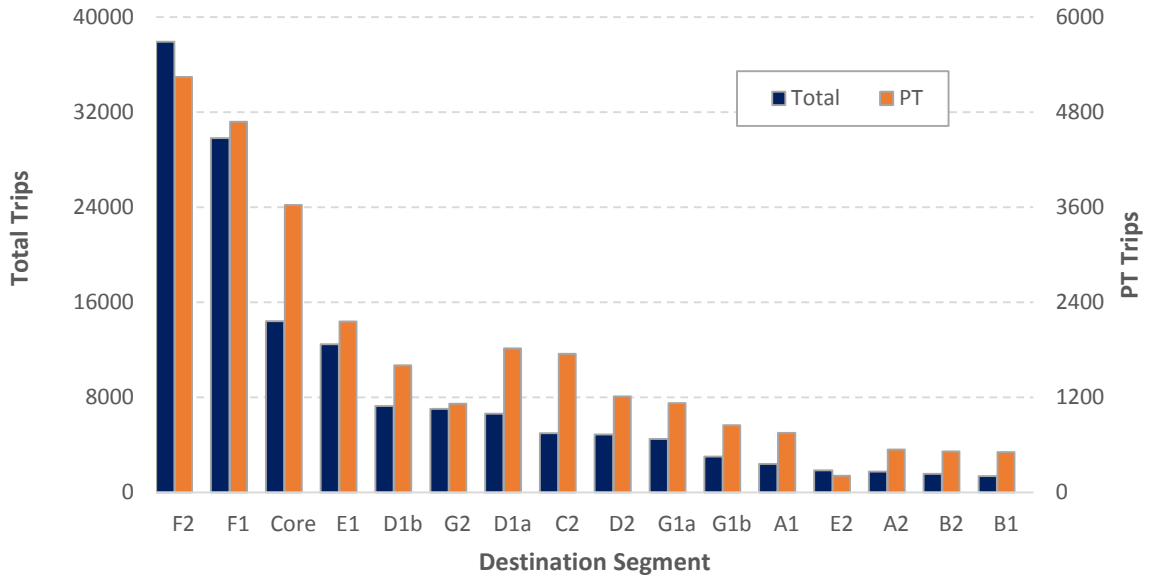


Figure 5.32 Destination Segments of all 24-hour Total and PT demand originating within Corridor F

In the AM morning peak, they overall pattern of travel is similar to the 24-hour demand with a high proportion of demand within Corridor F itself. There is a higher proportion of public transport demand to F1and to D1a.

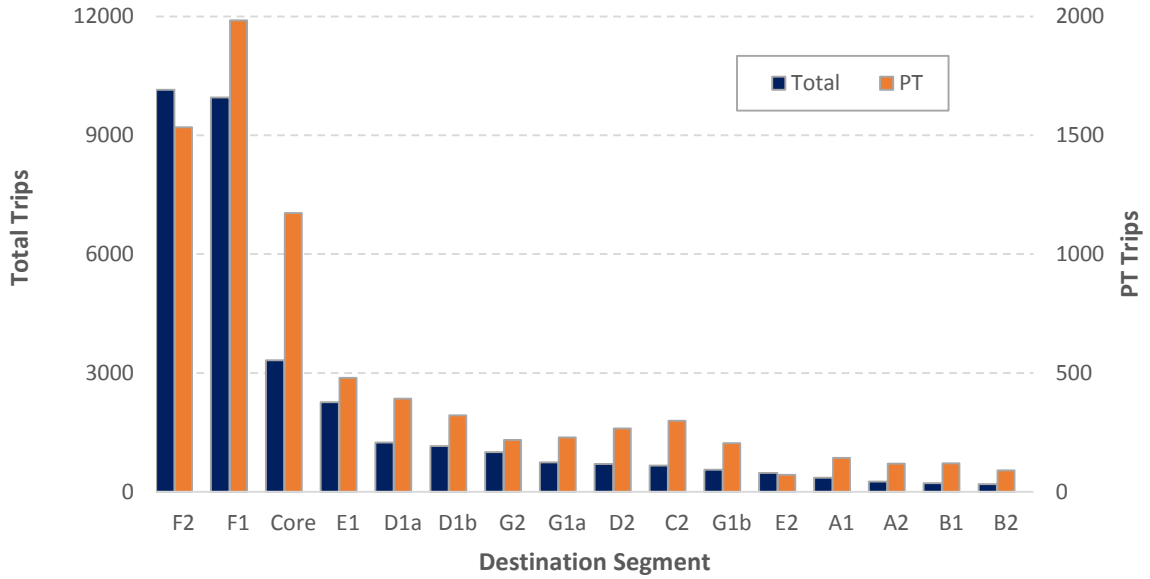


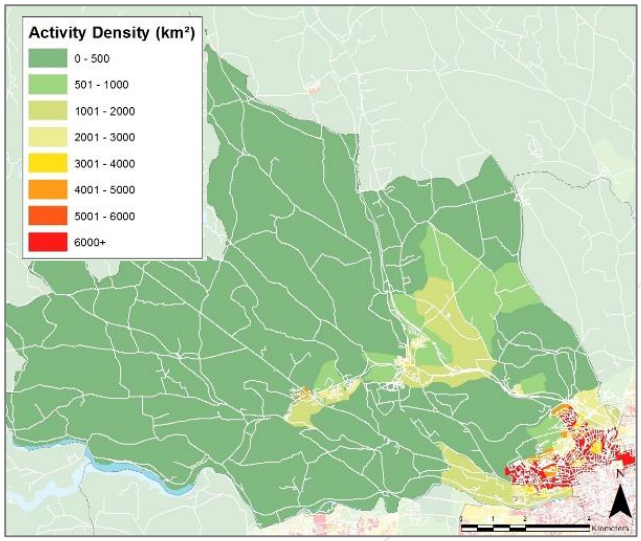
Figure 5.33 Destination Segments of all AM Peak Total and PT demand originating within Corridor F

5.10 Corridor G

5.10.1 Overview

Corridor G covers the North-West quadrant of the City and the N20 Corridor. This includes areas such as Fairhill, Blackpool, Knocknaheeney, Blarney, Tower & Monard. The Corridor is served by the N20 national primary and the Cork-Dublin Railway Line. Significant levels of residential growth are planned for the corridor at Stoneview and Monard which is a designated Special Development Zone (SDZ).

5.10.2 Population & Employment Density



The activity density has been mapped for the 2036 Idealised Network Scenario. The approximate density within the corridor is shown in Figure 5.34 and shows some areas of significant density at the edge of the corridor adjacent to the city in areas such as Blackpool & Fairhill.

Outside of the immediate city areas there is some areas of medium density within Tower, Blarney & Monard. However overall the corridor is low in activity density. It is worth noting the small areas of Stoneview and Monard are large due to their existing greenfield nature and will have a higher density than shown in the map.

Figure 5.34 Corridor G Activity Density

5.10.3 Mode Share

Corridor G has the lowest overall car mode share of any corridor except for Core City Corridor. This is largely due to the low car mode share within the city segments, G1a & G1b, which reflects their proximity to Cork City. Figure 5.36 shows a breakdown of the car mode share by SWRM for all zones within Corridor G and shows the low mode shares within the City which increase gradually along the N20 corridor.

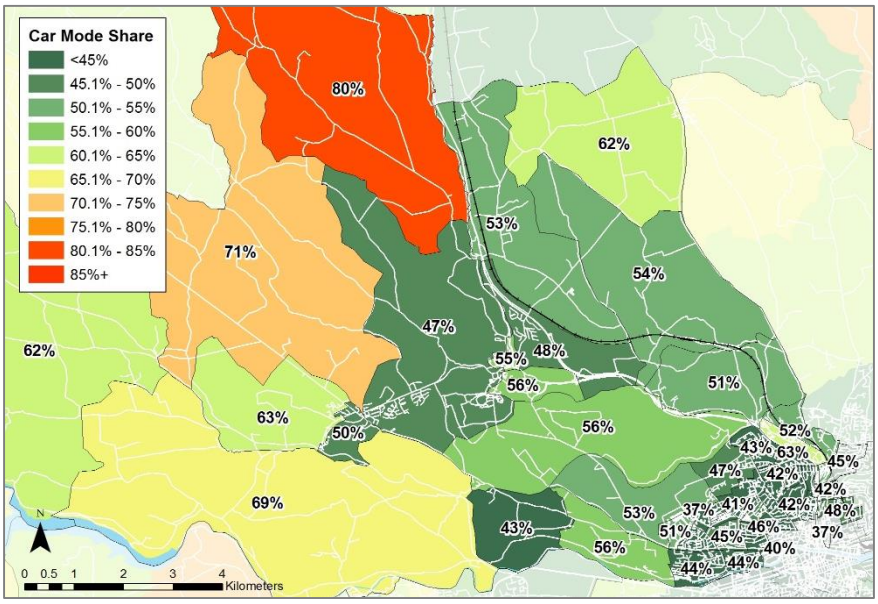


Figure 5.35 Corridor G 24-Hour Idealised Car Mode Shares

5.10.4 Distribution of Demand

The distribution of total and public transport demand for trips originating in Corridor G for the 24-hour & AM morning peak is presented below in Figures 5.37 & 5.38 respectively. The 24-hour chart shows the highest demand, total and public transport within Corridor G, followed by the City Core and F1. The distribution of public transport demand is similar with a higher proportion of demand to the core, F1, D1a, D1b and C2.

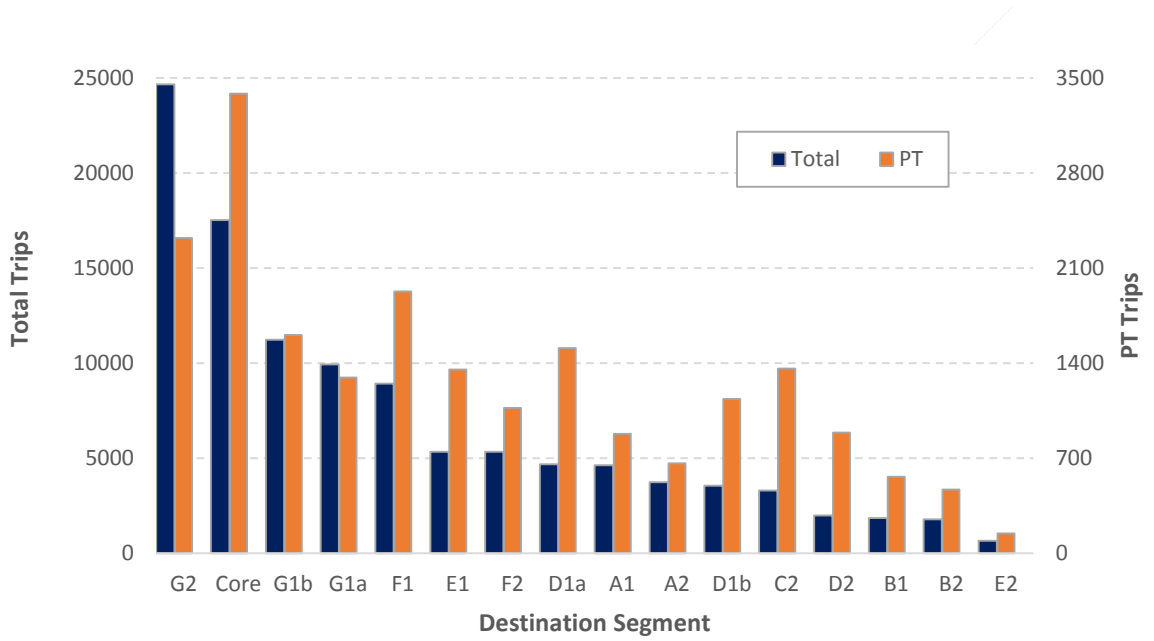


Figure 5.36 Destination Segments of all 24-hour Total and PT demand originating within Corridor G

In the AM morning peak, they overall pattern of travel is similar to the 24-hour demand with a high proportion of public transport demand to the City Core and F1.

