

South Fingal Transport Study

SWORDS STUDY

SYSTRA LTD. 2nd Floor, Riverview House, 21-23 City Quay, Republic of Ireland, Dublin 2

SYSTRA

Contents

1	Swords	4
1.1	Introduction	4
2	2016 Travel Demand Analysis	5
2.1	Swords Sectors.....	5
2.2	Population and Employment.....	5
2.3	Travel Patterns to Wider Destinations	6
2.3.1	Strategic Overview	6
2.4	Mode Shares of Trips to Work and School (Census 2016).....	9
3	Future Swords	10
3.1	Overview.....	10
3.2	Committed Development.....	11
3.2.1	Oldtown -Mooretown.....	11
3.2.2	Rathingle.....	11
3.2.3	Streamstown.....	11
3.3	Local Area Plans	11
3.3.1	Fosterstown (2010 LAP).....	11
3.3.2	Barrysparks (2010 LAP)	11
3.3.3	Lissenhall (Future LAP).....	12
3.3.4	Rowlestown (Rural Village)	12
3.3.5	Rivermeade (Rural Village)	12
3.4	Transport Plans	13
3.4.1	NTA Greater Dublin Area Transport Strategy 2035	13
3.4.1.1	GDA Cycle Network Plan	13
3.4.1.2	MetroLink.....	14
3.4.1.3	Dublin Area Bus Network Redesign	15
3.4.2	Fingal County Development Plan Road Schemes	16
3.4.2.1	Swords Western Distributor Road (SWDR).....	16
3.4.2.2	The Swords Western Relief Road (SWRR)	17
3.4.2.3	Other Potential Schemes noted in Swords Emerging City / FDCP	17
3.5	Future Land Use	19
3.5.1	Recognised Development.....	19
3.5.2	MetroLink Intensification (Swords 75k)	20
4	Swords Modelling Assessment	24
4.1	Overview.....	24
4.2	Assessment Structure.....	24
4.3	Scenarios Tested	25
4.4	Recognised Development Assessment	26
4.4.1	Population Growth	26
4.4.2	Trip Generation	27
4.4.2.1	Swords North West	27
4.4.2.2	Swords South West.....	28
4.4.2.3	Swords East.....	29
4.4.2.4	Swords Centre	30
4.4.3	Trip Destinations by Mode	31
4.4.3.1	Overview.....	31
4.4.3.2	Swords North West	31
4.4.3.3	Swords South West.....	32
4.4.3.4	Swords East.....	33
4.4.3.5	Swords Centre	33
4.4.4	Network Analysis.....	34
4.4.4.1	Swords North West	34
4.4.4.2	Swords South West.....	37
4.4.4.3	Swords Centre and East.....	37
4.4.4.4	Swords Emerging City Vision	39
4.5	Swords Outline Traffic Management Plan	40



4.6	Scheme Orientated Assessment	41	6.3.7	Study 21 Flows SWDR Swords Western Distributor	68
4.6.1	Swords Western Relief Road (SWRR).....	41	6.3.8	Study 22 Flows SWDR Swords Western Distributor	69
4.6.2	Swords Western Distributor Road (SWDR)	41	6.4	Area Based Assessment	70
5	Conclusions and Recommendations	45	6.4.1	Study 23 Oldtown Mooretown Traffic Distribution	71
5.1	Swords Recommendations Summary Map.....	46	6.4.2	Study 23 Oldtown Mooretown Traffic Distribution with SWRR	72
6	Appendix	47	6.5	Volume / Capacity Maps	73
6.1	Swords Road Network – Recognised Development	48	6.5.1	Study 24 V/C; 2016 vs Do-Min 2027.....	74
6.1.1	Study 1 Flows; 2016 vs Do-Min 2027	48	6.5.2	Study 25 Swords Off Peak Comparison	76
6.1.2	Study 2 Flows; 2016 vs GDA Strategy 2027	49	6.6	Swords Outline Traffic Management Plan	76
6.1.3	Study 3 Delays; 2016 vs Do-Min 2027.....	50	6.6.1	Study 26 Swords Main Street Through Traffic	77
6.1.4	Study 4 V/C; 2016 vs Do-Min 2027	51	6.6.2	Study 27 Main Street Bus Gate Reduction in Flow.....	78
6.1.5	Study 5 Flows; Do-Min 2027 vs GDA Strategy	52	6.6.3	Study 28 Main Street Bus Gate V/C Changes	79
6.1.6	Study 6 Delay; 2016 vs GDA Strategy 2027.....	53	6.6.4	Study 29 Main Street Bus Gate Delay Changes	80
6.1.7	Study 7 Delay; Do-Min 2027 vs GDA Strategy 2027.....	54	6.6.5	Study 30 Main Street Bus Gate + Junction Improvements.....	81
6.1.8	Study 8 V/C; 2016 vs GDA Strategy 2027	55	6.6.6	Study 31 Flow Diff; Swords Inner Ward River Crossing	82
6.1.9	Study 9 V/C; Do-Min 2027 vs GDA Strategy 2027.....	56	6.6.7	Study 32 V/C Diff; Swords Inner Ward River Crossing.....	83
6.1.10	Study 10 Flows; SWRR Recognised Development	57	6.6.8	Study 33 Delay Diff; Swords Inner Ward River Crossing.....	84
6.2	Swords Western Relief Road Assessment – Recognised Development	57	6.6.9	Study 34 Delay Diff; Fosterstown Link.....	85
6.2.1	Study 11 Flow Difference; SWRR / No SWRR.....	58	6.6.10	Study 35 Flow; Northern Section of the SWDR.....	86
6.2.2	Study 12 Flow Difference; SWRR / No SWRR.....	59	6.6.11	Study 36 Flow Difference; Northern Section of the SWDR	87
6.2.3	Study 13 V/C Difference; SWRR / No SWRR	60			
6.2.4	Study 14 Traffic Routing on SWRR	61			
6.3	Swords Western Distributor Road (SWDR) Recognised Development Assessment	62			
6.3.1	Study 15 Flows with SWDR	62			
6.3.2	Study 16 Flows Difference; With and without SWDR Extension	63			
6.3.3	Study 17 Flow Difference; With and without SWDR Extension	64			
6.3.4	Study 18 Flows Difference; With and without SWDR	65			
6.3.5	Study 19 V/C Difference; With and without SWDR	66			
6.3.6	Study 20 Routing, SWDR.....	67			

Figures

Figure 1.1	Swords Map.....	5
Figure 2.1	Swords Analysis Sectors	6
Figure 2.2	Swords Sectors	6
Figure 2.3	POWSCAR Commuter Destinations by Mode.....	8
Figure 2.4	POWSCAR Education Destinations by Mode.....	8
Figure 2.5	POWSCAR Work and School Trip Destinations by Mode	9
Figure 3.1	GDA Cycle Network Plan in Swords (Key Routes).....	13
Figure 3.2	MetroLink Preferred Alignment in Swords.....	14
Figure 3.3	Bus Connects Proposed High Frequency Bus Services	15



Figure 3.4 Map of Proposed Road Schemes in Swords 18

Figure 3.5 Swords Population Projections (2 Scenarios) 20

Figure 3.6 Population Growth Map – Recognised Housing 22

Figure 3.7 Population Growth Map – Metro Intensification 23

Figure 4.1 Table of Model Scenarios 25

Figure 4.2 Swords Sector System..... 26

Figure 4.3 Trip Generation by Mode, Swords North West 27

Figure 4.4 Trip Generation by Mode, Swords South West 28

Figure 4.5 Trip Generation by Mode, Swords East 29

Figure 4.6 Trip Generation by Mode, Swords Centre 30

Figure 4.7 Trips Destinations from Swords North West 31

Figure 4.8 Trips Destinations from Swords South West 32

Figure 4.9 Trips Destinations from Swords East 33

Figure 4.10 Trips Destinations from Swords East..... 33

Figure 4.11 Journey Time Routes in Swords..... 35

Figure 4.12 Journey times from Swords NW to Main Street..... 35

Figure 4.13 SWRR and SWDR Alignments 41

Figure 5.1 Swords Recommendations Summary Map..... 46

Tables

Table 1 Swords Population and Employment by Sector 5

Table 2 Bus Connects Proposed Services and Headways Swords..... 15

Table 3 FCDP Road Schemes..... 16

Table 4 Swords Recognised Development (Housing Units) 19

Table 5 Swords Growth Scenarios – Housing Units 21

Table 6 Swords Population by Sector (Recognised Development) 26

Table 7 Do-Min / GDA Strat Flow Comparison Swords North West 34

Table 8 Swords Western Relief Road Assessment 42

Table 9 Swords Western Distributor Road Extension Assessment 44



1 Swords

1.1 Introduction

This report forms part of the South Fingal Transport Study (SFTS), covering the study sub-area Swords.

Swords is a large town situated 14km north of Dublin City at the fringe of its metropolitan area, shown below in Figure 1.1. A new metro is to be built by 2027 linking Swords, the Airport, and Dublin City Centre with connections to the rail network. The strategic vision for Swords is to continue to grow into a sustainable new city with a population of 100,000 (“Your Swords, An Emerging City, Strategic Vision 2035, Fingal County Council 2008). The town’s population was 43,000 according to the most recent 2016 Census; 6,000 more than the Census of 2011, making Swords one of the largest and fastest growing towns in Ireland. The Airport is just 4km to the south along the R132. Census POWSCAR data suggests that of the Airports’ 12,000 workers, 2,000 live in Swords.

Housing in Swords is predominantly situated to the west of the town, typically in the form of predominantly semi-detached housing estates, arranged along several former rural roads, such as Rathbeale Road, Brackenstown Road, and Forest road. In contrast to its relatively housing orientated western areas, eastern Swords includes a diverse range of residential and commercial land uses along the Main Street, the R132, and along the edges of the M1. Main Street retains a vibrant character and provides a broad mix of shops, bars and restaurants. There is a mix of low density housing and a large shopping centre between Main Street and the R132. Light industrial uses occupy the western side of the Ward River just north of Main Street.

The strategic road network is predominantly orientated on a north-south axis, due to Swords’ historical development along the Dublin-Belfast road (R132), which has now been superseded by the M1. Various business and retail parks are located on the western side of the R132, such as Airside and Swords Business Park. Formerly the R132 served as the by-pass of Swords on the old Dublin-Belfast Road. The R132 has since become an integral part of Swords’ urban fabric, and functions as

a local traffic distributor for the town’s population to places of work and commerce.

Swords is identified as a Metropolitan Consolidation town in the FDP. It has an important role as both a developing town in the Dublin region, and as the main County Town in Fingal. It is identified in the National Planning Framework (NPF) as an example of a Metropolitan location which can significantly grow with urban expansion or sustainable infill development. The NPF states that up to 20% of the growth targeted for the overall Dublin City region can be accommodated in such outer suburban metropolitan locations. Swords is highlighted in the NPF because the delivery of MetroLink will enable significant and sustainable non-car dependant growth.

The development of Swords is also guided by the Swords Emerging City Vision 2035 and the Swords Town Centre Masterplan (2009), which emphasise Main Street as the future centre of Swords with strong links to the MetroLink corridor.



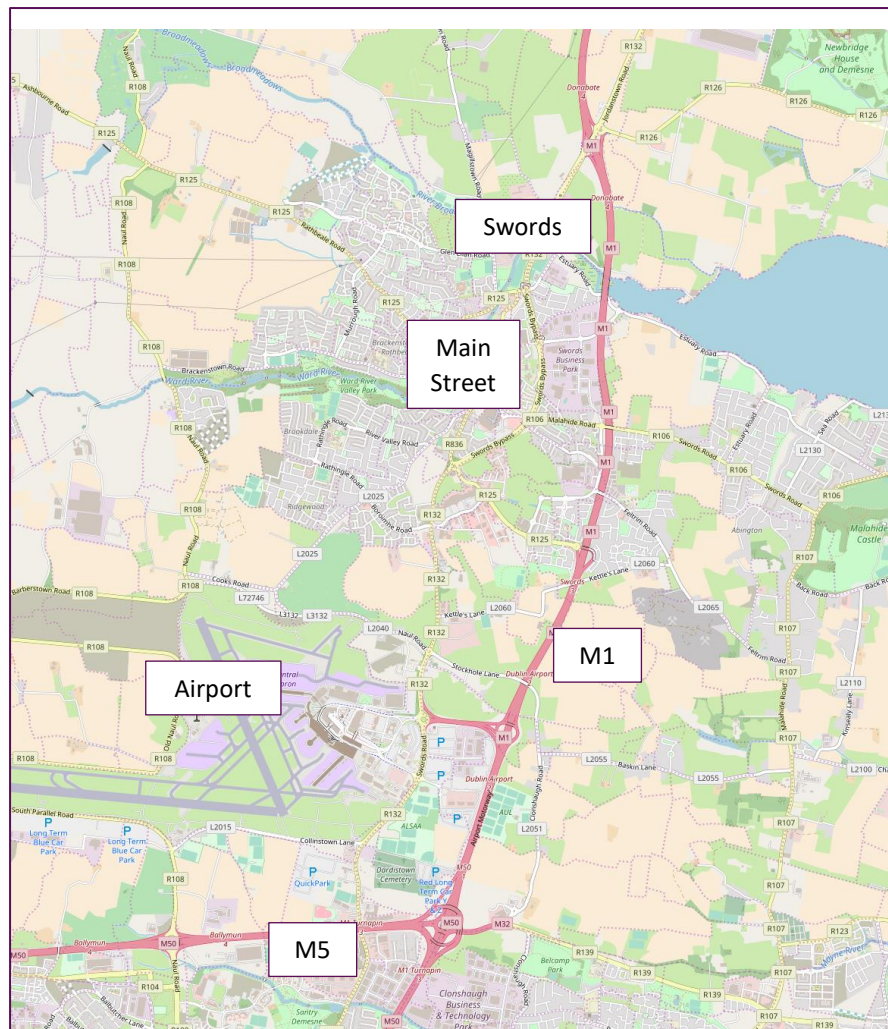


Figure 1.1 Swords Map

2 2016 Travel Demand Analysis

2.1 Swords Sectors

For the purposes of this assessment Swords' has been grouped into 4 main sectors, shown right, to enable description of its key population and employment areas.

2.2 Population and Employment

This section presents an analysis of Swords' population and typical daily travel behaviour. According to the 2016 Census, Around 30,000 people live in western Sword, with around 17,000 residing north of River Ward, and 13,500 to the south.