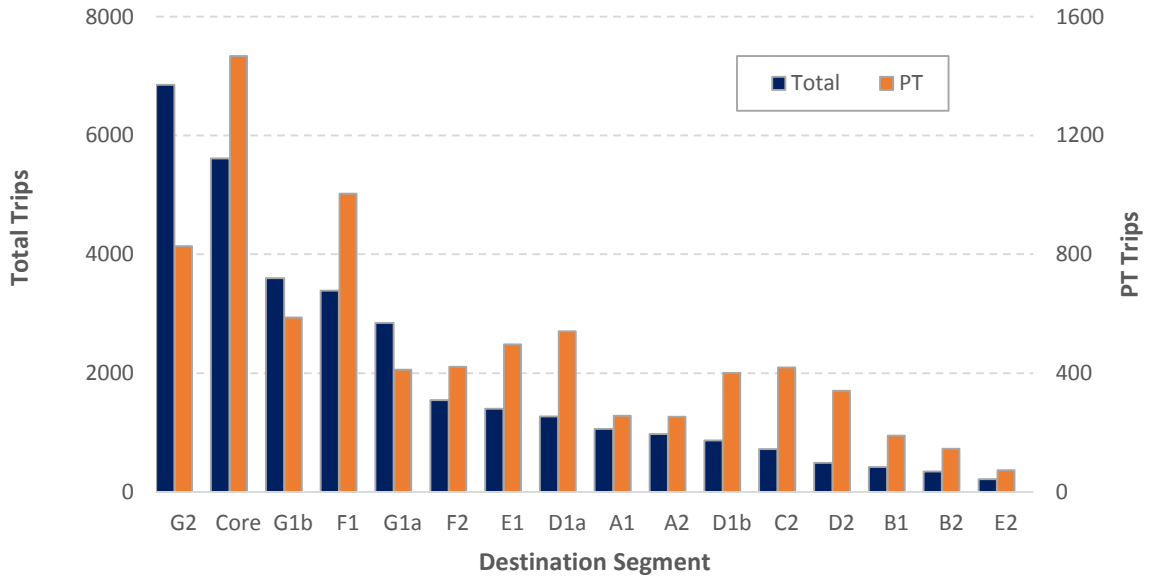


Figure 5.37 Destination Segments of all AM Peak Total and PT demand originating within Corridor G

6 Combined Demand Analysis

6.1 Desire Line Analysis

To assess the cumulative impact of the corridor demand outlined in Section 5 and identify key desire lines to be served by all modes, desire line maps were produced based on the OD matrices presented in Tables 5.1-5.4. The desire lines for total 24-hour demand are shown below in Figure 6.1 (Note demand below 1500 trips has been excluded).

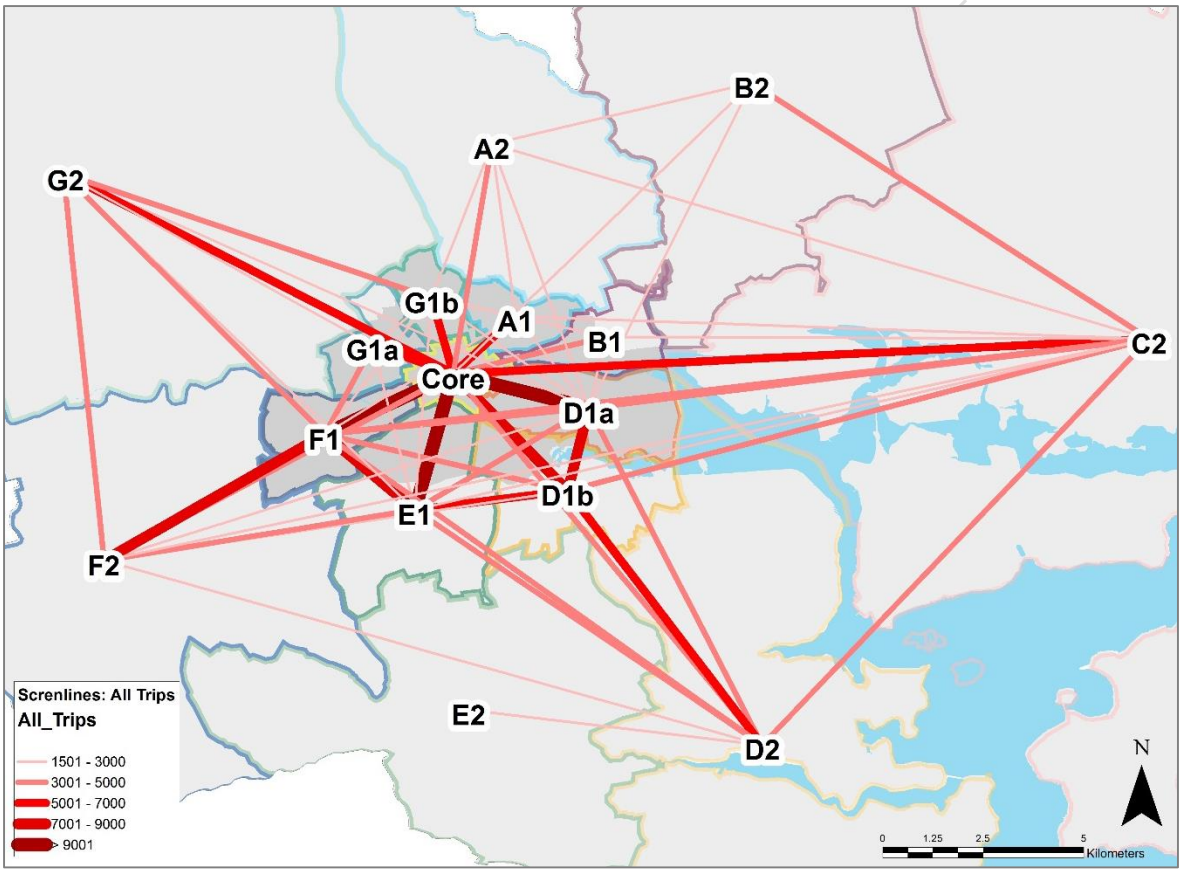


Figure 6.1 24-Hour Total Demand Desire Lines

The desire lines shows a strong demand along the existing heavy rail line linking Corridor G to the Core and continuing to C2. In addition, the figure shows very high east-west high demand along Corridor F to the Core and from the Core to E1 and Corridor D1.

To understand the potential demand for an improved public transport network, the AM public transport demand desire lines have also been mapped and are shown in Figure 6.2. Once again, the strong demand lining Corridor G & C to the core along the existing heavy rail line is prevalent.

In addition, there is strong demand from C2 to F1 which highlights the importance for good interchange at Kent Station linking the rail line to Corridor F. A service from Kent Station to F1 could be extended to serve the high demand between F2 & F1. There is also significant public transport demand to Corridor D, in particular D1a, and E1.

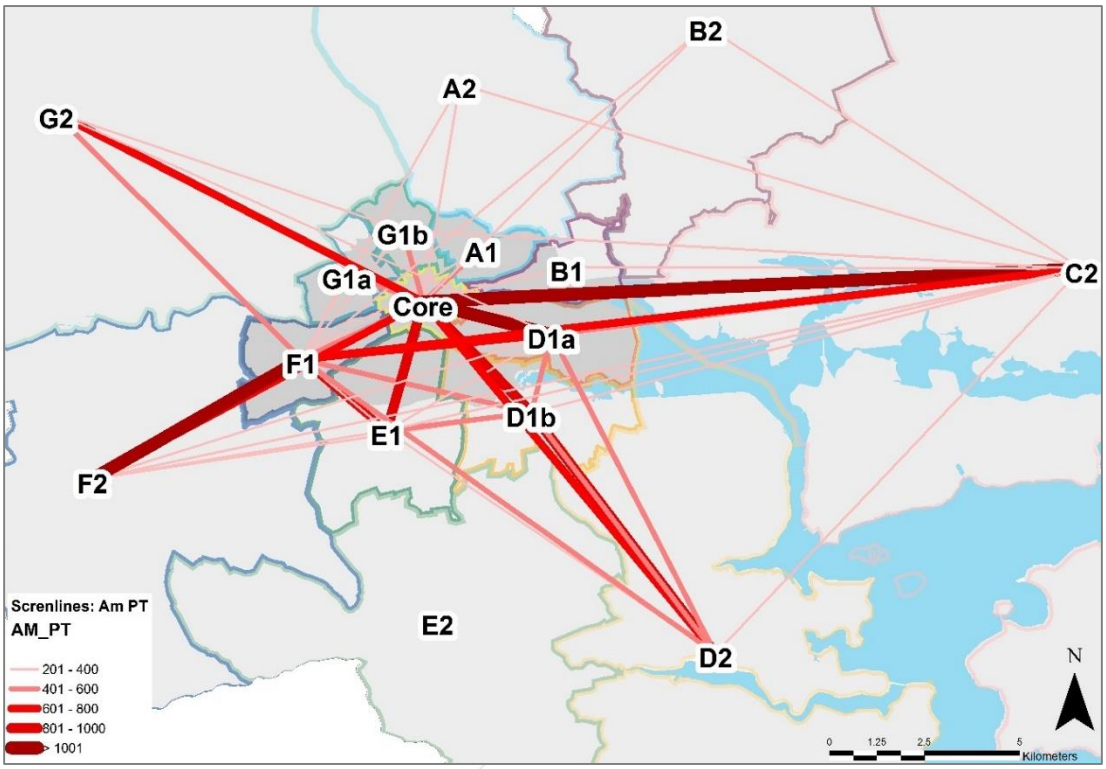


Figure 6.2 24-Hour Total Demand Desire Lines

6.2 Spider Web Analysis

To further refine the corridor demand shown in the desire line maps into a more understandable and coherent framework the demand was assigned onto a simplified 'Spider's Web Network'. Demand by each mode was assigned onto the 'Network' using different assumption, as follows:

- For Car demand it was assumed that demand would use the quickest path based on journey time. Generally, demand was routed orbitally around the city unless travelling to destinations on the direct opposite side of the City Core, in which case it was assigned through the City Core. For example, demand from F2 to D1b would travel via F1-E1 to D1b and demand from F2 to A1 would travel via F1-Core to A1;
- For public transport demand, it was assumed that demand from each corridor could travel orbitally to adjacent corridors and all other demand was routed radially through the city core. For example, PT demand from Corridor D would travel orbitally to Corridor E but through the City Core to Corridor F; and
- Active mode demand, i.e. walking and cycling, were assumed to take the most direct route in terms of distance to their destination segment.

The 'Spider's Web Network' created using this approach for the AM peak for all demand, public transport demand and road demand, including and excluding demand from outside the CMA, is shown in Figures 6.3-6.6. Figure 6.3 shows the strong total demand along the N25, N28 and N22 national road corridors and orbitally along the N40 corridor. There is also strong demand from G1b, D1b and B1 to the City Core.

As before Figure 6.4 shows a strong east-west public transport demand with significant demand between C2- B1-Core-F1. There is also strong demand from Corridor G along the rail line and from F2 -F1-Core inbound and from Corridor D to the Core. As shown in Figure 6.5 & 6.6 the overall pattern of road demand is similar to the total demand with strong demand along the national road corridors particularly orbitally along the N40 corridor. There is also notable orbital demand between B1 & G1b.

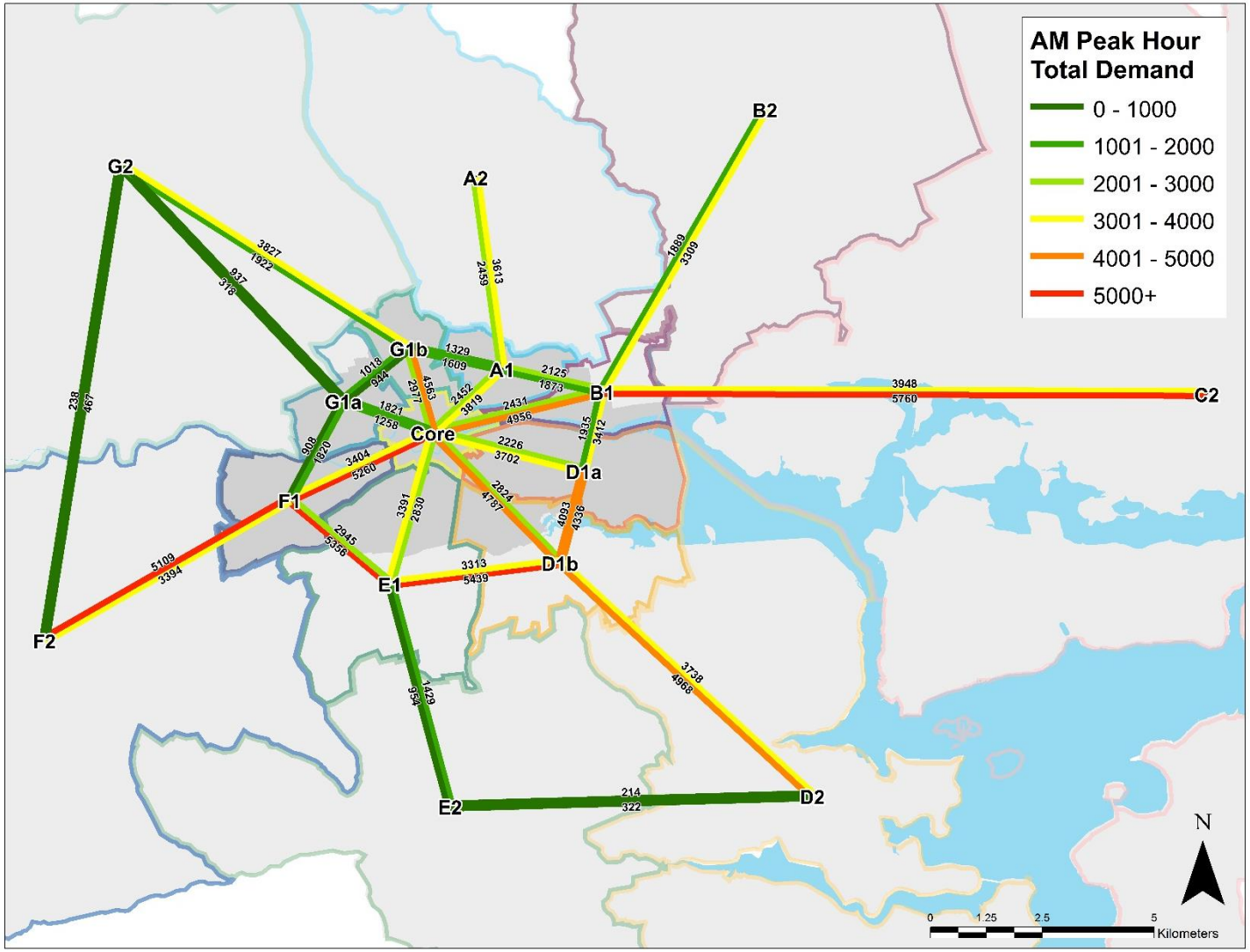


Figure 6.3 Total Demand 'Spider's Web Network'

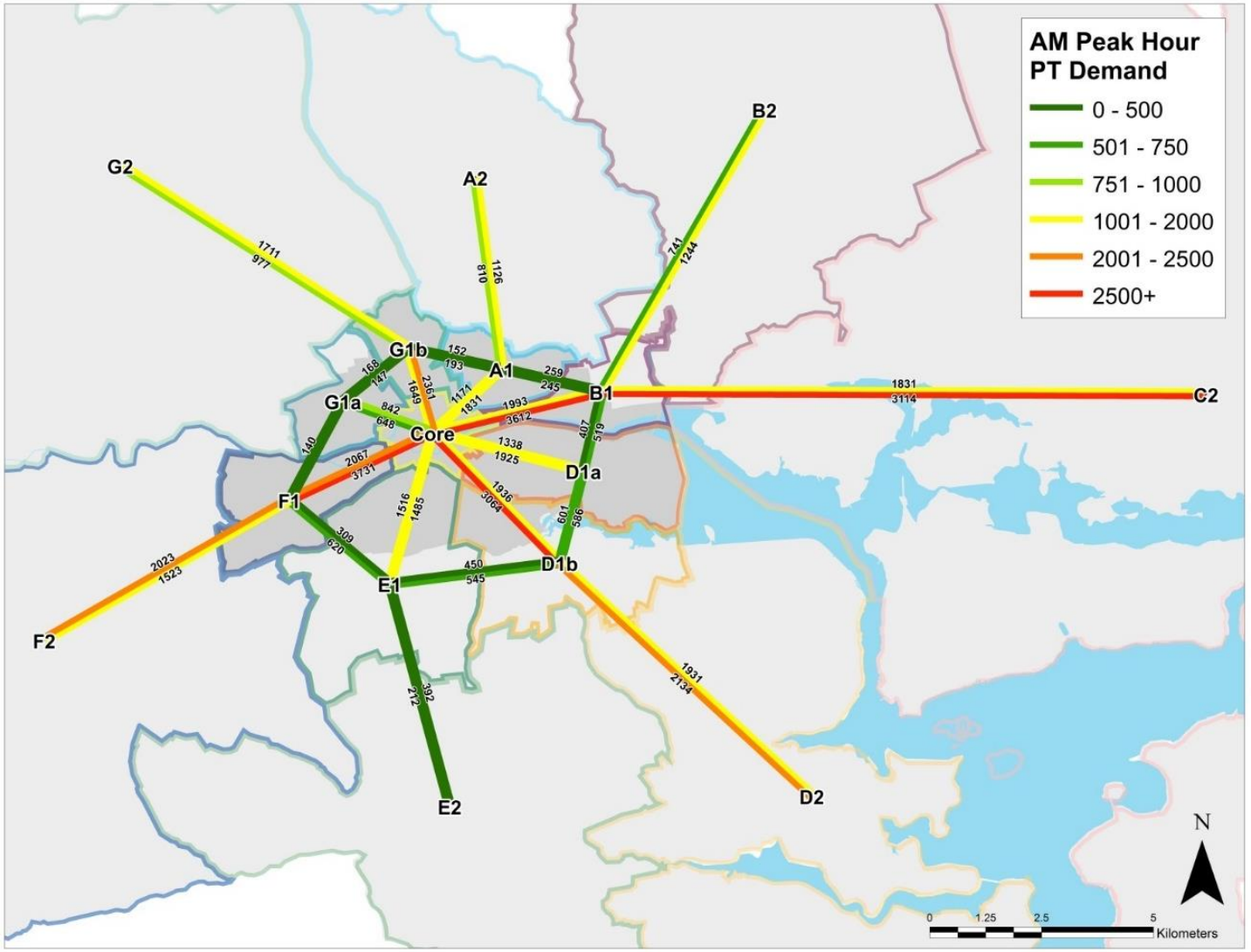


Figure 6.4 AM Public Transport Demand 'Spider's Web Network'