Table 1 Swords Population and Employment by Sector

Swords Sectors	2016 Population	2016 Employment
Swords South West	13,500	500
Swords East	10,000	9,500
Swords North West	17,000	1,500
Swords Centre	2,500	3,500
Grand Total	43,000	15,000



The main areas of employment are the Business parks, retail centres, and industrial uses located along the R132. Census POWSCAR¹ indicates over 6,500 jobs between Swords business park and the Airside Business/Retail park, 1,500 jobs in the business park to the north end of Main Street, and over 3,000 jobs in Main Street and Swords Pavilions.

Figure 2.1 *Swords Analysis Sectors*

2.3 Travel Patterns to Wider Destinations

2.3.1 Strategic Overview

This section presents an analysis of travel patterns of work and school trips from Swords, as per the 2016 Census POWSCAR dataset.

Figure 2.3 and Figure 2.4 the total numbers of work and school related trips segment by their destination area. The data shows the population of Swords generates total work and school trips of around 21,000 and 10,500 respectively. Of the 21,000 work trips, nearly 5,000 stay within Swords. Over 9,000 travel to within the M50, and around 2,000 travel to the Airport. Of the 10,500 school trips, 6,000 stay within Swords, 2,000 travel to within the M50, and 1,600 travel to Malahide or Portmarnock. Of the 11,000 work and school trips that stay within Swords, 43% are active modes, 49% car, and 8% public transport.

Of the nearly 4,000 work related trips that are to within the M50 and north of the city centre, 84% travel by car. Around 3,000 are destined to the city centre, however just 42% of these go by car, and 55% take public transport. Just under 2,000 trips continue further to the south of the city but inside the M50. Many trips will take the M50 whether destined inside or outside the M50.

Work trips to Malahide/Portmarnock and the North Fringe areas are comparatively small, amounting to only around 1,000, ranging from 70% to 80% car, and 3% to 6% active modes. However, the former attracts the most school

trips of any area outside Swords, amounting to 1,600, and of these, 65% are by car and 24% are by public transport.

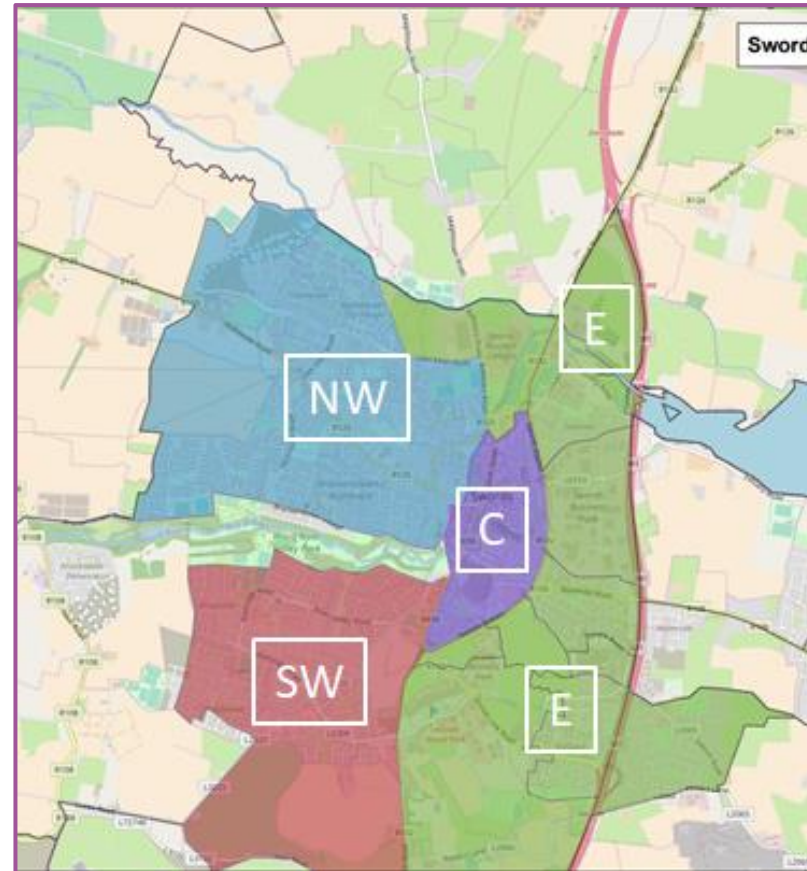


Figure 2.2 *Swords Sectors*

¹ Census POWCAR provides a record of responses to the Census questions ‘what is your usual place of travel to work or school’ on a typical day in April 2016, with home and destination locations defined at the Census Small Area level.



The Airport is the largest single destination for work trips (as the other destinations are comprised of aggregated areas of the city/region), with nearly 2,000 trips going there from Swords each day. The nearly 2,000 trips to the Airport are split 75% car and 21% public transport; less on 100 trips are active modes. The Airport will have a different pattern with respect to the time of travel, but this is level of information is not recorded in POWSCAR. Non-standard travel times will tend to result in a higher car mode share, particularly if bus frequencies decline outside typical AM / PM peak travel.

Given the compact nature of Swords, the car mode share for trips to work of 57% could be reduced. However, given the lack of competitiveness of public transport with other modes over short distances such as those typical within Swords (<4km), the primary reduction in car usage should come through an increase in active modes, and particularly cycling. The cycling mode share could be significantly improved from its currently very low base through the implementation of safe, pleasant, and direct cycle routes.



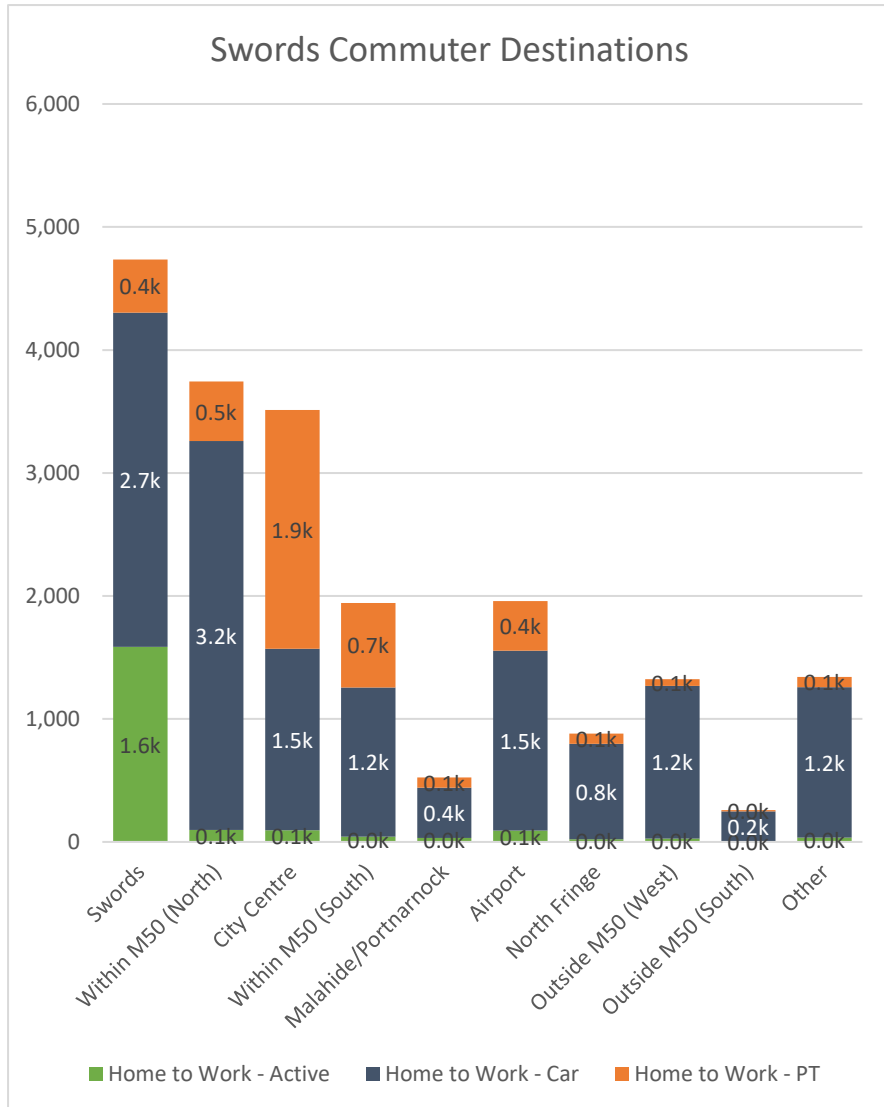


Figure 2.3 POWSCAR Commuter Destinations by Mode

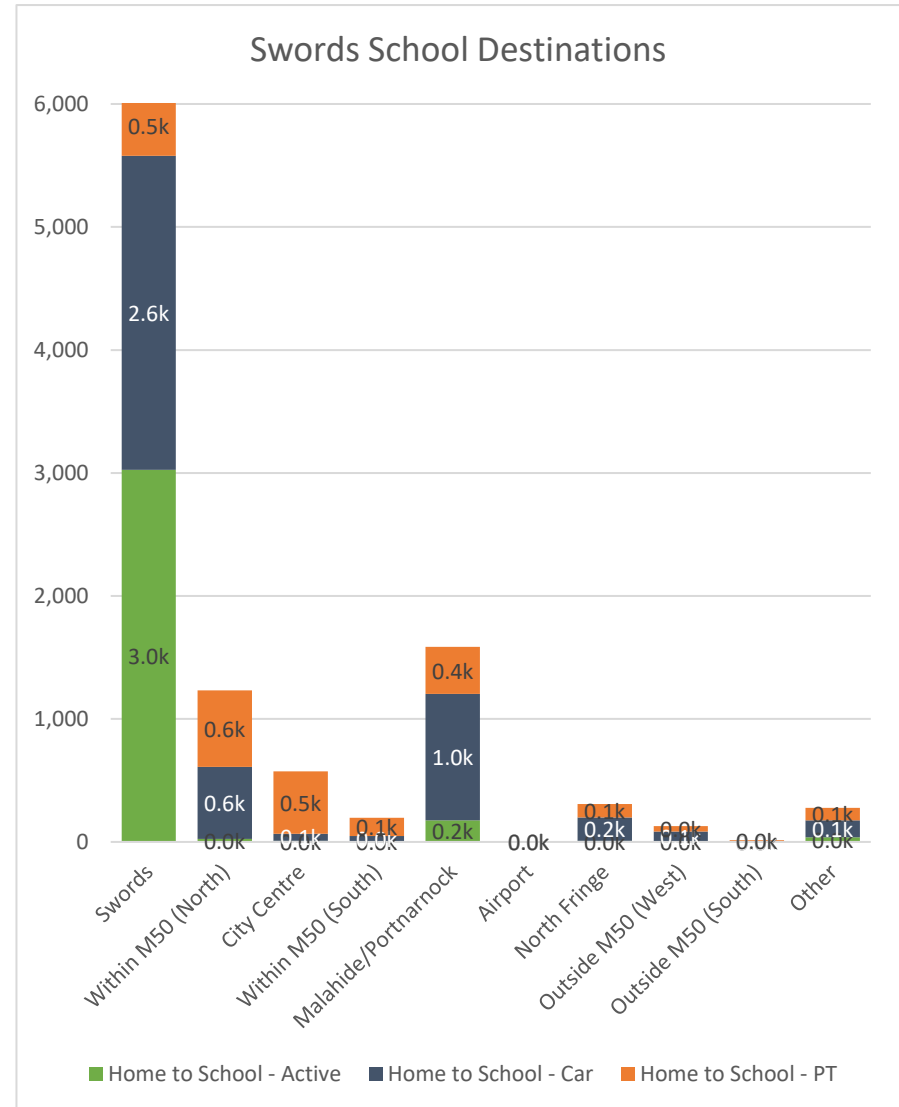


Figure 2.4 POWSCAR Education Destinations by Mode



2.4 Mode Shares of Trips to Work and School (Census 2016)

2016 Mode shares and total trips as recorded in Census 2016 are shown in the image to the right. Mode shares are quite similar in Swords North West (NW) and South West (SW), both around 60% car and 20% bus, and walking and cycling accounting for the remaining 20% of trips.

Swords NW and SW areas respectively generate around 6,000 and 5,000 car trips from home to work daily. Together these areas account for 70% of typical work and school related travel in Swords.

Between Swords NW and SW nearly 3,000 people walk to work and less than 500 cycle. Of these, very few are travelling beyond Swords. As shown in the charts on the right, the Swords Central sector has the highest proportion of pedestrian trips to work and school. The overall number of trips in this sector are low compared to the other sectors: it generates only 6% of all from-home to work or school trips in Swords.

In summary, POWSCAR data shows for work and school trips:

- The only major movement with a significant existing Public Transport mode share is from Swords to the City Centre (60% PT)
- The only major movements with a significant active modes share is those trips which stay within Swords (43% Active modes).
- Work trips to the Airport are car dominated, given its proximity to Swords (e.g. 75% of the approx. 2000 trips)
- The share of public transport from the western areas is around 17-20%; nearly all are travelling to the City Centre.
- There is significant potential to increase the level of walking and cycling in Swords, due to the high number of trips that are less than 4km.
- The low PT mode share within Swords could be improved on by providing more frequent services.
- The largest potential gain could come from increasing cycling as it is currently at a very low base.