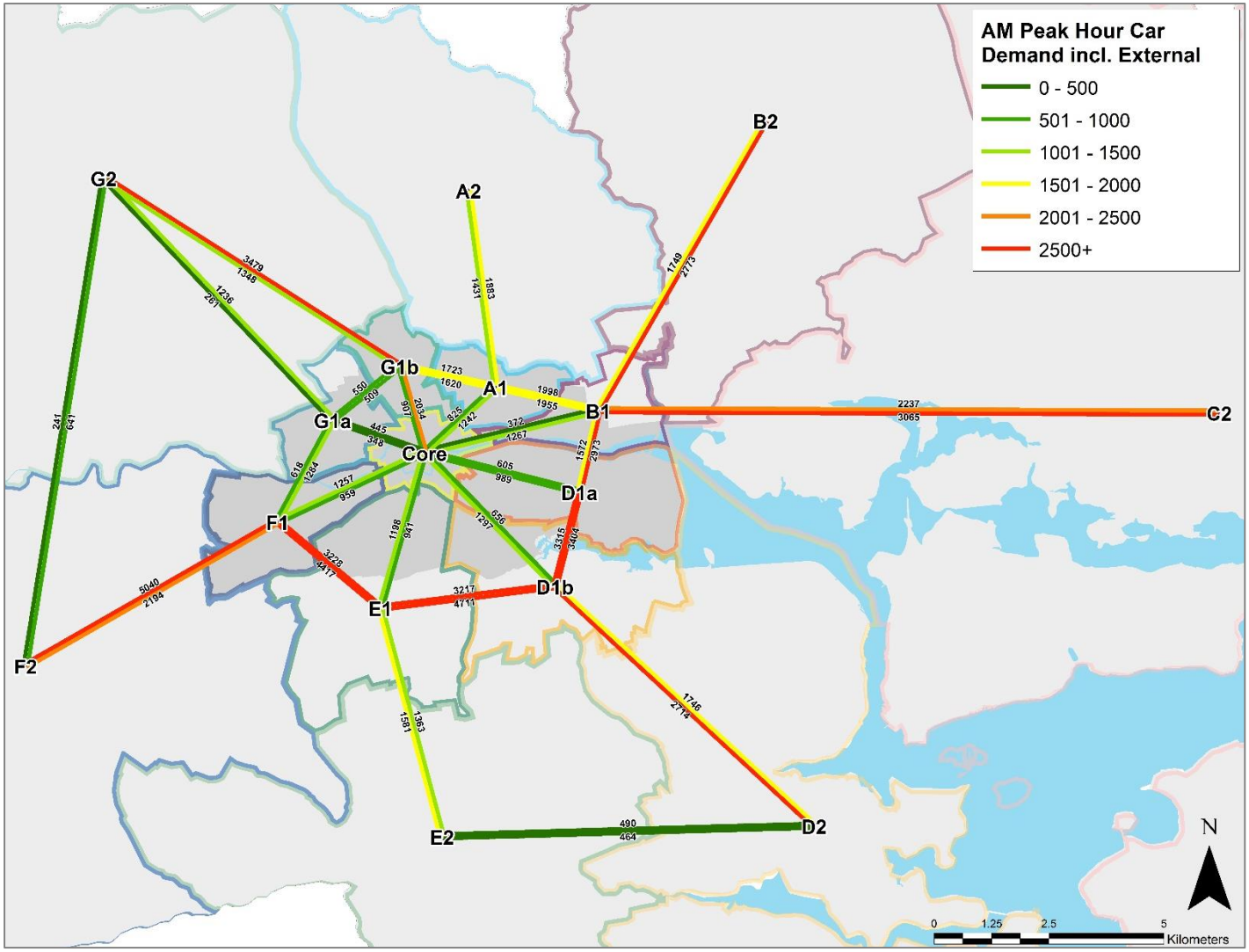


Figure 6.5 AM Road Demand including External Demand 'Spider's Web Network'

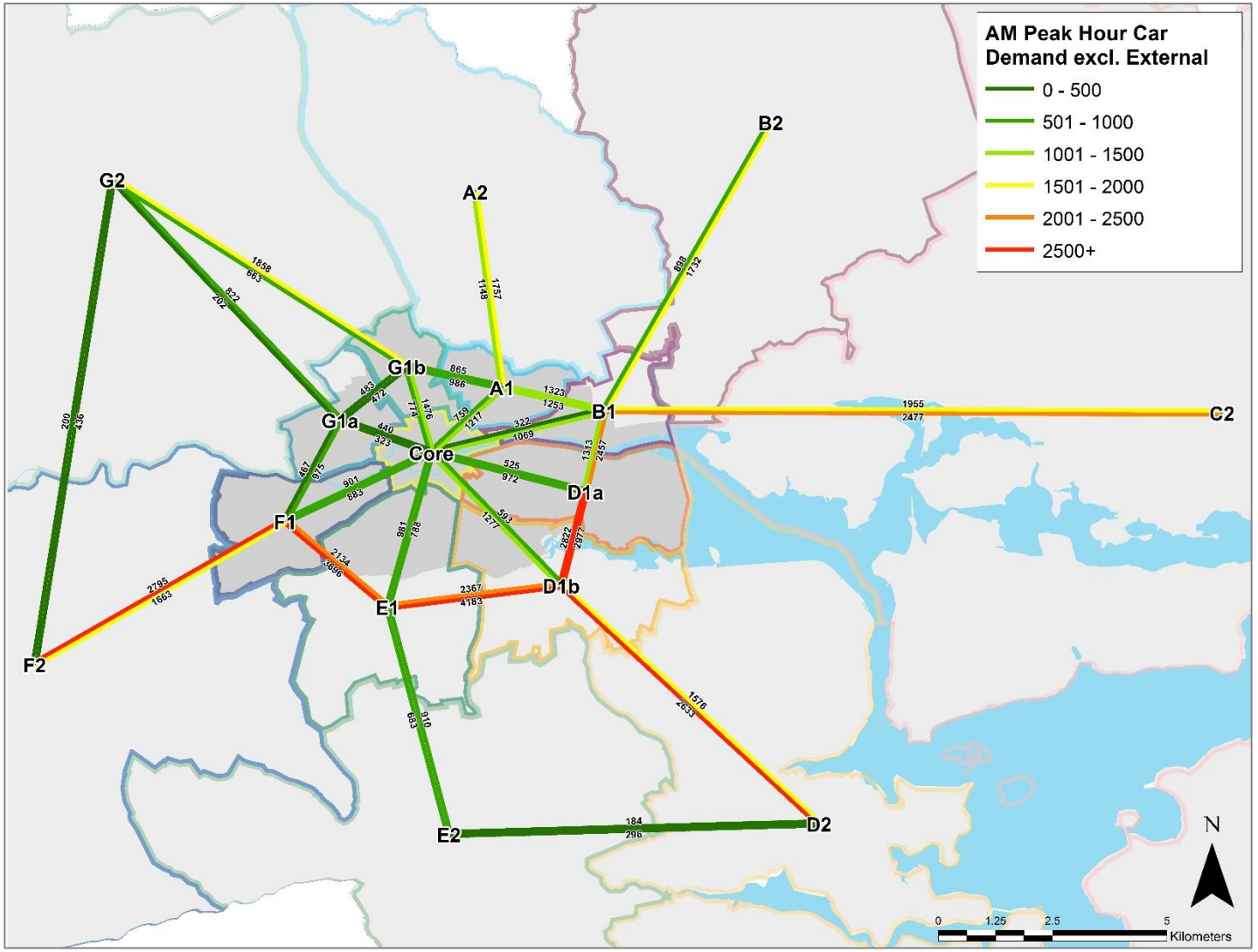


Figure 6.6 AM Road Demand excluding External Demand 'Spider's Web Network'

6.3 Indicative Public Transport Network

6.3.1 Strategic Cross City Demand

To identify potential high capacity strategic public transport corridors, the two-way cross-city AM peak demand was extracted from the OD matrices presented previously and is shown below in Table 6.1. Note that travel by public transport to the adjacent corridor is considered an orbital movement and not included in Table 6.1.

Table 6.1 Two-Cross City AM Peak Demand

Corridor	D1a	D1b & D2	E1 & E2	F1 & F2	G1a	G1b & G2
A1 & A2	623	771	490	833	169	216
B1, B2 & C2		353	1030	1962	472	1015
D1a			819	1272	326	712
D1b & D2				2001	415	1037
E1 & E2					315	716
F1 & F2						540

As shown in the table the highest cross city demand is between Corridors D & F as well as Corridors B, C & F. There is also high demand from Corridor B & C to G1b & G2 along the existing rail line and between D1b & D2 to G1b & G2. The links carrying this demand were extracted from the AM Peak Spider's Web Network as shown below in Figure 6.7. The strategic corridors run along the rail line and along an east-west corridor as identified from the desire lines.

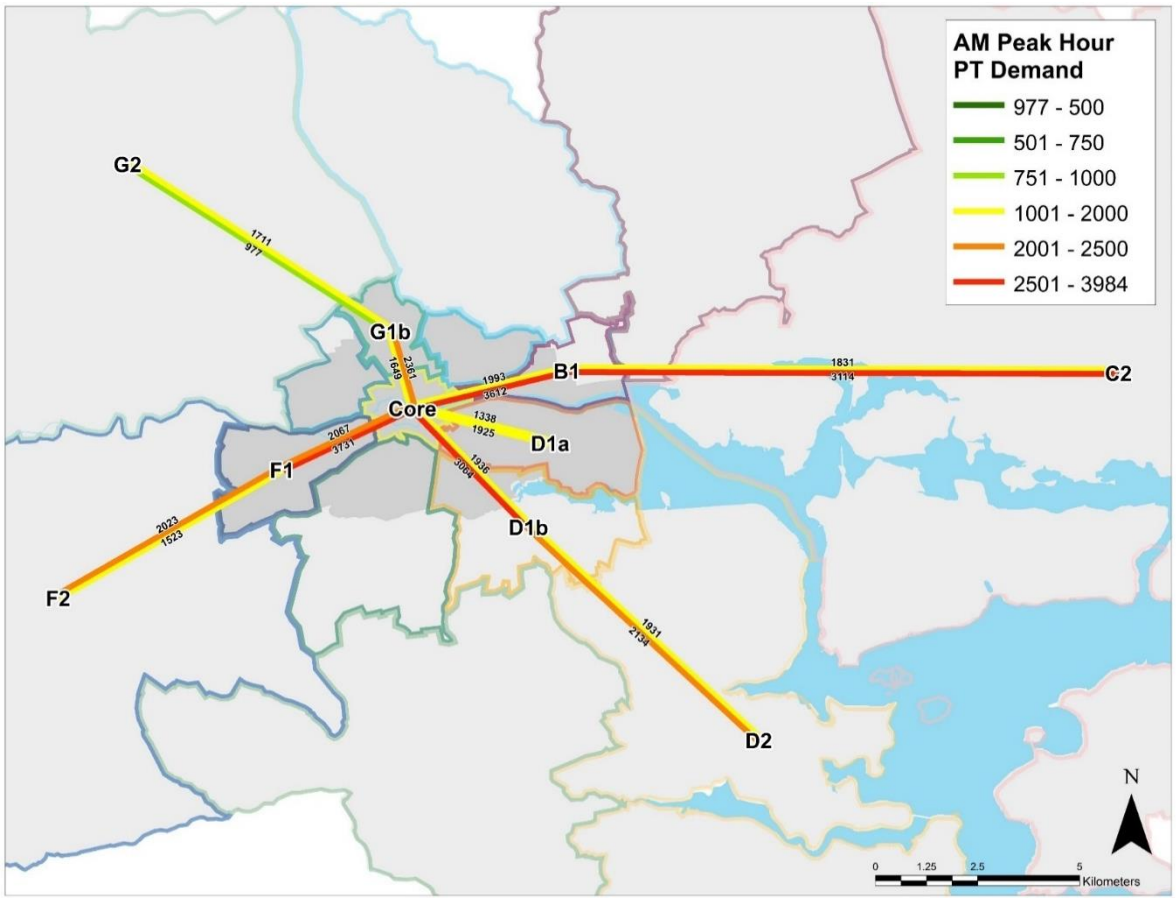


Figure 6.7 AM Peak PT Demand – High Demand Corridors

6.3.2 Strategic Rail Corridor

Travel between Corridors C, B, G and the Core is accommodated along the existing rail link between Mallow, Midleton & Cobh to Cork Kent. This corridor has long been identified as part of the strategic public transport network for Cork and improvements have been made to the Cork Metropolitan Rail Network in the past number of years including the reopening of the Midleton railway line.

In the idealised network it was assumed that through running trains through Kent Station from Midleton and Cobh to Mallow were in place along with new rail stations at Water-Rock, Ballynoe, Dunkettle, Tivoli, Blackpool, Monard and Stoneview to accommodate future development and Park & Ride at these locations. These improvements along with the assumed increase in frequency have resulted in the high public transport demand shown in Figure 6.7. The rail line and potential future stations are shown below in Figure 6.8.

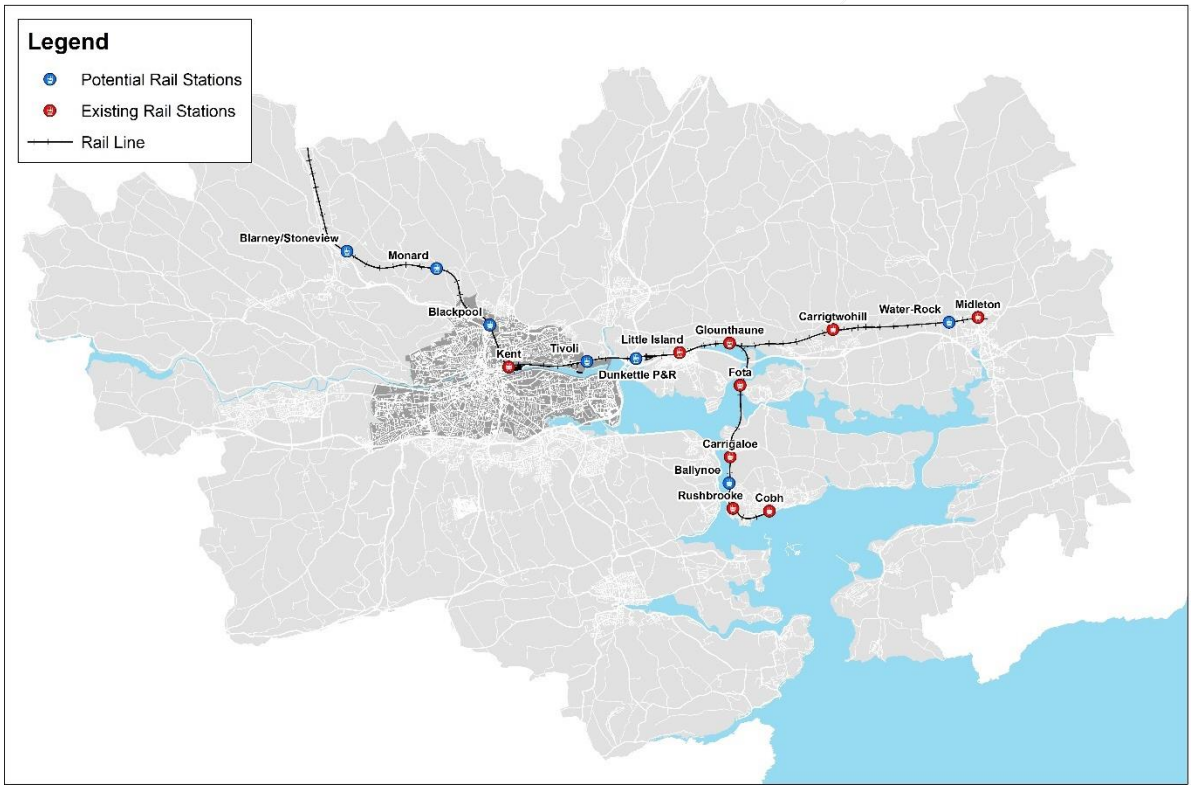


Figure 6.8 Strategic Rail Corridor with Existing and Potential Future Stations

To facilitate the high demand shown in Table 6.1 travelling from the corridors along the Rail line to Corridor F, interchange at Kent Station will be required which the reorientation of the station will allow. The upgrades currently underway at Kent will create a new entrance to the station along Horgan's Key and will allow buses to stop at the station entrance.

6.3.3 Strategic East West Rapid Transit Corridor

As identified in Table 6.1 there is strong cross city demand between corridors F and D which will need to be catered for by a high capacity rapid public transport link in the future. Though the demand between F and D1b & D2 (of 2001), appears higher than to D1b (1272), much of this demand originates within D2. Demand from D2 is split between several settlements including Carrigaline, Ringaskiddy, Crosshaven, Passage West and Monkstown. As a result of this and the distance of these settlements from the south city environs it is not feasible to run a high capacity and frequency service to D2. In comparison within Corridor F the demand originating within F2 is concentrated within Ballincollig which is 2km from the city environs thus F2 can be feasibly served by a high capacity public transport service.

To assess whether the proposed service should run to D1a or D1b if the demand from D2 was excluded for the reasons outlined, the Spider's Web Network was reassigned with just demand from the inner corridors as shown in Figure 6.9.

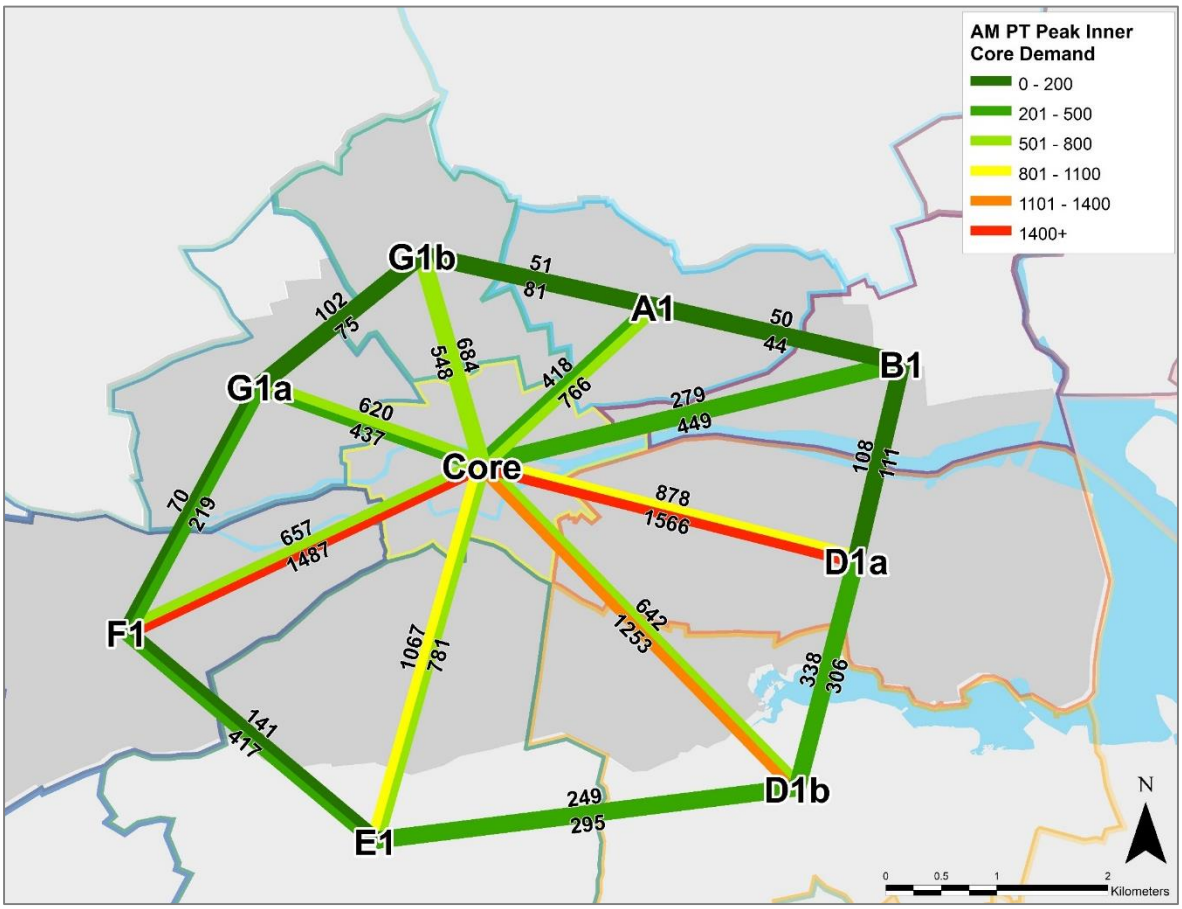


Figure 6.9 AM Peak PT Demand Spider's Web with Inner demand only

Without the demand from D2 included, the demand from corridor D1a to the Core is significantly higher than from D1b. Thus, the proposed east-west strategic corridor will run from Corridor F, serving F2 & F1, to D1a which includes the south City Docklands and Mahon. As outlined previously this service will ideally serve Kent Station to facilitate interchange and the high demand between Corridors B, C, D1a, F & G. The indicative strategic corridors for the CMA are shown in Figure 6.10.

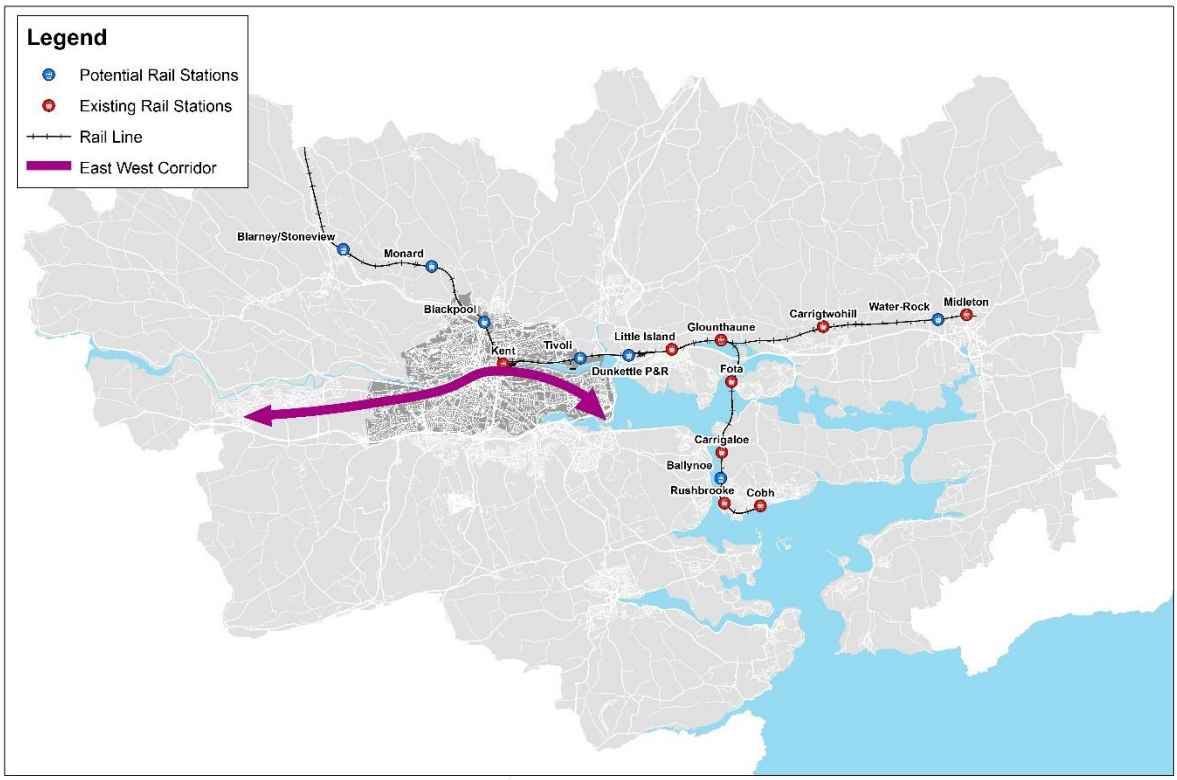


Figure 6.10 Indicative Strategic Public Transport Network

6.3.4 Remaining Demand

In addition to the strategic public transport services the corridors along the strategic network will require additional bus routes to accommodate demand from areas outside the catchment of the rail and east-west corridors. Though D2 cannot feasibly be served by a form of rapid transit there is considerable cross city demand between both D2 & D1b to Corridor F, B & G. A number of high frequency bus routes from Corridor D to the Core will be required to accommodate this level of demand and facilitate interchange with the proposed strategic corridors.