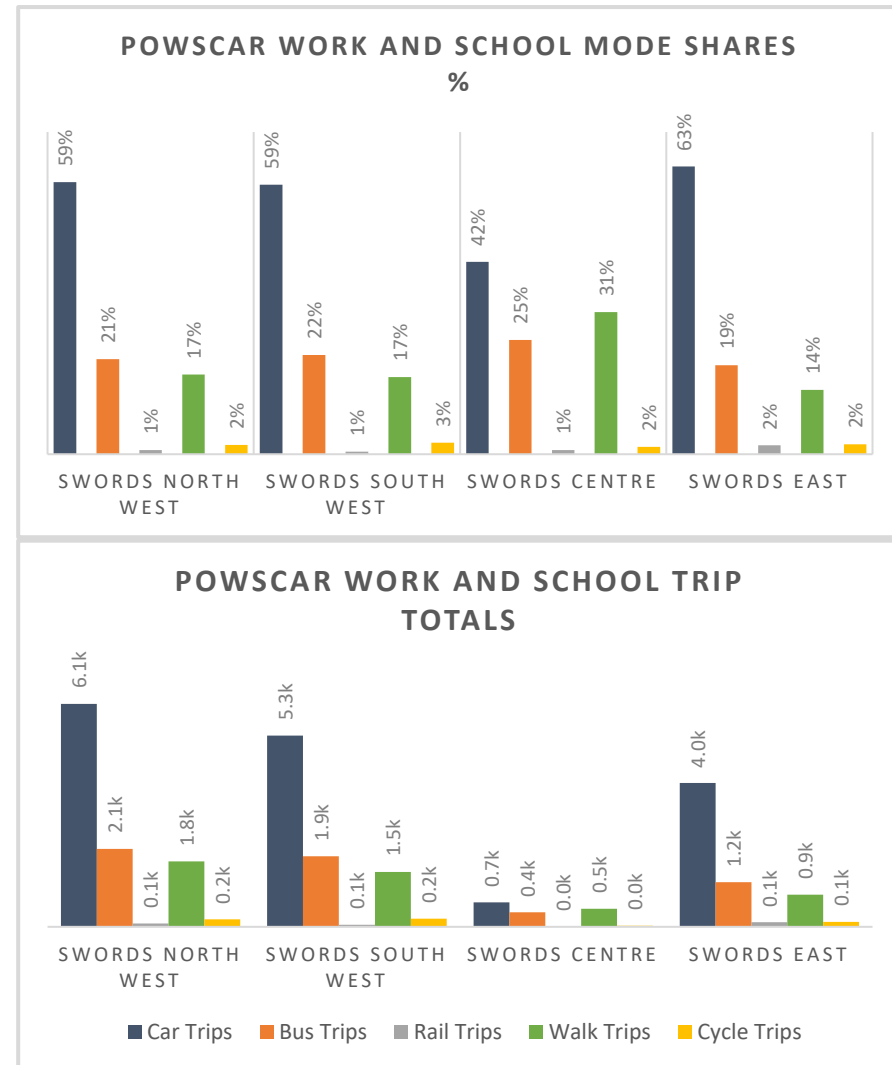


Figure 2.5 POWSCAR Work and School Trip Destinations by Mode



3 Future Swords

3.1 Overview

Swords is designated as a metropolitan consolidation town in the Fingal County Development Plan (FCDP) and is recognised in the National Planning Framework as a growth area of metropolitan Dublin. Planning policy in Fingal remains one of consolidation within the Metropolitan Area, that is, Swords and Baldoyle / Belcamp. The FCDP’s settlement strategy is one of consolidation and integration of land-use and transportation.

In keeping with a recognised need to integrate land use and transport, most long term growth in Swords is planned to occur along the alignment of MetroLink, in the Metro Economic Corridor Zones. In the short term Swords growth is largely directed to its western fringes, in the currently developing Oldtown-Mooretown and Rathingle areas.

The yet-to-be-developed infill sites along the R132 / future MetroLink corridor include Crowcastle/Barrysparks, Fosterstown, in the extensive areas to the north around the Broad Meadow River, near the R132 and M1 (e.g. Balheary, Lissenhall, Lissenhall West), and potentially within sites such as the existing North Dublin corporate business park. The level of achievable and sustainable growth within these areas is to be examined by this study, including a potential 100k Swords population future scenario.

To ensure continuity of supply of zoned residential land, the FCDP 2017-2023 provides for enough residentially zoned land for nine years from the start of the plan. The latest FCDP provides for an additional 8,828 residential units in the town by 2026, which could accommodate nearly 24,000 people. With Lissenhall lands included the FCDP allows for 15,828 units, or approximately an additional 43,250 people. This level of addition housing would provide much of what is required to achieve the target 100,000 population in The Strategic Vision for Swords (i.e. Swords Emerging City). The locations of the units, however, remains subject to further assessment and is to be informed in outline by this study.

The delivery of MetroLink is identified within a number of land-use and transport policy and objectives within the FCDP, including specifically Section 1.6, Strategic Policy, where it states that the Development Plan will “seek the development of a high quality public transport system throughout the County and linking to adjoining counties, including the development of the indicative route for New Metro North and Light Rail Corridor, improvements to railway infrastructure including the DART Expansion Programme, Quality Bus Corridors (QBCs) and Bus Rapid Transit (BRT) systems, together with enhanced facilities for walking and cycling considered a key”.

At the time of writing, both MetroLink and Bus Connects are undergoing public consultation. Bus Connects supersedes the BRT and QBC schemes noted in the FCDP. MetroLink supersedes Metro North and Light Rail Corridor.

The FCDP also identified further transport network improvements which would be required, in addition to MetroLink, to enable the sustainable growth Swords in line with the projected growth forecast; these include:

- Implementing the GDA Cycle Network Strategy
- High quality bus to connect outer areas (with specific mention of Oldtown & Mooretown) to MetroLink and to the Town Centre.
- The Swords Western Relief Road and the Western Distributor Road (incl. the Ward River Valley crossing) to enable the full development of Swords Strategic Vision.
- Improvements to the pedestrian and cycle networks such as “green-way” routes through parkland setting/corridors, and “Bike & Ride” to MetroLink, are mentioned.
- The potential for bus priority and enhancements to the pedestrian environment on Main Street is highlighted.

The next section reviews the key LAPs and developing areas of Swords. These plans were used to developing the future scenarios in Swords for input to the transport modelling.



3.2 Committed Development

3.2.1 Oldtown -Mooretown

The Oldtown-Mooretown LAP area comprises approximately 111.4 hectares and is located at the western edge of Swords, with the recent Masterplans for the areas shown superimposed over the current greenfield areas in the figure to the right.

The LAP lands are two distinct areas, with the lands to the north of the Rathbeale Road known as Oldtown (c. 50.4 ha) and to the south known as Mooretown (c. 61 ha). A street runs between the two areas crossing the Rathbeale road approximately 2.5 km to the east of the town centre. This street is often termed as the Western Distributor Link Road, although it is predominantly a local access route.

To the west is open countryside, Ashbourne being the nearest large settlement in this direction, approximately 10 km away. The Broadmeadow River is located north of the Oldtown lands, beyond the LAP boundary.

It is estimated that the LAP will facilitate approximately 3,400 residential units (1,600 at Oldtown and 1,800 at Mooretown), equating to an approximate new population of around 10,000 inhabitants in Swords North West. This population will be supported by a range of community services, open space and physical infrastructure, which will be developed in tandem with the growth of the area.

3.2.2 Rathingle

The LAP area comprises 6 hectares (14.8 acres gross) of undeveloped, residentially zoned lands, located at the western development boundary of Swords, directly adjoining the existing residential development at Ridgewood. The LAP lands are located to the south west of Swords town centre, accessed off Forest Road via Ridgewood. The LAP proposes the development of circa 170-190 new homes comprising 2, 3, & 4 bedrooomed dwelling units, resulting in an additional population of circa 550. Access is proposed from the existing Ridgewood development at Ridgewood Avenue and Cedar Park.

3.2.3 Streamstown

The Streamstown development area is situated between the R107 Malahide / Dublin Road and the Feltrim Road, at the southern edge of Malahide. The total site area is approx. 25.4 hectares and its LAP provides for a gross density of 10 units per hectare, providing 179 family homes. Junctions improvements are planned at the eastern and western ends of Streamstown Lane.

3.3 Local Area Plans

The following LAPs were adopted in the 2010-2016 FCDP but are now expired. Fosterstown and Barrysparks are currently being re-evaluated as Masterplans in a process that will have regard to the outcomes of the present study.

3.3.1 Fosterstown (2010 LAP)

The lands are bound by the R132 to the east and the Forrest Road to the west. The MetroLink Fosterstown stop will be located opposite the subject lands on the east side of the R132. The LAP lands are located within circa. 400 metres of stop [circa 4-5 minutes' walk]. Access to the metro stop from the LAP lands will be via a proposed pedestrian bridge over the R132. The LAP provided for a predominantly medium to high density residential area of around 900-1000 units at 80-90 units per hectare. It states that not less than 45% of the units were to be 3 bed.

An east- west distributor road [The Fosterstown Link Road] through the northern section of the site connecting the Forrest Road and the R 132 and [2] a north-south distributor road through the development lands linking the Forest Road to the R132 are notable additional transport elements.

3.3.2 Barrysparks (2010 LAP)

Barrysparks Local Area Plan (LAP) lands are located contiguous to Swords town centre, east of the R132, and adjoining the planned Metro rail line/'Swords Town Centre' Stop. The development of Barrysparks LAP (approx 10 ha in area) will facilitate Swords' consolidation. Expansion and Consolidation of Swords Town Centre, with connectivity to MetroLink is a guiding principle of the LAP. The quantity of land-uses permitted by the LAP are given in the table below.



Development Type	Minimum Extent	Maximum Extent	% of Development
Retail etc.	35,000 sqm	55,000 sqm	41%
Office	20,000 sqm	30,000 sqm	22%
Residential	45,000 sqm (400 units)	50,000 sqm (500 units)	37%
Total	100,000	135,000	100%

The above land use ranges will be subject to revisions during the present master-planning stages. This study will examine increased residential potential with respect to the ability of a future transport network with Bus Connects and MetroLink.

3.3.3 Lissenhall (Future LAP)

In anticipation of the development of MetroLink, a strategic land bank providing for the development of a sustainable, vibrant, attractive and well-connected mixed use urban district on the northern side of Swords has been identified at Lissenhall. These lands would be the subject of an approved Local Area Plan and be developed over the period of several Development Plans i.e. over the next 20 – 25 years. It is anticipated Lissenhall could accommodate up to 7,000 units.

3.3.4 Rowlestown (Rural Village)

Rowlestown Village is a rural village in the Metropolitan Area of the north county on the R125, a busy regional road linking Swords to Ashbourne. This LAP proposes a more modest increase in residential development in the village of circa 150 units.

3.3.5 Rivermeade (Rural Village)

Rivermeade is located 7 km to the west of Swords, approx. 3 km north of St. Margaret's and approx. 8 Km north of Finglas. The LAP lands are approximately 41 hectares [101 acres] in area. The proposed Swords Western Ring Road traverses the south east edge of the area. The potential for approximately 139 new units is indicated in the LAP, increasing the total number of dwellings in Rivermeade to circa.314 units (c.1000 population) over time.



3.4 Transport Plans

This section presents the key schemes and transport plans awaiting implementation and/or further evaluation in Swords. The NTA GDA Strategy 2035 will have a major effect on Swords within the next decade, with the flagship infrastructural projects Bus Connects / Core Bus Corridors and MetroLink planned for full implementation by 2027. The FCDP also proposes several small to large scale road schemes in the area.

3.4.1 NTA Greater Dublin Area Transport Strategy 2035

3.4.1.1 GDA Cycle Network Plan

The GDA Cycle Network Plan identifies urban and inter-urban networks in accordance with The National Cycle Policy Framework (NCPF). The plan sets out a range of actions required to develop a strong cycling culture in Ireland to the extent that, by 2020, 10% of all journeys will be by bike. It forms a key part of the NTA’s integrated strategy to deliver sustainable transport infrastructure throughout the GDA. The target in the Dublin City and Suburban areas is an increase in the overall cycling mode share (for all purposes and distances) from approximately 3% to 10% over the 10-year horizon of the plan (from 2014).

In Swords, an extensive network of primary routes is identified in the Cycle Plan. The 2a route is a primary GDA route connecting Swords to the Airport and the City Centre. The plan proposes a fully connected network of A/A+ Quality of Service routes throughout Swords, which would generally consist of a two-abreast lane per direction that is 2 to 2.5m wide with minimal conflicts along the route. The primary cycle routes designated at SW and are coloured orange in the image on the right.

This report examines which sections should be prioritised for implementation based on where main development is anticipated and where the greatest benefits could be expected. The key routes/schemes of the plan are shown in Figure 3.1

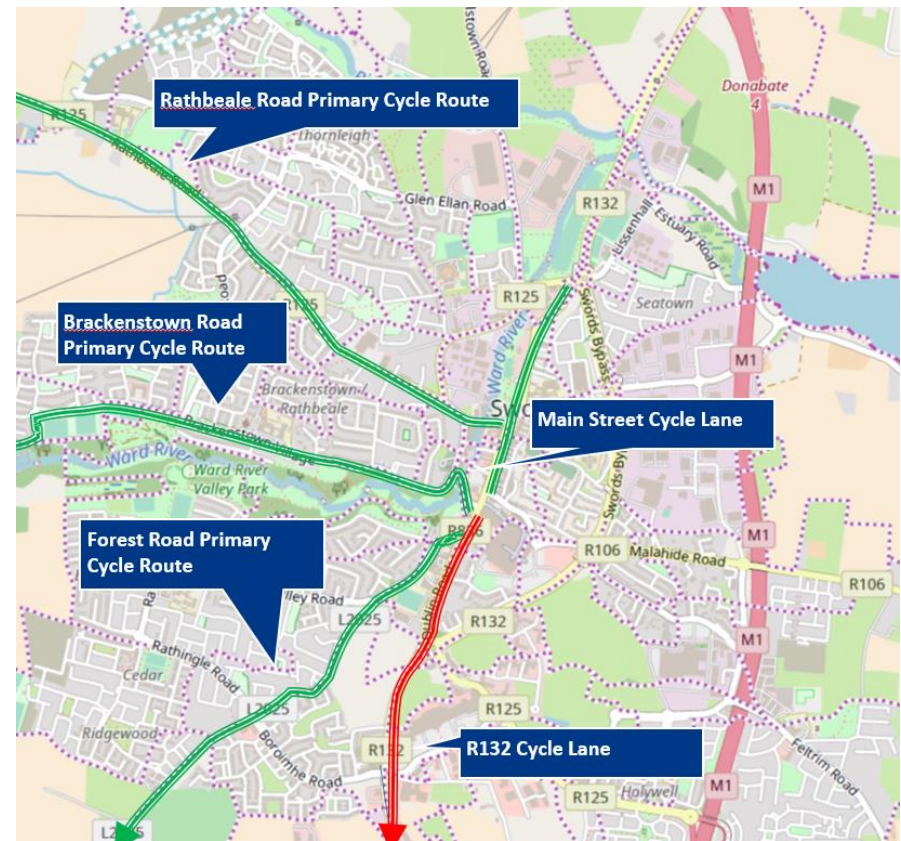


Figure 3.1 GDA Cycle Network Plan in Swords (Key Routes)

3.4.1.2 MetroLink

The objective of MetroLink is “to provide a safe, high frequency, high capacity, fast, efficient and sustainable public transport light rail service connecting Swords, Dublin Airport and Dublin City Centre.” FCC have provided a dedicated Metro Economic Corridor (ME) zoning along the anticipated route of MetroLink, with the intent of facilitating opportunities for high density mixed use employment, commercial and residential development.