In addition, there is also strong demand between Corridor E and the corridors along the rail line. High frequency services will be needed between Corridor E and Kent Station to cater for this demand with services running directly from Kent Station to Cork Airport located in Corridor E. The demand from the remaining Corridors, A & G1a, is less due to the lower populations within these segments, however high frequency bus routes will be required from these corridors to the city centre. There will also be a need for orbital services north and south of the city centre.

The overall indicative public transport network is shown in Figure 6.11.

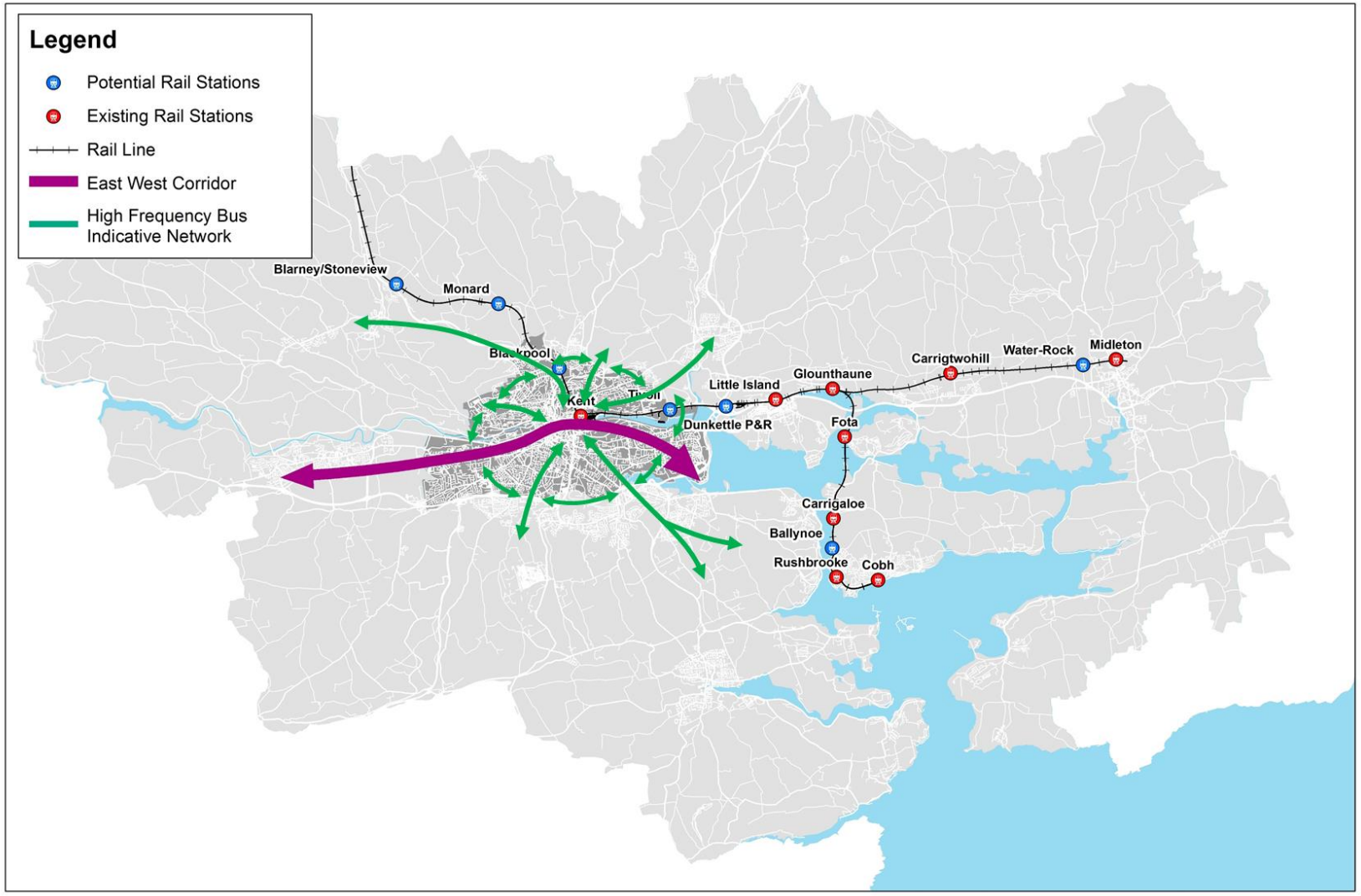


Figure 6.11 Indicative Overall Public Transport Network

6.4 HGV Demand Analysis

To assess the level of HGV demand in the 2036 scenario the HGV links, flows were extracted from the Idealised Network Scenario for the AM peak hour and are shown below in Figure 6.5. The figure shows high levels of demand across the National Network and in particular the N40, M8 and N25 corridors. It should be noted that the Port of Cork has been relocated to Ringaskiddy in the 2036 scenario though HGV traffic into the city along the N8 at Tivoli remains high.

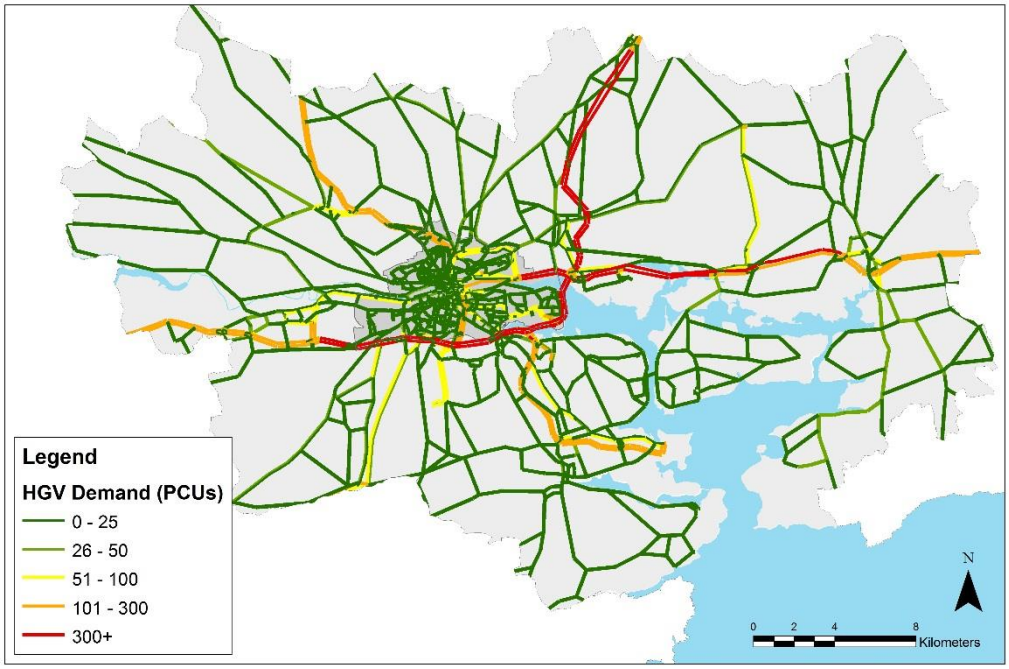


Figure 6.12 AM Peak Hour HGV Link Flows (PCUS)

In addition to the above, the HGV demand has been assigned onto the 'Spider's Web Network' as shown in Figure 6.6. Overall its shows a similar pattern of demand along the national road network corridors and is highest along the F1-D1 orbital corridor.

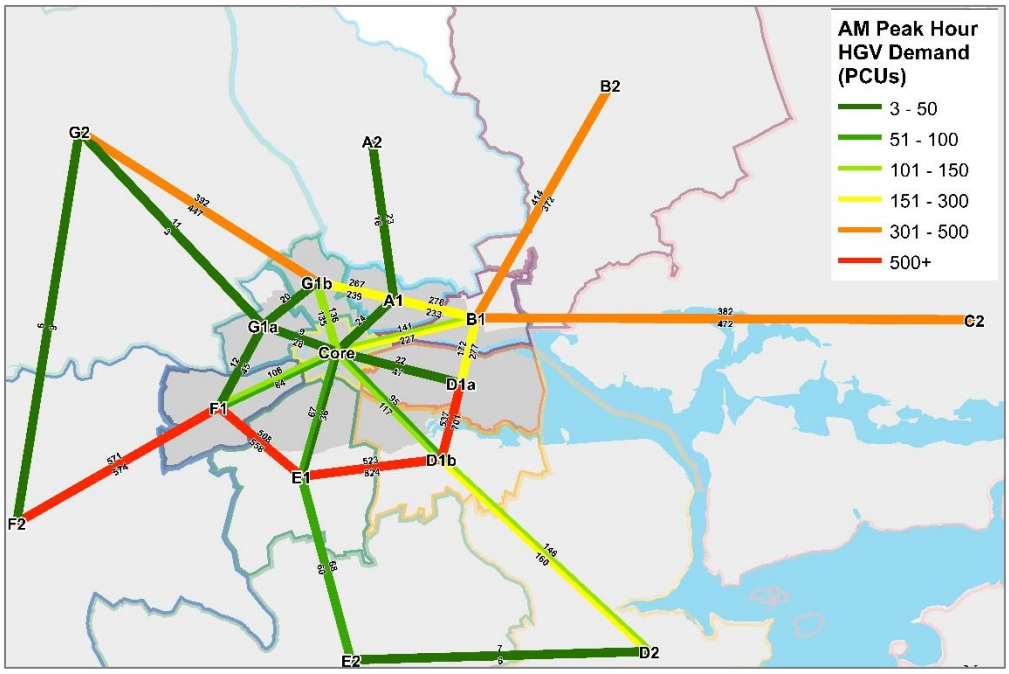


Figure 6.13 AM Peak Hour HGV Demand 'Spider's Web Network'

7 Addendum

7.1 Introduction

Since this Demand Analysis Report was initially produced, the National Planning Framework (NPF) 2040 has been published which sets out high-level strategic planning and development for Ireland over the next 20+ years.