The FCDP vision for the Metro Economic Corridor is to “provide for an area of compact, high intensity/density, employment generating activity with associated commercial and residential development which focuses on the Metro.” and “form sustainable districts which possess a high degree of connectivity and accessibility”.

The ME zoning includes the strategic land bank at Lissenhall and several Masterplans for ME zoned lands located at Estuary West, Estuary Central and Estuary East, Northwood, Seatown North and Seatown South and Watery Lane.

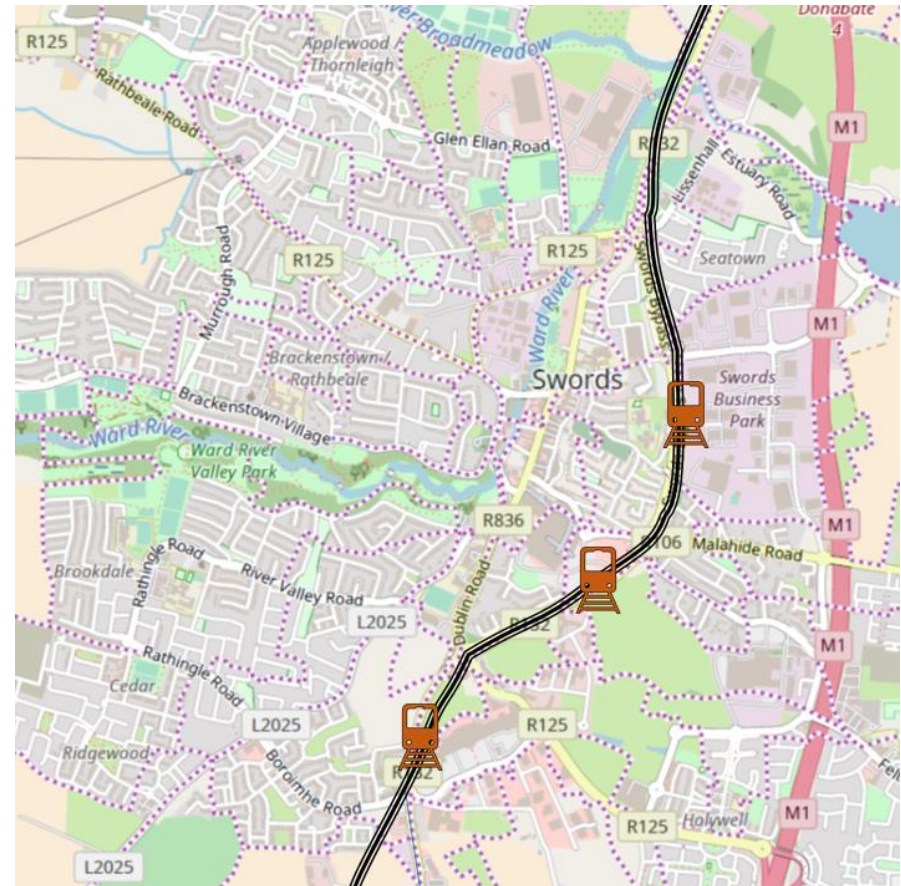


Figure 3.2 MetroLink Preferred Alignment in Swords

3.4.1.3 Dublin Area Bus Network Redesign

Bus Connects is a public transport improvement programme that aims to overhaul the national urban bus systems. The Dublin Area Bus Network Redesign document has been recently published for public consultation, with the proposed new routes as shown below in Swords.

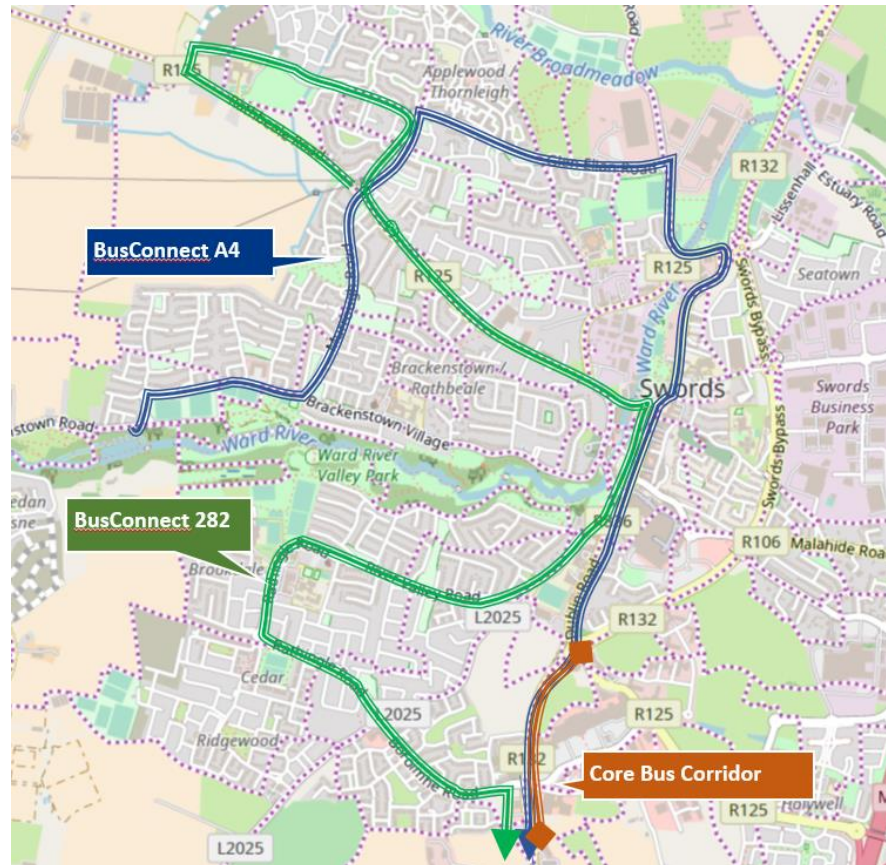


Figure 3.3 Bus Connects Proposed High Frequency Bus Services

The A4, shown in the image, is one of four “A” routes that would converge into the new corridor around Whitehall, with the A4 joining the A2 near the Airport. The A4 and the 282 are proposed as high frequency all-day services running every 10-15 minutes. The table below details the other lower frequency services as proposed, but not shown in the figure.

Table 2 Bus Connects Proposed Services and Headways Swords

Service	Headway	Weekly Midday Hourly Frequency (max)
A4	10-15	5
60	30	2
280	40	2
281	20-25	3
282	10-15	5
285	30	2

In total, up to 5 services converge on Main Street between Bridget Street and Church Street. An improved level of bus priority will be needed on Main Street, Glen Ellan Road, and Rathbeale Road, to provide reliable services at the intended frequencies. In addition to the service redesign, a series of “next generation” Core Bus Corridors are proposed on the key Dublin radials, providing high quality contiguous bus lanes, segregated cycle lanes, and high quality bus shelters.

Currently, the A Spine Core Bus Corridor is proposed to run from Pinnock Hill roundabout to the city along the R132 and N1; however, the need to provide similar levels of priority for bus and cycle north of Pinnock Hill does not diminish given the requirements for high frequency reliable services through Swords North and Main Streets. Therefore, it will be necessary to advance Bus Priority scheme through Main Street. Such a scheme could provide significant benefits in advance of Bus Connects and would enable Swords to capitalise fully on Bus Connects as it is delivered. **It is important to note that implementation of proposed Bus Connects services is independent of the main CBC infrastructure and may precede its development.**



3.4.2 Fingal County Development Plan Road Schemes

In addition to aiding the NTA and TII in implementing their transport strategies, plans, and policies in Fingal, it is an objective of Fingal Council to provide the road infrastructure required for the sustainable economic development of the County. The following road schemes in Swords are listed in the CDP:

Table 3 FCDP Road Schemes

Potential Scheme	Future	Description	Scope of Study
Swords Western Relief Road		See detailed description below	Not committed; subject to assessment
Swords Western Distributor Road		See detailed description below	Not committed; subject to assessment
R125 Rathbeale Road Improvements		1km upgrade between new Swords Western Distributor Road and Murrough Road	Committed Scheme
Inner Ward River Crossing			Not committed; subject to assessment
Swords-Brackenstown Link			Committed Scheme
Completion of Airside to Feltrim Road Link			Committed Scheme; no assessment required
Fosterstown Link			Not committed; subject to assessment

The FCDP states that all schemes will subject to assessment against the criteria set out in Section 5.8.3 of the NTA Transport Strategy for the GDA; which states:

- That there will be no significant increase in road capacity for private vehicles on radial roads inside the M50 motorway;
- That each proposed road scheme is consistent with this Strategy and with Government policies related to transport;
- That the travel demand or the development needs giving rise to the road proposal are in accordance with regional and national policies related to land use and development planning;
- That the development of the road scheme does not diminish in any significant way the expected beneficial outcomes of the Strategy;
- That the road scheme, other than a motorway or an express road proposal, will be designed to provide safe and appropriate arrangements to facilitate walking, cycling and public transport provision; and
- That alternative solutions, such as public transport provision, traffic management or demand management measures, cannot effectively and satisfactorily address the circumstances prompting the road proposal or are not applicable or appropriate.

Following from the table (left), the SWDR and SWRR schemes are described below, including how and why they are to be assessed by this study.

3.4.2.1 Swords Western Distributor Road (SWDR)

The SWDR is local street within the developing Oldtown and Mooretown areas, providing access to the Rathbeale Road from the lands to its north and south respectively. In Oldtown there is active frontage on the SWDR, which serves as a main street for the development, and provides access to the Glenn Ellan Road. In Mooretown the SWDR alignment is a tree lined 2 lane local access road with a 2-way cycle track and forms the western edge of the new area.

The SWDR Extension is a continuation of this alignment to the south, with a connection to the Brackenstown Road.

The Oldtown Mooretown LAPs note the following about the SWDR:

- The Swords Western Distributor Road will form a spine for access to both Oldtown and Mooretown.



- Existing routes which will interface with the SWDR are Rathbeale Road and Glen Ellan Road Extension, both of which will be redesigned to slow movement of traffic to protect the amenity and safety of pedestrians and cyclists in the new urban areas.
- The Swords Western Distributor Road will form the western boundary of development at Mooretown and will be internal to Oldtown.
- The road shall also comprise a safe and attractive pedestrian/cyclist green corridor to facilitate access to the Ward River Valley Park, thereby ensuring connectivity to the wider green network of open spaces.
- Swords Western Distributor Road could also act as a relief road to improve the local road network for Swords and as a distributor road for the Oldtown-Mooretown lands. The SWDR may facilitate north-south connectivity to the west of the town, thereby removing traffic from Main Street, R132 and M1.

This study will assess the SWDR with respect to the final point, that is, whether it will facilitate north-south connectivity to the west of the town and reduce traffic on Main Street and key north-south routes to the east.

3.4.2.2 *The Swords Western Relief Road (SWRR)*

The SWRR is an objective of the current Fingal development Plan and of the ‘Your Swords, An Emerging City, and Strategic Vision 2035’. The SWRR is proposed to connect the R132 north of the M1 Lissenhall junction and proceeds for 8 to 9km through rural Fingal to the N2 north of the M50 (via the Airport Box). An outline design incorporated seven interchanges along its length connecting to the R132, M1, Newtown, Rathbeale, Naul Road, the R122 and the N2. The scheme was proposed to improve north-south movement to the west of Swords, and provide a bypass of the town to the N2, M50 and other national primary roads.

The Emerging City document states the new road could:

- remove significant volumes of traffic from the Swords Town Centre area, as well as serving strategic traffic between the M1 and M2/M50 corridors.
- act as a bypass of Swords at a strategic level
- provide a more direct and efficient route from the M1 to the proposed Dublin Airport Box (new road network).

- serve the proposed strategic park and ride, minimizing the amount of traffic utilizing limited carrying capacity on the existing and proposed local road network in Swords.
- greatly enhance traffic mobility within the Town,
- reduce congestion on existing roads in the Town Centre,
- reduce traffic on the M1 [south of the Lissenhall interchange] and on sections of the M50, and
- improve access to Dublin Airport.

This study examines the need for the SWRR against the above objectives, and against the FCDP/NTA objectives in relation to road scheme assessment noted above.

3.4.2.3 *Other Potential Schemes noted in Swords Emerging City / FDCP*

The following schemes are mentioned in the Swords Vision document or the FCDP, and will be examined by this study:

- Inner Ward River Crossing
- **Enhancement of junctions** e.g. Castlegrange Junction; Glen Ellan Road/Balheary Road; Estuary Junction; and R125 Rathbeale Road /Murrough Road
- **Widening Balheary Road** between Glen Ellan Road and the Castlegrange junction and then eastward towards the R132 and M1.
- Upgrading the roundabouts on Glen Ellan Road to cyclist friendly roundabouts.

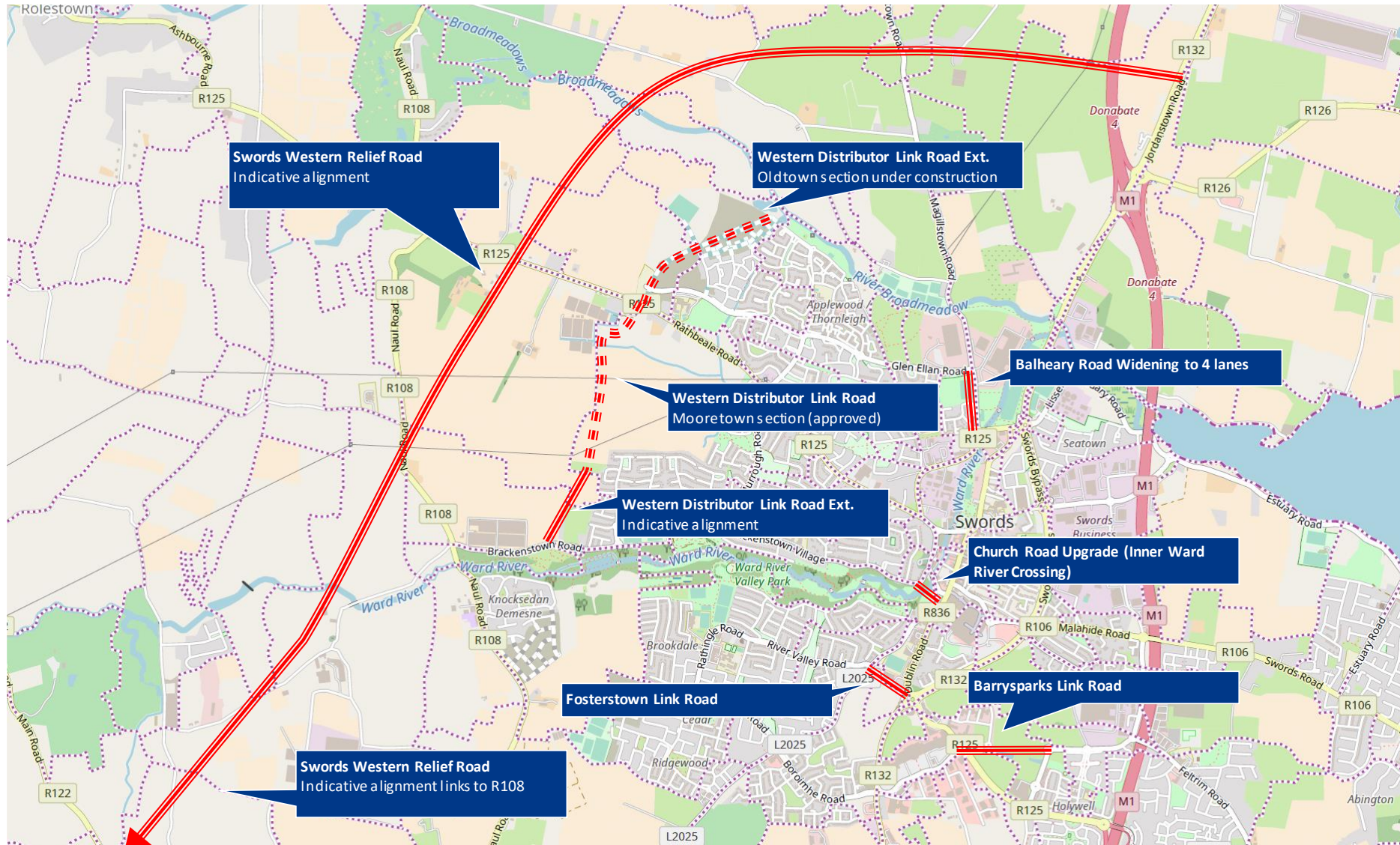


Figure 3.4 Map of Proposed Road Schemes in Swords



3.5 Future Land Use

This section presents the growth assumptions applied in Swords with respect to a 10-year timeframe to 2027, coinciding with the anticipated opening year of MetroLink. Two main scenarios were developed, the first termed “Recognised Development”, which includes development underway or likely, and the second “Metro Intensification”, which includes increased levels of development along MetroLink, in line with policy on land use and transport integration.

3.5.1 Recognised Development

Within the Recognised Development scenario growth was derived from the following sources:

- as envisaged in the relevant 2010 LAPs;
- development with planning permissions or currently underway; and
- areas identified by Fingal County Council where near-term potential exists for infill development.

The table on the right presents the numbers of units assumed in each growth area. An average household occupancy of 2.75 occupants per unit has been assumed throughout this study.

Based on the assumptions around the number of units and the household occupancy, the population in Swords under the Recognised Development scenario is 60k, an increase of 17k above its Census 2016 population.

Table 4 Swords Recognised Development (Housing Units)

Site	Units allowed by LAP	Units assumed in 2027 Baseline	Comment
Oldtown	1,600	1,200	Approved / underway
Mooretown	1,800	1,800	Approved
Rathingle	200	200	Underway
Swords Business Park	850	850	Assumed mixed-use infill development
Streamstown	200	200	Underway; total is included in Malahide/Portmarnock subarea
Fosterstown	1,000	1,000	LAP Expired. Revisions possible. Masterplan in progress.
Barrysparks (Swords Central)	500	500	LAP Expired. Revisions possible. Masterplan in progress.
Non LAP - Drinan	n/a	300	
Non LAP – Swords Centre	n/a	250	
Rowlestown	0	0	Not in study scope.
Rivermeade	0	0	Not in study scope.
Lissenhall	0	0	LAP to be developed.
Total		6,300	



Under the Recognised Development scenario, the north-western neighbourhoods increase from 17,000 to a total population of around 25,500. This increase is mainly driven by the new neighbourhoods of Oldtown and Mooretown, comprising about 3,000 units with an approximate residential population of over 8,000 people. The south-western part of Swords with an existing population of about 13,500 people increases to around 16,500 principally driven by development of around 1,100 units in Rathingle and Fosterstown. Swords East is also assumed to grow substantially. In this sector the Business Park is assumed to grow through infill development amounting to a total of 850 units and Drinan is by an additional 300 units. Barrysparks is the only growth area in Swords East with an LAP associated, albeit expired. Together, these areas in Swords East are assumed to accommodate 1,650 or up to 5,000 additional inhabitants. In Swords Centre, a modest 250 additional units are assumed as infill; a greater level of residential development in this part of Swords in the Metro Intensification scenario.

3.5.2 MetroLink Intensification (Swords 75k)

Further scenarios are examined later in which population growth is intensified along the MetroLink corridor, increasing the Swords population to 75k by developing the Lissenhall site and concentrating development in higher densities in Barrysparks, Fosterstown, and others. The chart below shows the growth scenarios by the sector in which where the development occurs, with the 2 scenarios totalling 60k and 75k.

In the context of the recently National Planning Framework 2040 (NPF) this level of urban expansion in the designated cities can occur in their metropolitan areas if the growth is achieved through infill or sustainable urban extension. The future development of Swords and Fingal, in the context of MetroLink and proximity to Dublin Airport, is supported by the NPF as an area where higher levels of growth can be accommodated.

This study examines where future challenges occur under high growth assumptions. In the context of NPF objectives to develop along public transport corridors such as future Metro, the Metro Intensification scenario specifically examine for issues that may arise with high growth in residential development along MetroLink.

The maps below show the distribution of population and employment for the 3 main scenarios.

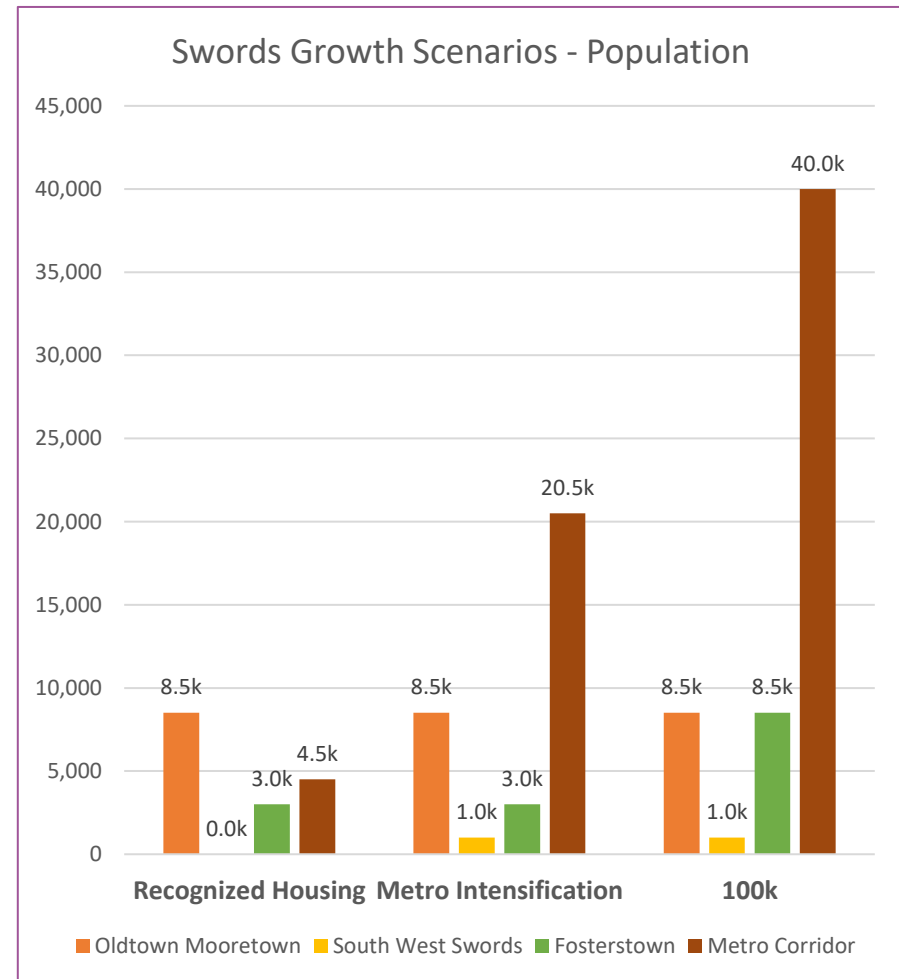


Figure 3.5 Swords Population Projections (2 Scenarios)



Table 5 Swords Growth Scenarios – Housing Units

Site	Units allowed by most recent LAP	Recognised Development Units	Metro Intensification Units	Comment
Oldtown	1,600	1,200	1,200	
Mooretown	1,800	1,800	1,800	
Rathingle	200	200	200	
Swords Business Park	n/a	850	850	
Streamstown	200	200	200	
Fosterstown	1,000	1,000	1,000	
Barrysparks (Swords Central)	500	500	500	
Non LAP - Drinan	n/a	300	300	
Non LAP – Swords Centre	n/a	250	250	
Lissenhall	n/a	n/a	3,000	
Lissenhall East of R132	n/a	n/a	n/a	
Balheary	n/a	n/a	1,000	
Castlegrange	n/a	n/a	1,000	
Airside Business Park	n/a	n/a	700	
Total		6,300	12,000	