Due to the timing of the release of NPF 2040, the strategic transport modelling of the proposed CMA Transport Strategy network has been undertaken using 2040 NPF demand and included iterative adjustments to the public transport provision within each corridor to meet the levels of demand envisaged within the NPF. It was therefore, not necessary to update the Idealised Network modelling contained within this report with the new planning forecasts.

This addendum chapter has been prepared to provide a comparison between the NTA 2036 M2F2 forecast and the 2040 NPF forecast at both a strategic and settlement level.

7.2 M2F2 Planning Datasheet and NPF 2040 Summary

The sections below detail the population, job and educations totals for 2036 M2F2 planning datasheets and are compared to the equivalent developed for the NPF 2040 scenario.

7.2.1 Population

Table 7-1 to 7-2 provides population comparisons, both at the county level, and at the Metropolitan and County settlement level. The NPF 2040 planning data forecasts much larger growth than 2036 M2F2, with an overall population growth of 35% in 2040, compared to 13% for the 2036 M2F2 forecasts.

Within the NPF 2040 growth, settlements forecasting the highest population growth include:

- City – Docklands – from 2011 to 2040 **increase 22,408** in population
- City Centre – from 2011 to 2040 **increase 9,593** in population
- City SW – from 2011 to 2040 **increase 12,799** in population
- Metropolitan – Ballincollig – from 2011 to 2040 **increase 13,946** in population
- Metropolitan – Midleton – from 2011 to 2040 **increase 13,955** in population
- County – Cork Rural – from 2011 to 2040 **increase 18,539** in population

Table 7-1: Population Comparison at City, Metropolitan and County Level

	Population			Growth			
Cork Split	**2011**	**2036 M2 F2**	**2040 NPF**	**2011 - 2036**		**2011 - 2040**	
Cork City	119,230	142,426	186,850	23,196	19.5%	67,620	56.7%
Cork Metro	170,509	203,070	246,935	32,561	19.1%	76,426	44.8%
Cork County	229,293	242,718	267,551	13,425	5.9%	38,258	16.7%
Total	**519,032**	**588,214**	**701,337**	**69,182**	**13.3%**	**182,305**	**35.1%**

Table 7-2: Population Comparison at Settlement Level

City Settlements	Population			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
City Centre	17,393	18,664	26,986	1,271	7.3%	9,593	55.2%
City NW	18,255	19,397	19,930	1,142	6.3%	1,675	9.2%
City NE	15,419	16,133	19,000	714	4.6%	3,581	23.2%
City SE	19,429	20,370	20,953	941	4.8%	1,524	7.8%
City SW	32,307	33,884	45,106	1,577	4.9%	12,799	39.6%
Blackpool	4,759	6,309	8,978	1,550	32.6%	4,219	88.6%
Tivoli	2,587	7,133	9,788	4,546	175.7%	7,201	278.3%
Docklands	1,342	11,264	23,750	9,922	739.3%	22,408	1669.7%
Mahon	5,761	7,192	7,829	1,431	24.8%	2,068	35.9%
Wilton	212	222	729	10	4.7%	517	243.9%
CUH	890	933	1,352	43	4.8%	462	51.9%
Model Farm	631	662	2,181	31	4.9%	1,550	245.6%
Apple	245	261	268	16	6.5%	23	9.5%
Total	**119,230**	**142,424**	**186,850**	**23,194**	**19.5%**	**67,620**	**56.7%**

Metro Settlements	Population			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
Ballincollig	16,861	21,094	30,807	4,233	25.1%	13,946	82.7%
Blarney	5,310	9,152	13,100	3,842	72.4%	7,790	146.7%
Carrigaline	14,818	16,282	17,054	1,464	9.9%	2,236	15.1%
Carrigtwohill	5,738	9,550	13,695	3,812	66.4%	7,957	138.7%
Cobh	12,468	13,519	14,536	1,051	8.4%	2,068	16.6%
Ballyvolane	7,565	11,703	11,967	4,138	54.7%	4,402	58.2%
Glanmire	9,706	10,946	16,113	1,240	12.8%	6,407	66.0%
Midleton	13,987	19,260	27,942	5,273	37.7%	13,955	99.8%
Monard	501	5,604	7,655	5,103	1018.6%	7,154	1428.0%
South Environs	32,811	33,034	34,859	223	0.7%	2,048	6.2%
Passage West	5,603	6,332	6,617	729	13.0%	1,014	18.1%
CSIP	1,123	1,470	4,213	347	30.9%	3,090	275.2%
Little Island	1,922	1,934	2,875	12	0.6%	953	49.6%
Ringaskiddy	1,343	1,352	1,426	9	0.7%	83	6.2%
Airport	354	367	386	13	3.7%	32	9.1%
Metro Villages & Rural Areas	40,399	41,471	43,687	1,072	2.7%	3,288	8.1%
Total	**170,509**	**203,070**	**246,935**	**32,561**	**19.1%**	**76,426**	**44.8%**

County Settlements	Population			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
Fermoy	7,031	7,948	8,722	917	13.0%	1,691	24.1%
Kinsale	6,500	7,191	7,903	691	10.6%	1,403	21.6%
Mallow	12,604	15,020	16,429	2,416	19.2%	3,825	30.3%
Bantry	4,440	5,103	5,594	663	14.9%	1,154	26.0%
Youghal	8,192	9,293	10,197	1,101	13.4%	2,005	24.5%
Clonakilty	5,793	6,665	7,306	872	15.1%	1,513	26.1%
Bandon	7,615	8,553	9,391	938	12.3%	1,776	23.3%
Macroom	4,563	5,111	5,612	548	12.0%	1,049	23.0%
Mitchelstown	4,168	4,814	5,276	646	15.5%	1,108	26.6%
Watergrasshill	1,319	1,359	1,500	40	3.0%	181	13.8%
Millstreet	2,904	3,116	3,432	212	7.3%	528	18.2%
Skibbereen	3,820	4,187	4,604	367	9.6%	784	20.5%
Kanturk	3,515	3,805	4,188	290	8.3%	673	19.1%
Dunmanway	2,407	2,646	2,909	239	9.9%	502	20.9%
Rathcormac	2,506	2,581	2,851	75	3.0%	345	13.8%
Castlemartyr	2,320	2,390	2,639	70	3.0%	319	13.8%
Rathluirc	4,004	4,124	4,555	120	3.0%	551	13.8%
Kilumney	1,572	1,619	1,788	47	3.0%	216	13.8%
Ballinhassig	695	716	791	21	3.0%	96	13.8%
Cork Rural	143,325	146,478	161,864	3,153	2.2%	18,539	12.9%
Total	**229,293**	**242,719**	**267,551**	**13,426**	**5.9%**	**38,258**	**16.7%**

7.2.2 Employment

Table 7-3 to 7-4 provides employment comparisons, at both the county level, and also at the settlement level. The NPF 2040 planning data is forecast much larger growth than 2036 M2F2, with an overall employment growth of 49% in 2040, compared to 22% for the 2036 M2F2 forecasts.

Table 7-3: Employment Comparison at City, Metropolitan and County Level

Cork Split	Employment			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
Cork City	64,731	82,731	120,167	18,000	27.8%	55,436	85.6%
Cork Metro	47,415	61,002	60,596	13,587	28.7%	13,181	27.8%
Cork County	44,211	47,946	52,756	3,735	8.4%	8,545	19.3%
Total	**156,357**	**191,679**	**233,519**	**35,322**	**22.6%**	**77,162**	**49.3%**

Table 7-4: Employment Comparison at Settlement Level

City Settlements	Employment			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
City Centre	21,251	26,913	37,000	5,662	26.6%	15,749	74.1%
City NW	2,649	3,022	2,360	373	14.1%	- 289	-10.9%
City NE	3,916	4,289	3,353	373	9.5%	- 563	-14.4%
City SE	3,362	3,816	2,982	454	13.5%	- 380	-11.3%
City SW	10,479	11,184	12,500	705	6.7%	2,021	19.3%
Blackpool	3,475	4,367	5,000	892	25.7%	1,525	43.9%
Tivoli	807	2,750	5,000	1,943	240.8%	4,193	519.6%
Docklands	2,441	5,053	23,350	2,612	107.0%	20,909	856.6%
Mahon	5,153	8,370	10,250	3,217	62.4%	5,097	98.9%
Wilton	1,336	1,503	3,157	167	12.5%	1,821	136.3%
CUH	3,971	4,076	4,520	105	2.6%	549	13.8%
Model Farm	3,381	4,127	7,000	746	22.1%	3,619	107.0%
Apple	2,508	3,260	3,695	752	30.0%	1,187	47.3%
Total	**64,729**	**82,730**	**120,167**	**18,001**	**27.8%**	**55,438**	**85.6%**

Metro Settlements	Employment			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
Ballincollig	4,088	6,643	5,606	2,555	62.5%	1,518	37.1%
Blarney	810	1,215	1,005	405	50.0%	195	24.0%
Carrigaline	2,225	2,700	1,634	475	21.3%	- 591	-26.5%
Carrigtwohill	2,879	4,265	3,535	1,386	48.1%	656	22.8%
Cobh	1,524	1,727	1,474	203	13.3%	- 50	-3.3%
Ballyvolane	1,714	3,193	1,887	1,479	86.3%	173	10.1%
Glanmire	1,347	1,594	1,356	247	18.3%	9	0.7%
Midleton	3,485	5,500	4,611	2,015	57.8%	1,126	32.3%
Monard	36	322	254	286	794.4%	218	606.0%
South Environs	7,275	7,500	4,573	225	3.1%	- 2,702	-37.1%
Passage West	344	357	215	13	3.8%	- 129	-37.4%
CSIP	962	1,910	8,687	948	98.5%	7,725	803.0%
Little Island	6,108	7,188	10,858	1,080	17.7%	4,750	77.8%
Ringaskiddy	3,343	4,546	5,000	1,203	36.0%	1,657	49.6%
Airport	3,331	4,291	5,000	960	28.8%	1,669	50.1%
Metro Villages & Rural Areas	7,944	8,052	4,901	108	1.4%	- 3,043	-38.3%
Total	**47,415**	**61,003**	**60,596**	**13,588**	**28.7%**	**13,181**	**27.8%**

County Settlements	Employment			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
Fermoy	2,486	2,850	3,127	364	14.6%	641	25.8%
Kinsale	1,886	2,118	2,327	232	12.3%	441	23.4%
Mallow	4,159	5,025	5,496	866	20.8%	1,337	32.2%
Bantry	2,033	2,200	2,412	167	8.2%	379	18.6%
Youghal	1,629	1,874	2,056	245	15.0%	427	26.2%
Clonakilty	2,880	3,360	3,684	480	16.7%	804	27.9%
Bandon	2,345	2,672	2,934	327	13.9%	589	25.1%
Macroom	1,583	1,800	1,976	217	13.7%	393	24.8%
Mitchelstown	1,376	1,500	1,644	124	9.0%	268	19.5%
Watergrasshill	568	596	658	28	4.9%	90	15.8%
Millstreet	1,110	1,209	1,332	99	8.9%	222	20.0%
Skibbereen	1,810	2,012	2,213	202	11.2%	403	22.3%
Kanturk	859	943	1,038	84	9.8%	179	20.9%
Dunmanway	748	834	917	86	11.5%	169	22.6%
Rathcormac	209	218	241	9	4.3%	32	15.2%
Castlemartyr	230	241	266	11	4.8%	36	15.7%
Rathluirc	2,250	2,250	2,485	-	0.0%	235	10.4%
Kilumney	112	117	130	5	4.5%	18	15.9%
Ballinhassig	25	26	29	1	4.0%	4	15.2%
Cork Rural	15,913	16,100	17,791	187	1.2%	1,878	11.8%
Total	**44,211**	**47,945**	**52,756**	**3,734**	**8.4%**	**8,545**	**19.3%**

7.2.3 Education

Table 7-5 to 7-6 provides education comparisons, both at the county level, and at the settlement level. Again, the NPF 2040 planning data is forecast much larger growth than the 2036 M2F2, with an overall education growth of 40% in 2040, compared to 16% for the 2036 M2 F2 forecasts.