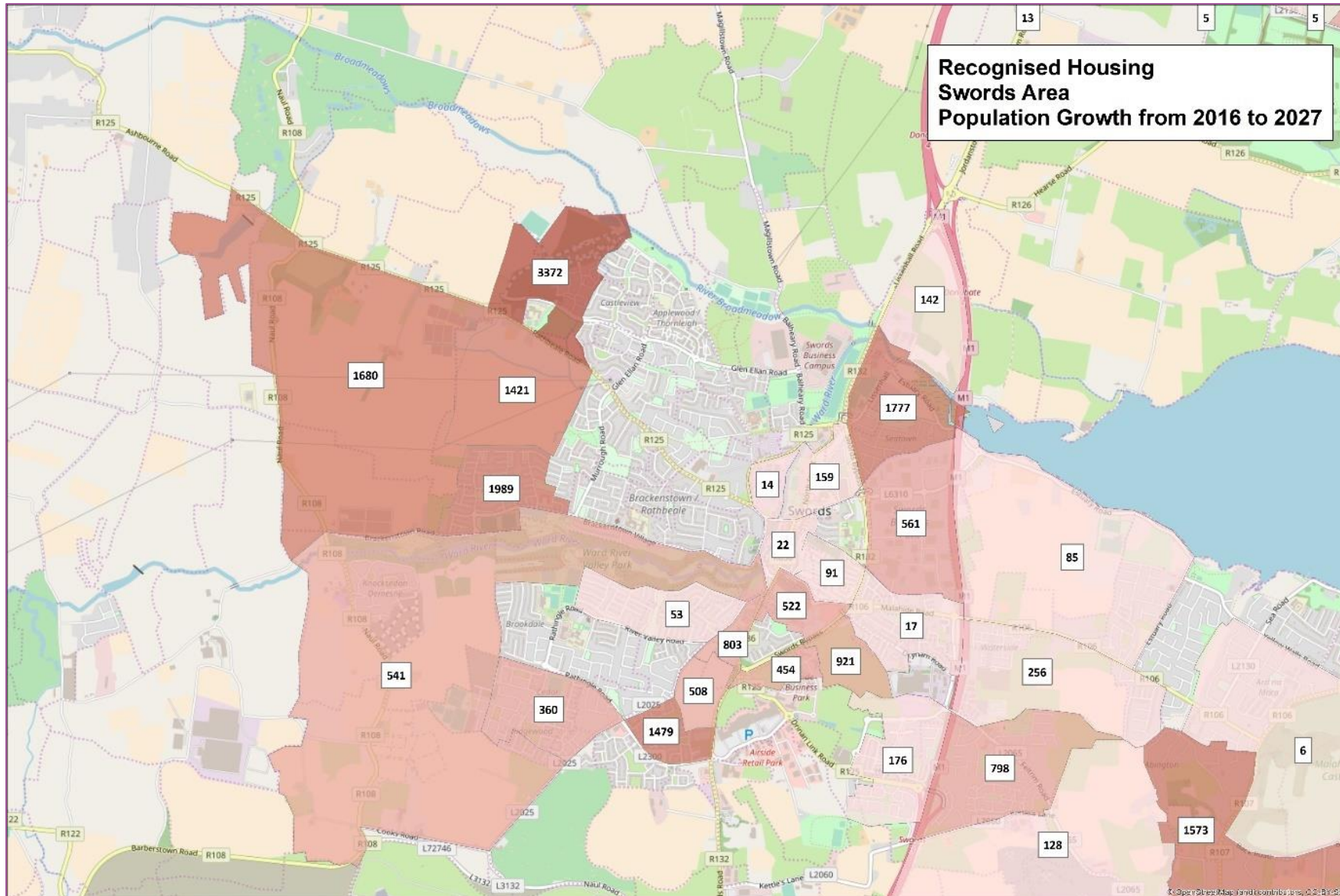


Figure 3.6 Population Growth Map – Recognised Housing



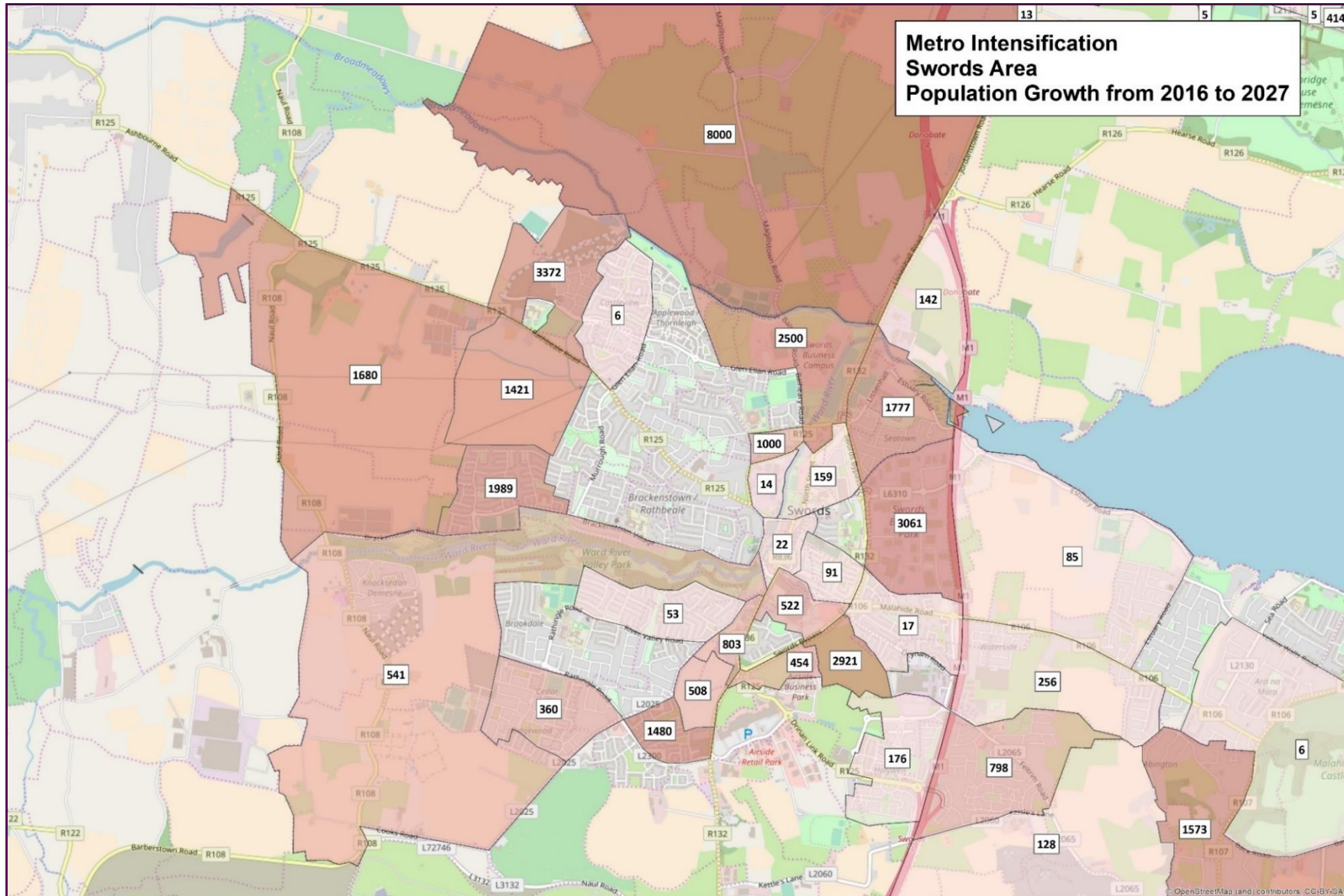


Figure 3.7 Population Growth Map – Metro Intensification



4 Swords Modelling Assessment

4.1 Overview

A key aim of the Fingal South Transport Study is to examine where issues arise in transport network as a result of the assumed population growth. The effects of constrained network capacity and/or over-development of certain areas are thus estimated using transport modelling of the future scenarios. The East Regional Model takes forecasts of planning data and estimates future levels of trip generation, travel patterns, modes chosen, and routing through the networks.

The study recommends potential solutions—with respect to a range of policy objectives—that provide Fingal County with an evidence base for deciding how its transport networks should evolve to meet the needs of its growing population and economy over the next decade until MetroLink is built (with an estimated opening year of 2027).

Questions pertaining to the immediate future in Swords include:

- Where should development (residential and employment) be located and how should it be phased to best meet sustainability and other objectives?
- What range of bus services are required to service an additional population of 17,000 prior to MetroLink?
- Which cycle routes should be prioritised to best provide access to local services for the existing and new population?

4.2 Assessment Structure

The assessment of the impacts of future development on the transport network in Swords is structured as follows:

1) Trip Generation by Mode

Trips generated by each mode resulting from future development in Swords is discussed first. Trip generation is segmented by mode and sector, so that the effects of the introducing various levels of public transport and/or other schemes can be understood at a general level. Trip generation data is presented in charts below which enable a comparison of the 2016 modelled

data and the 2027 Recognised Housing Scenario, for both the Do-Min network (meaning that no additional transport infrastructure is included in the model), and the NTA GDA Strategy without Metro (i.e. Bus based improvements). **Note that the period examined is from 7am to 10am.**

2) Trip Patterns by Mode

This section expands on the information in (1) with analysis of key destinations of trips from Swords, and the modes used (in terms of Sector-Sector movements). **Note that the period examined is from 7am to 10am.**

3) Network Analysis

Having described the level of trips generated, where they are travelling and by what mode, the network is then assessed in terms of the impact this travel has on its future performance. In Network Assessment, the period examined is the **peak hour 8am to 9am.**

Insights into the impacts of future development on trip generation and travel patterns are provided in the first two sections. The final Network Analysis stage provides recommendations based on the effects of increasing development on the road network, building on the insights in the preceding sections. Later in the report the recommended solutions are assessed through an appropriate objectives framework.

Analysis is presented for the sectors in which the most significant development is expected to occur; that is Swords North West (containing Oldtown / Mooretown) and Swords South West (containing Fosterstown and Rathingle). Swords Centre is combined with East for the purposes of the discussion as the level of residential development (in the Recognised Development scenario) in the Central centre is comparatively small.



4.3 Scenarios Tested

The following table presents the key East Regional Model scenarios undertaken to perform the Swords assessment.

The relevance of each of the above scenarios is explained below.

Do-Min assumes no changes are made to the transport network; this scenario, therefore, represents what could happen on the transport network due to population and employment growth if no improvements were made to accommodate the increased travel;

GDA Strategy assumes the NTA GDA Strategy is implemented with respect to its flagship bus network improvement programme, but without MetroLink or the GDA Cycle Network Plan in Swords.

CDP Roads includes all potential future road schemes in the main strategic model run, on top of the GDA Strategy scenario above.

Scenario Name	DoMin 2016	DoMin 2027	GDA Strategy	GDA Strategy + MetroLink	CDP Roads
Growth / Schemes	No Growth (2016)	Recognised Housing	Recognised Housing	Recognised Housing	Recognised Housing
		Metro Intensification	Metro Intensification	Metro Intensification	Metro Intensification
Bus Connect			✓	✓	✓
Metro Link				✓	✓
CDP Roads					✓

Figure 4.1 Table of Model Scenarios

4.4 Recognised Development Assessment

4.4.1 Population Growth

The table below summaries the growth by sector. The sector system is shown under below. This sector system is used throughout the rest of the report to summarise results for Swords at an appropriate level. Further analysis of the scenario is presented on the following page.

Table 6 Swords Population by Sector (Recognised Development)

Swords Sectors	2016 Population	Population (Units) Increase	2027 'Recognised Development' Baseline Population
Swords South West	13,500	3,000 (1,100 units)	16,500
Swords East	10,000	5,000 (1,800 units)	15,000
Swords North West	17,000	8,500 (3,000 units)	25,500
Swords Centre	2,500	1,000 (350 units)	3,500
Grand Total	43,000	17,000 (6,300)	60,000

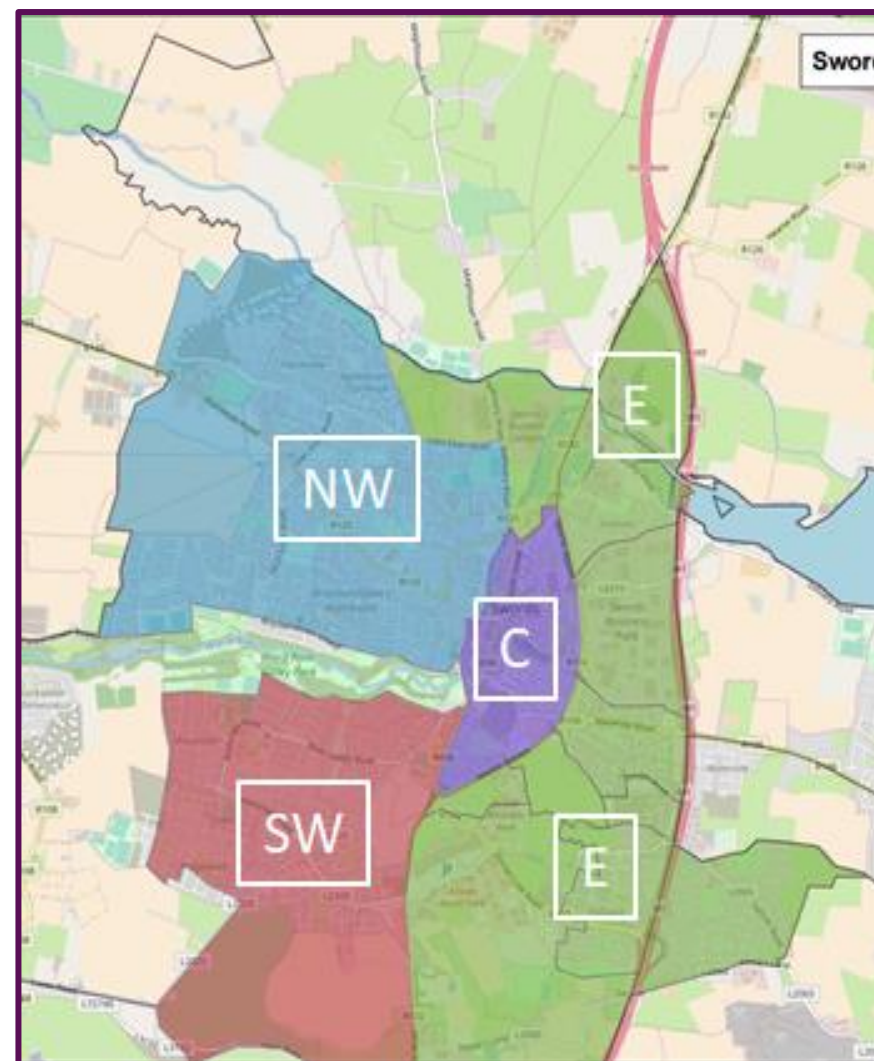


Figure 4.2 Swords Sector System

4.4.2 Trip Generation

This section examines increased trip generation by mode for the Recognised Development forecasts with no intervention (Do-Min) and with GDA Strategy up to 2027 (Bus Connects and Cycle Network Plan but no Metro).

4.4.2.1 Swords North West

This sector is examined first as it contains most of the future growth under the Recognised Development scenario, e.g. in Oldtown and Mooretown.

Between 2016 and 2027 in **Swords North West** total trip making increases from around 11,500 total productions in the morning (7-10am) to nearly 16,000. This is due mainly to population increase in the Oldtown Mooretown development.

The different levels of trip making by mode are shown in the chart below.

For the Do-Min 2027 Network, (e.g. without any network intervention to 2027), the largest increase is in overall car generated, from just under 7,000 trips to over 9,500 in the AM Period. This will result in increased pressures on Glen Ellan Road and Rathbeale road (explained in more detail in the network analysis section).

In the GDA Strategy scenario and with increased bus frequency extended into the key areas, car trips reduce from 9,500 to 8,000 and public transport trip increase from 2,400 to 4,300.

This level of car usage (8,000 AM Period trips), however, remains well above 2016 levels (7,000) despite the large increase in public transport mode share.

Insight 1: Even with substantially enhanced Public Transport, car usage will increase from above today's levels, without further intervention.

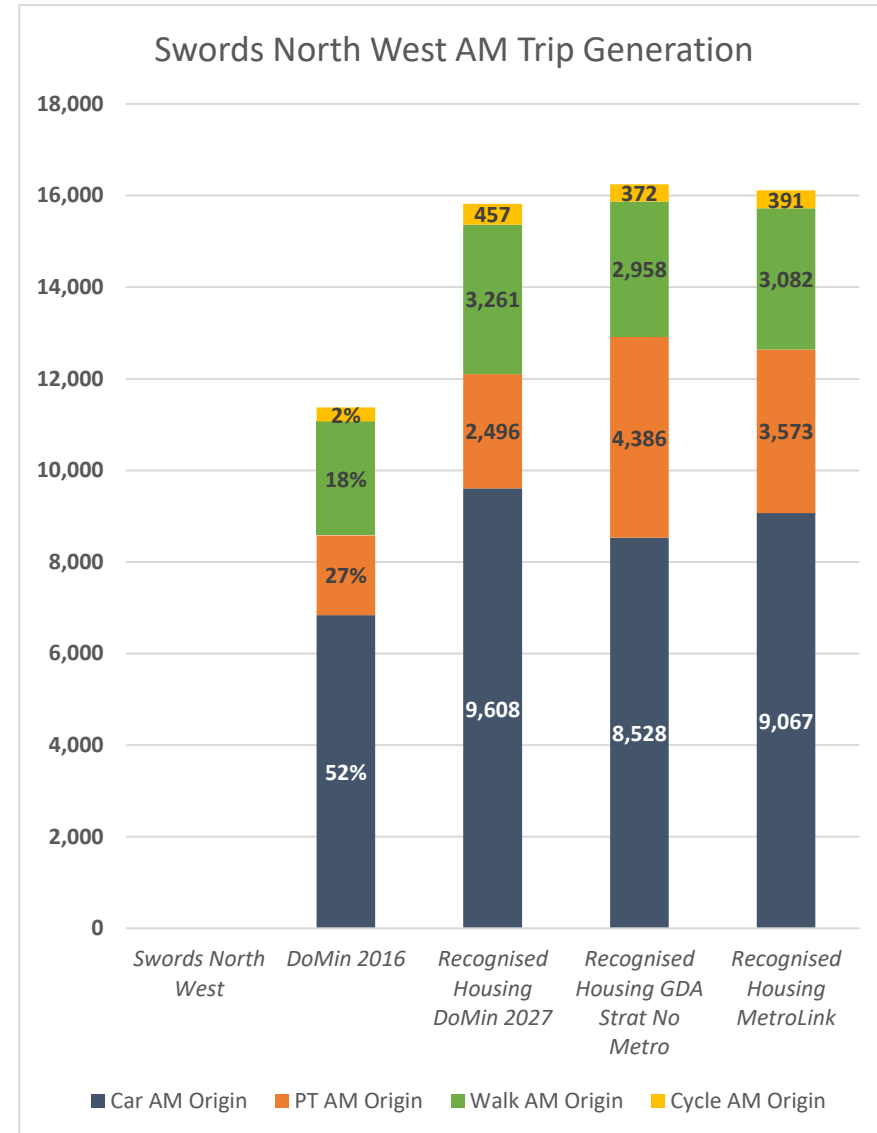


Figure 4.3 Trip Generation by Mode, Swords North West



4.4.2.2 Swords South West

Between 2016 and 2027 trips from **Swords South West** also increase substantially, from over 8,500 trips to 11,000, driven by development in Fosterstown and Rathingle. As shown in the figure on the bottom right, there is a decrease in the proportion of trips by car but in absolute terms, car trips increase slightly from 4,300 to 4,500. Public transport trips increase from 2,300 to 3,300 in the DoMin scenario.

Under the GDA Strategy scenario, trips from Swords South West show a further large increase in public transport use, increasing from 3,300 to 4,150. Walking and cycling increase in line with the increase in trip making, but their share of travel does not increase substantially.

Insight 3: Car trips hold relatively steady in Swords South West. Public transport grows significantly, due to most development (i.e. Fosterstown) being located close to a range of Public Transport service.

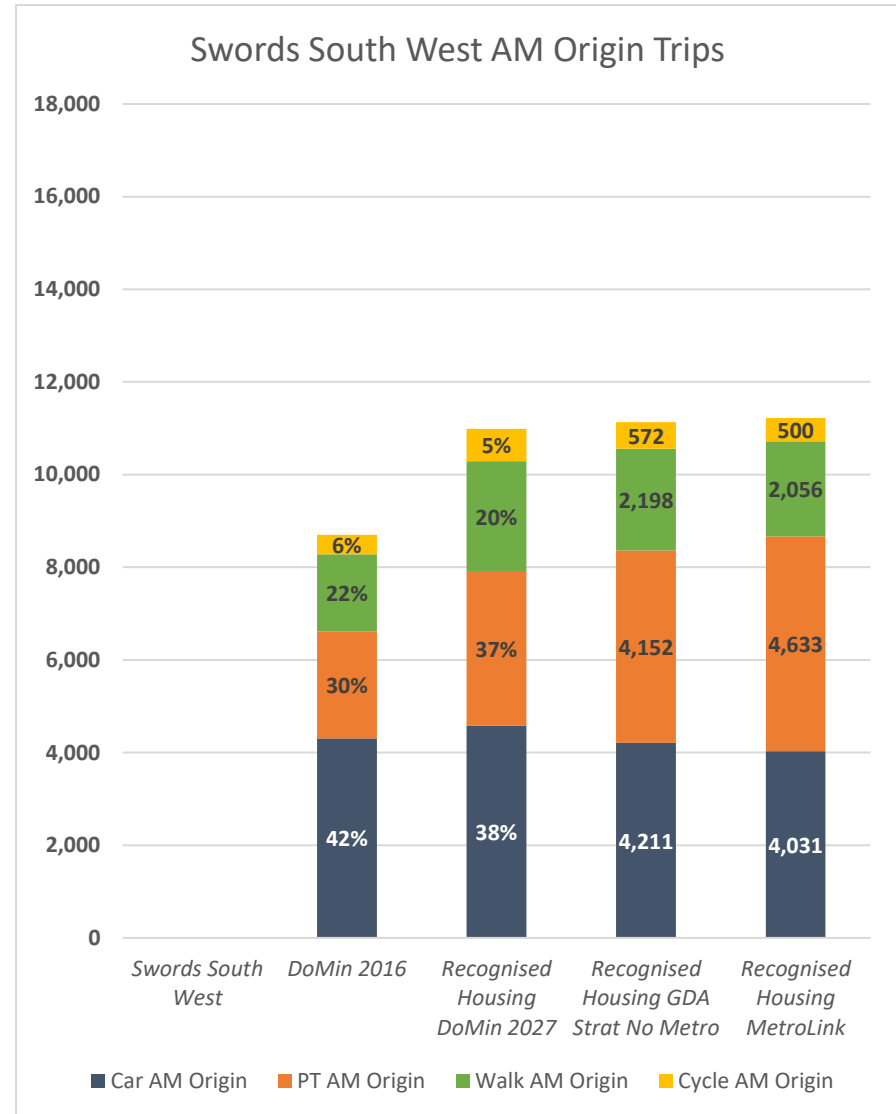


Figure 4.4 Trip Generation by Mode, Swords South West



4.4.2.3 Swords East

Swords East, where 1,800 new units are assumed, has the highest relative growth in trips, an increase of 42% in trip making overall above the 2016 levels. Car trips increase from 4,900 to 6,500, a 32% increase, although the car mode share goes down because public transport and active mode trips increase at a faster rate. Car trips are reduced to 5,800 with bus based improvements in line with the NTA GDA Strategy (when compared with the 2027 Do-Min). Public transport trips grow from 1,100 to 1,700, a 54% increase. Walking and cycling increase in line with the overall level of trip making from 18% to 22%.

With the introduction of the GDA Strategy, the share of public transport grows strongly, from 15% to 26%; in line with this, the share of car trips drop to 55%, although in absolute numbers grows by around 1,000. Therefore, even with significant investment in public transport, some additional car trips should be expected. This area differs from Swords North West, in that there is less scope to improve on this outcome with cycling infrastructure, as local services are highly walkable, and if travelling further, public transport or car are more likely to be the mode of choice.

Insight 5: Development in Swords East has the potential to generate significant additional car trips on the network unless supported by high frequency, high reliability public transport.

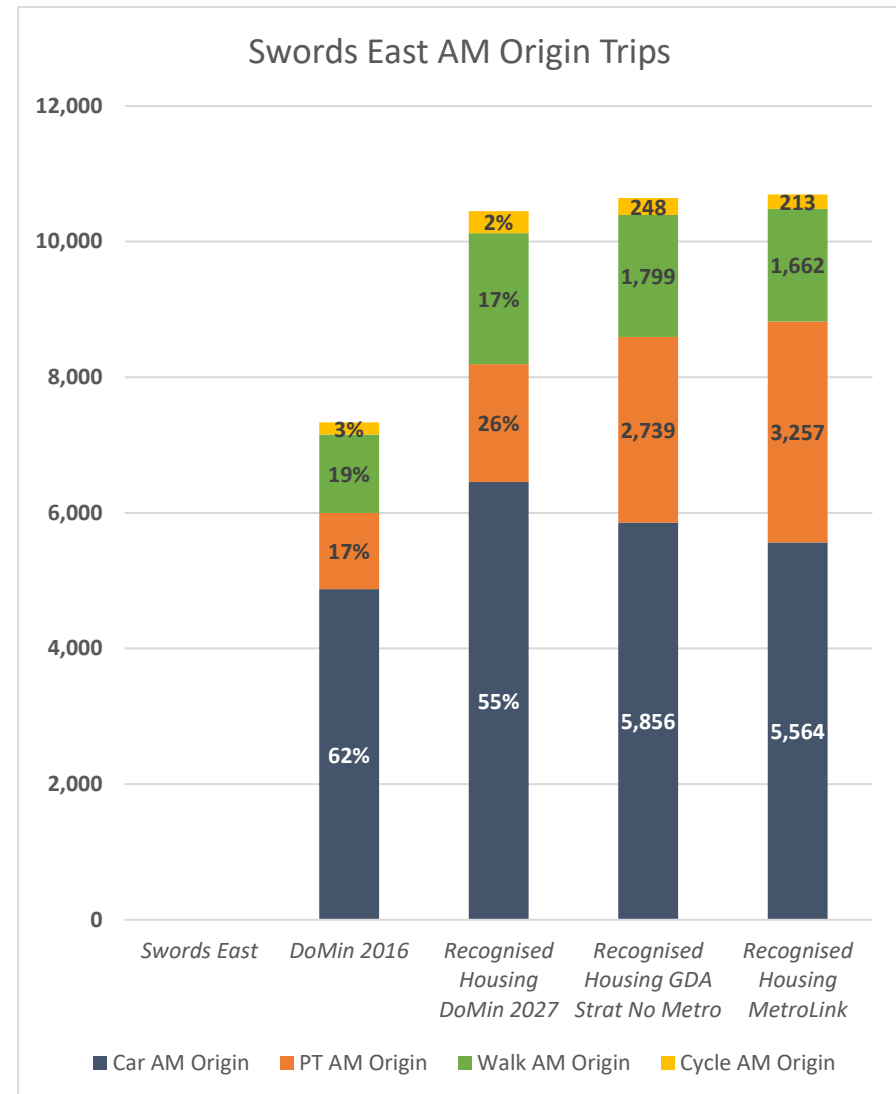


Figure 4.5 Trip Generation by Mode, Swords East



4.4.2.4 Swords Centre

Swords Centre has the lowest level of overall trip productions, as this sector does not include many residential areas. Trips increase from 3,000 to 3,800 in total in the Recognised Development Scenario. Walk mode share is the highest in Swords, due to the mixed nature of the development within the sector. There is a substantial public transport mode share improvement with the introduction of GDA Strategy. In this scenario car mode share decreases, but overall car trips slightly increase. Public transport has the lowest mode share, which is to be expected when many activities can be accessed within walking distance in this sector.

Insight 6: The effect of major residential development in Swords Centre on car trip levels is limited in the Recognised Development scenario, as only an additional 350 units are assumed. The small increase in car trips to 2027 can be offset with bus based improvements. There is scope for substantially increased levels of density within areas with potential for infill development in this zone. This is tested in the Metro Intensification scenario, presented later.

As with previous areas, the share of walking and cycling remains flat, without specific further intervention.

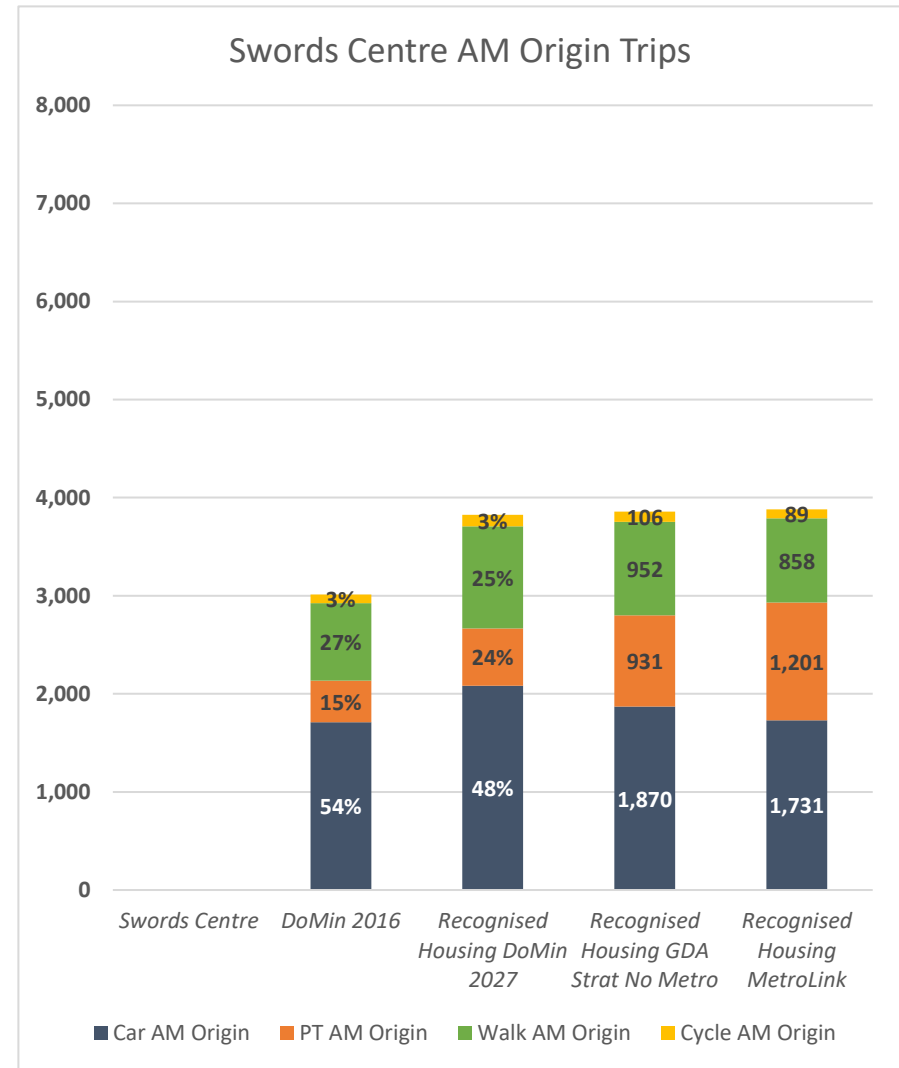


Figure 4.6 Trip Generation by Mode, Swords Centre



4.4.3 Trip Destinations by Mode

4.4.3.1 Overview

This section briefly examines the general patterns of travel by mode within Swords and from Swords to the rest of the modelled area. Model data is presented in 4 separate charts (1 per Swords sector), in Figure 4.7 to Figure 4.10 below. The charts provide a comparison of the Do-Min and GDA Strategy networks in terms of where trips are going to and by what mode, for the Recognised Development lane use scenario.

4.4.3.2 Swords North West

The key trip destinations from the Swords North West sector are shown Figure 4.7. The chart shows that of trips originating from Swords NW, the largest destination is within the same sector, i.e., the trip starts and ends in Swords NW. Within this sector, it is estimated that around 2,500 walk or cycle and nearly 2,000 are by car.

The chart also shows that Public Transport is only chosen by those who are making a longer trip outside Swords. This is shown in the right-most column, representing trips to ‘Rest of Model’. This is all areas other than Swords. Around 2,300 travel outside Swords from this sector by public transport. In the GDA Strategy scenario, with faster, more reliable bus services, this rises to 4,200 for the same population. In the GDA Strategy scenario, there are over 1,000 more (mostly public transport) trips estimated as travelling outside Swords, due to the improved network providing better access to more opportunities, and therefore inducing more long trips.