Table 7-5: Education Comparison at City, Metropolitan and County Level

Cork Split	Education			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
Cork City	41,337	48,444	58,627	7,107	17.2%	17,290	41.8%
Cork Metro	28,175	35,575	47,306	7,400	26.3%	19,131	67.9%
Cork County	39,184	42,430	46,712	3,246	8.3%	7,528	19.2%
Total	**108,696**	**126,449**	**152,646**	**17,753**	**16.3%**	**43,950**	**40.4%**

Table 7-6: Education Comparison at Settlement Level

City Settlements	Education			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
City Centre	9,397	10,673	13,781	1,276	13.6%	4,384	46.7%
City NW	2,548	2,761	2,533	213	8.4%	- 15	-0.6%
City NE	1,844	1,954	1,795	110	6.0%	- 49	-2.7%
City SE	4,936	5,221	4,796	285	5.8%	- 140	-2.8%
City SW	20,243	24,419	31,592	4,176	20.6%	11,349	56.1%
Blackpool	210	256	326	46	21.9%	116	55.0%
Tivoli	175	585	717	410	234.3%	542	309.8%
Docklands	76	305	574	229	301.3%	498	654.9%
Mahon	849	1,119	1,428	270	31.8%	579	68.2%
Wilton	241	255	235	14	5.8%	- 6	-2.7%
CUH	61	78	101	17	27.9%	40	64.9%
Model Farm	730	788	723	58	7.9%	- 7	-0.9%
Apple	27	30	28	3	11.1%	1	1.9%
Total	**41,337**	**48,444**	**58,627**	**7,107**	**17.2%**	**17,290**	**41.8%**

Metro Settlements	Education			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
Ballincollig	3,627	4,481	5,719	854	23.5%	2,092	57.7%
Blarney	674	1,558	1,949	884	131.2%	1,275	189.2%
Carrigaline	2,615	3,389	3,102	774	29.6%	487	18.6%
Carrigtwohill	1,149	2,247	2,816	1,098	95.6%	1,667	145.1%
Cobh	2,036	2,281	2,943	245	12.0%	907	44.5%
Ballyvolane	1,418	2,036	1,819	618	43.6%	401	28.3%
Glanmire	2,432	2,873	3,696	441	18.1%	1,264	52.0%
Midleton	3,284	4,636	5,877	1,352	41.2%	2,593	79.0%
Monard	4	787	940	783	19575.0%	936	23401.3%
South Environs	2,531	2,530	2,333	- 1	0.0%	- 198	-7.8%
Passage West	837	932	851	95	11.4%	14	1.7%
CSIP	2	2	8,000	-	0.0%	7,998	399900.0%
Little Island	156	161	209	5	3.2%	53	34.1%
Ringaskiddy	411	430	397	19	4.6%	- 14	-3.4%
Airport	1	1	1	-	0.0%	- 0	-7.8%
Metro Villages & Rural Areas	6,998	7,228	6,653	230	3.3%	- 345	-4.9%
Total	**28,175**	**35,572**	**47,306**	**7,397**	**26.3%**	**19,131**	**67.9%**

County Settlements	Education			Growth			
	2011	2036 M2 F2	2040 NPF	2011 - 2036		2011 - 2040	
Fermoy	2,465	2,645	2,903	180	7.3%	438	17.8%
Kinsale	1,607	1,719	1,889	112	7.0%	282	17.6%
Mallow	2,654	3,645	3,987	991	37.3%	1,333	50.2%
Bantry	1,209	1,293	1,418	84	6.9%	209	17.2%
Youghal	1,613	1,721	1,888	108	6.7%	275	17.1%
Clonakilty	1,841	1,969	2,158	128	7.0%	317	17.2%
Bandon	2,590	2,784	3,057	194	7.5%	467	18.0%
Macroom	1,198	1,291	1,418	93	7.8%	220	18.3%
Mitchelstown	1,230	1,318	1,444	88	7.2%	214	17.4%
Watergrasshill	3	3	3	-	0.0%	0	10.4%
Millstreet	467	499	550	32	6.9%	83	17.7%
Skibbereen	1,300	1,396	1,535	96	7.4%	235	18.1%
Kanturk	1,012	1,089	1,199	77	7.6%	187	18.4%
Dunmanway	817	875	962	58	7.1%	145	17.8%
Rathcormac	318	332	367	14	4.4%	49	15.3%
Castlemartyr	271	283	313	12	4.4%	42	15.3%
Rathluirc	1,171	1,253	1,384	82	7.0%	213	18.2%
Kilumney	-	-	-	-		-	
Ballinhassig	137	143	158	6	4.4%	21	15.3%
Cork Rural	17,281	18,172	20,081	891	5.2%	2,800	16.2%
Total	**39,184**	**42,430**	**46,712**	**3,246**	**8.3%**	**7,528**	**19.2%**

7.3 2040 NPF - Spider Web Demand Analysis

To provide a comparison with the Idealised demand presented in section 6.2, NPF 2040 corridor demand as output from the 2040 CMATS Strategy model run, has also been assigned onto a simplified 'Spider's Web Network'. The spider web analysis has been undertaken with the NPF 2040 forecasts for the AM peak public transport demand, and is shown below in Figure 7-1.

The public transport demand is similar in distribution to that shown with the 2036 M2F2 forecasts - Figure 6.4, with significant demand between C2 – B1 – Core – F1. The demand levels are slightly lower than the Idealised demand (on average 8% lower) even with the higher growth levels associated with the NPF scenario. This is due to the fact that the Do Strategy includes for capacity constraint on services and also accounts for road network speeds rather than the assumed minimum public transport speed of 25kph contained within the Idealised model run.

7.4 Addendum Summary

The demand analysis and option development stages of CMATS proceeded the publication of the NPF 2040. This addendum summarised the difference in assumed growth levels between the 2036 M2F2 growth scenario and the 2040 NPF scenario. It has been shown that the higher growth levels associated with NPF 2040 do not change the distribution of growth and the ultimate public transport demand within the defined CMA corridors.

The Strategy transport measures have been developed to be scalable, flexible and have adequate reserve capacity to allow for any changes in growth that may arise from the NPF 2040 to be catered for by the proposed strategy network.

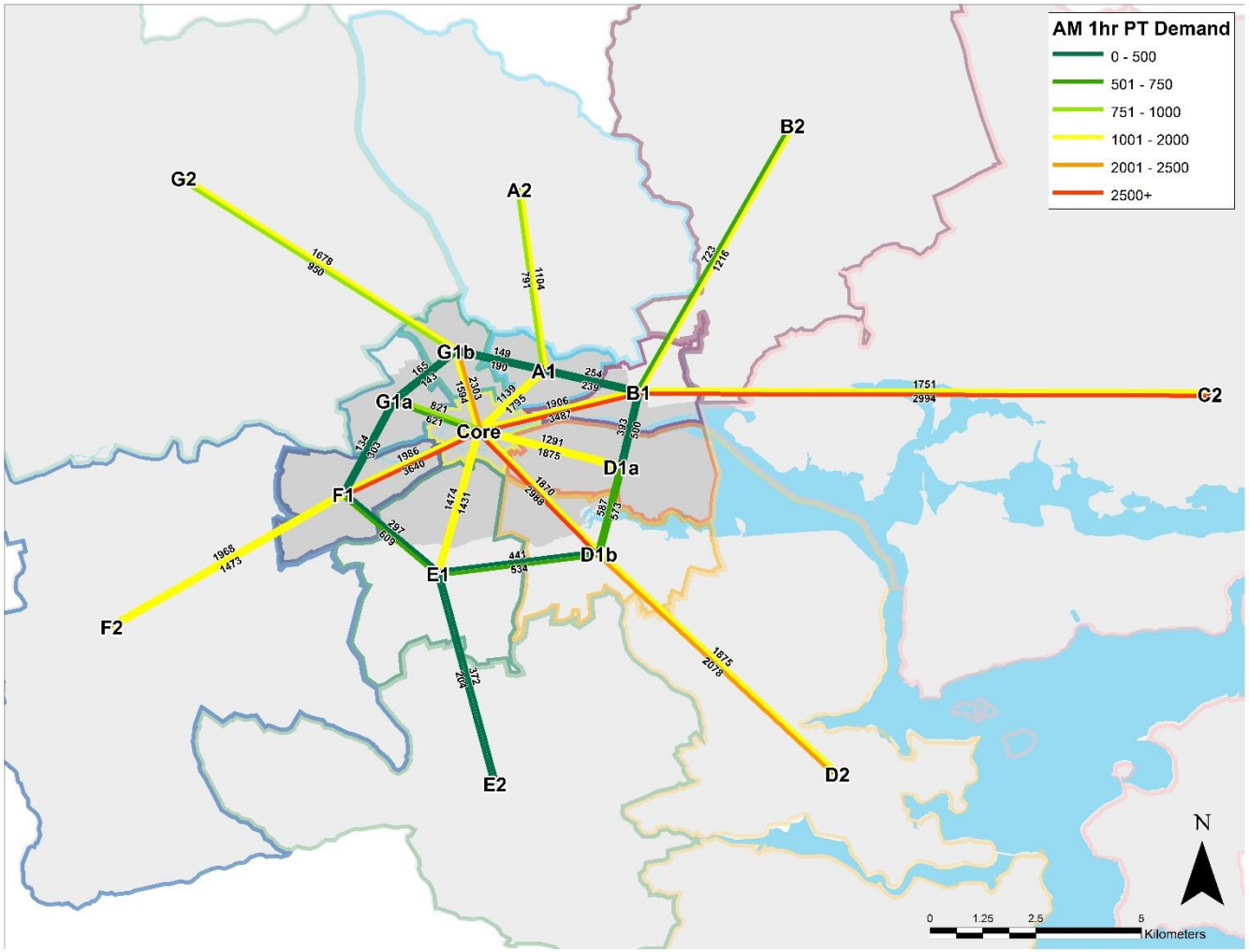


Figure 7-1: Spider's Web Network – 2040 Do Strategy Public Transport Demand