Insight 2: The high number of short trips highlights the opportunity to reduce the number of car trips internal to the sector.

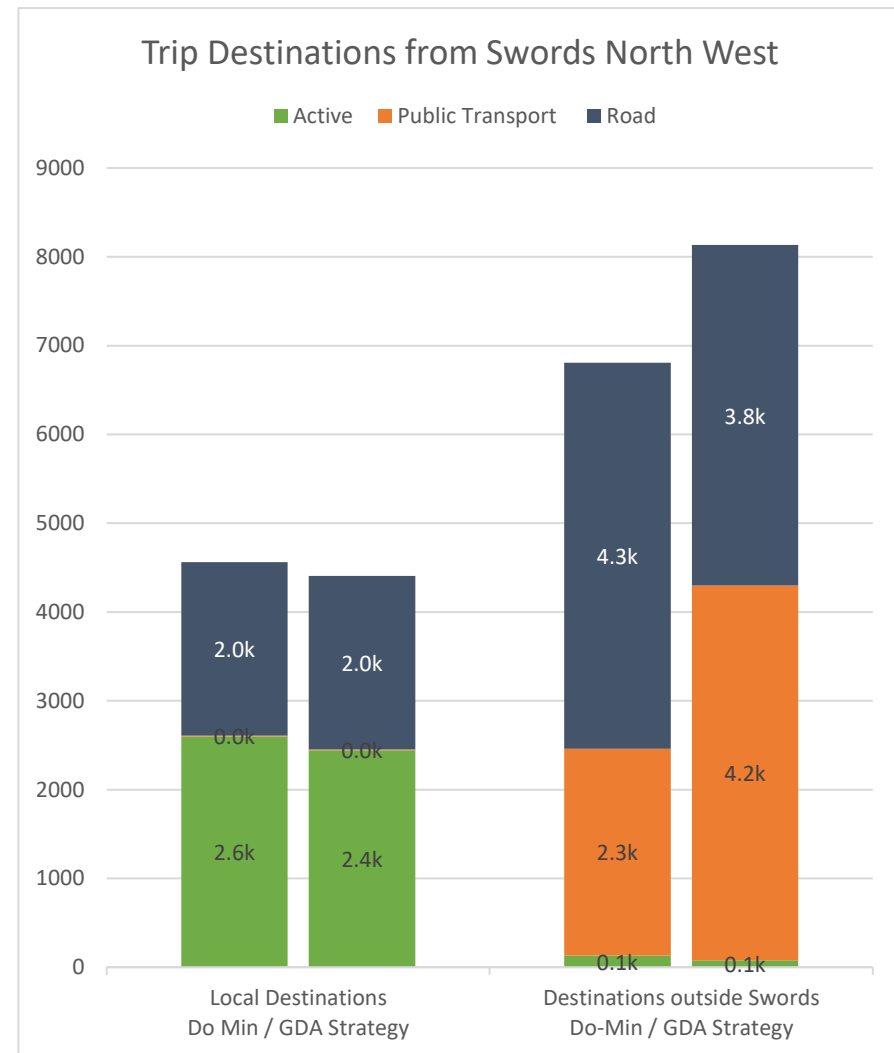


Figure 4.7 Trips Destinations from Swords North West



4.4.3.3 Swords South West

Trip making behaviour within Swords from this sector is affected very little by the GDA Strategy. This is because of the areas already good accessibility to local services. The largest change is in public transport share, and as discussed above, public transport users are almost exclusively destined outside Swords.

Insight 4: Development at Fosterstown does not result in a substantial increase in car trips. If the population wishes to travel locally, they are close to nearby services and commerce opportunities. PT options abound on the adjacent Dublin Road for those travelling to the city centre. The mode share responses in this area support the view that it is one of the more sustainable locations for development in Swords.

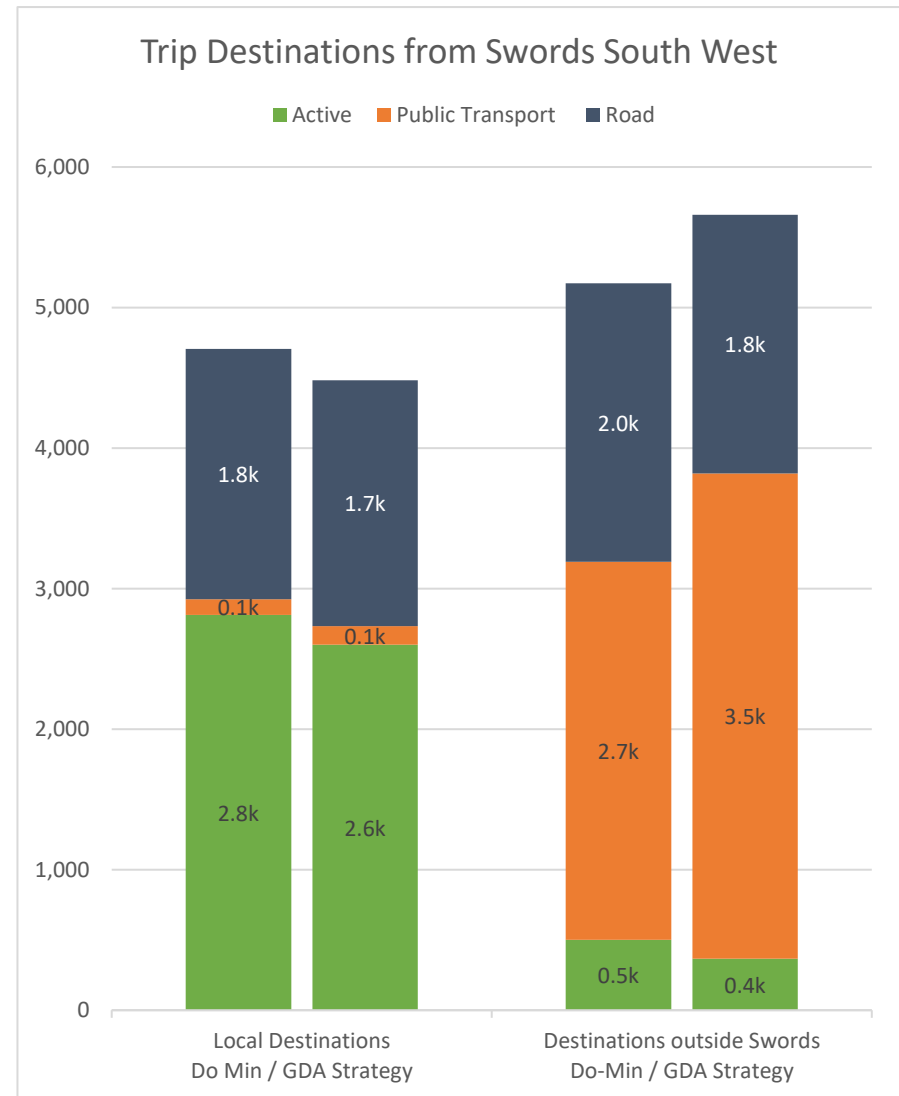


Figure 4.8 Trips Destinations from Swords South West



4.4.3.4 Swords East

As has been seen in other sectors, almost no public transport is used for trips within Swords, even with the GDA Strategy in place. However, there are 1,000 car trips which begin and end in the sector, and a mode share of between 50% and 60%.

Insight 6: The car / non-motorised mode share for short trips is around 50/50. Network topography is very amenable to car based journeys, which will tend to use the R132. Traffic management options should be considered on the R132 to discourage short car trips.

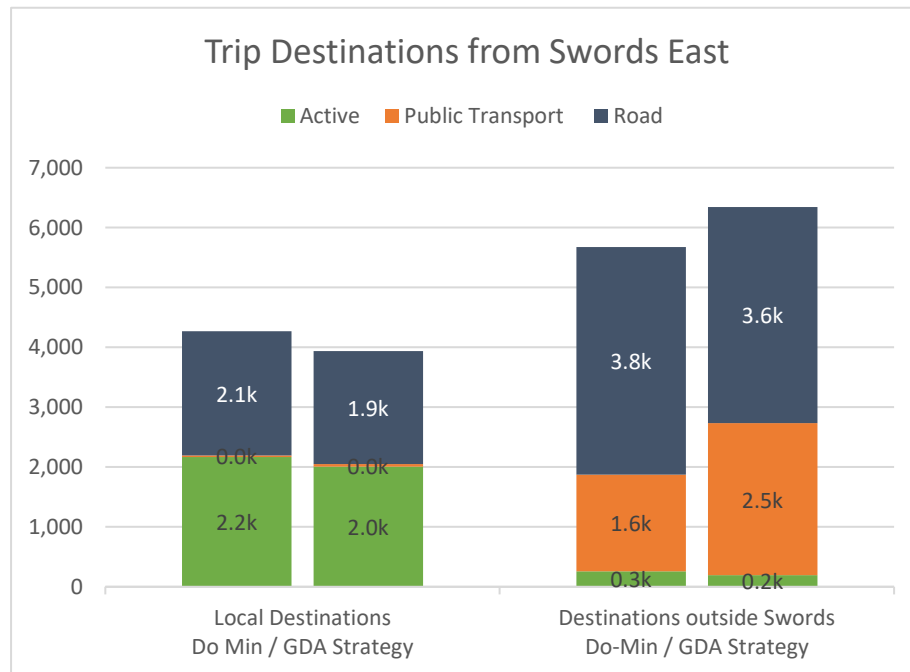


Figure 4.9 Trips Destinations from Swords East

4.4.3.5 Swords Centre

As has been seen in other sectors, almost no public transport is used for trips within Swords, even with the GDA Strategy in place. However, there are 500 car trips which begin and end in the sector, and a mode share of between 45% and 55%.

Insight 7: Swords centre benefits from high levels of active mode trip making for local destinations and from the public transport provided in the GDA Strategy.

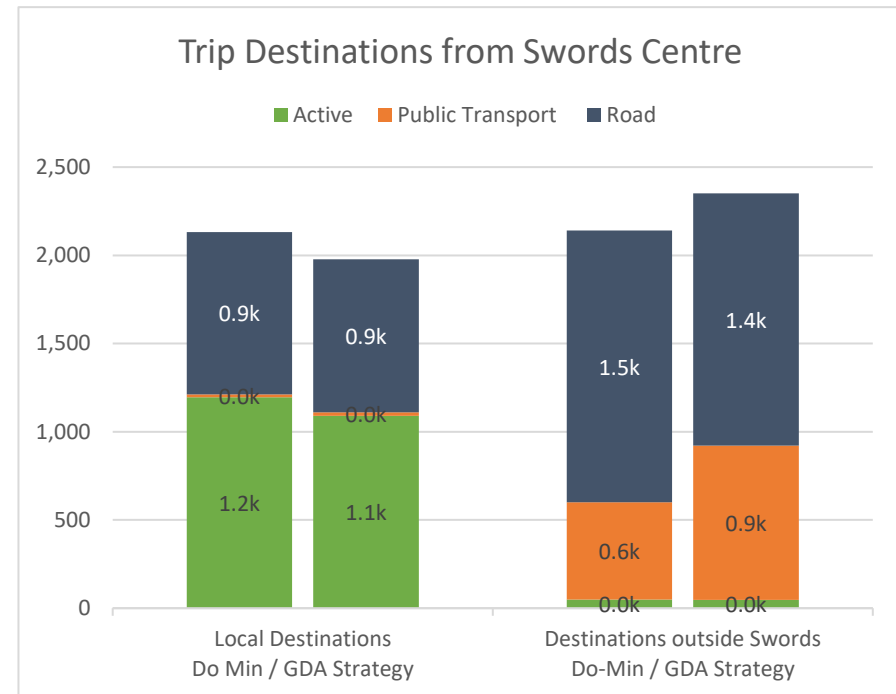


Figure 4.10 Trips Destinations from Swords East



4.4.4 Network Analysis

This section examines impacts on the road network due to the growth in population and employment under the Recognised Development scenario. Network analysis is performed generally by comparing the difference between one network and another for a certain measure, such as flows or delays. These measures can be shown as increases / decreases on the links and at junctions, in one network relative to the other, usually the Do-Min vs Scenario.

The analysis in this section is a synthesis of the various “Studies” present in the Appendix and of the insights developed in the previous section. Each Study presented is a self-contained analysis of the network in terms of changing delays / traffic volumes / volume/capacity ratios etc. Each includes an image of the network relevant outputs from the modelling software SATURN, with interpretation of the impacts bulleted to the right of each. A list of the all the Studies is provided in the initial Table of Contents.

Model data and analysis is again presented according to sectors within Swords to provide a structure to the report.

4.4.4.1 Swords North West

Swords North West is a key area in terms of the study of Swords, due to the increased demands being placed on the network in the short term by Oldtown and Mooretown. Critical routes in Swords NW include the Rathbeale Road (R125), Glenn Ellan Road / Balheary Road, and Brackenstown Road. Rathbeale Road and Brackenstown Roads meet with a very constrained road network just west of Main Street.

The Estuary Roundabout provides the only means of bypassing the narrow roads around Swords Main Street for car trips accessing the wider road network. Balheary Road and Glenn Ellan Road provide access to this junction.

As shown in Study 1, traffic increases in Swords NW are the largest in the Recognised Development scenario and are related to the Oldtown-Mooretown areas. Flows on links near this area in Swords NW are shown in the table below.

As is shown in the table, traffic increases due to the development; on Glen Ellen Road east of Oldtown, AM peak flows increase by around 20% in both directions. The enhanced bus network assumed in the GDA Strategy scenario reduces the flows by around 10%.

Table 7 Do-Min / GDA Strat Flow Comparison Swords North West

Link	2016		2027 D0-Min		GDA Strat	
	EB / SB	WB / NB	EB / SB	WB / NB	EB / SB	WB / NB
Glenn Ellen (in Oldtown)	63	563	553	885	455	782
Glenn Ellen (east of Oldtown)	456	360	551	441	491	435
Rathbeale Road	462	398	544	430	527	416
Brackenstown Road	520	159	513	142	519	146



The effect of these changes in traffic flow on journey times is shown in the chart below. Journey times are shown in total seconds on both the Glen Ellan Road and Rathbeale Road, from Oldtown/Mooretown to main street.

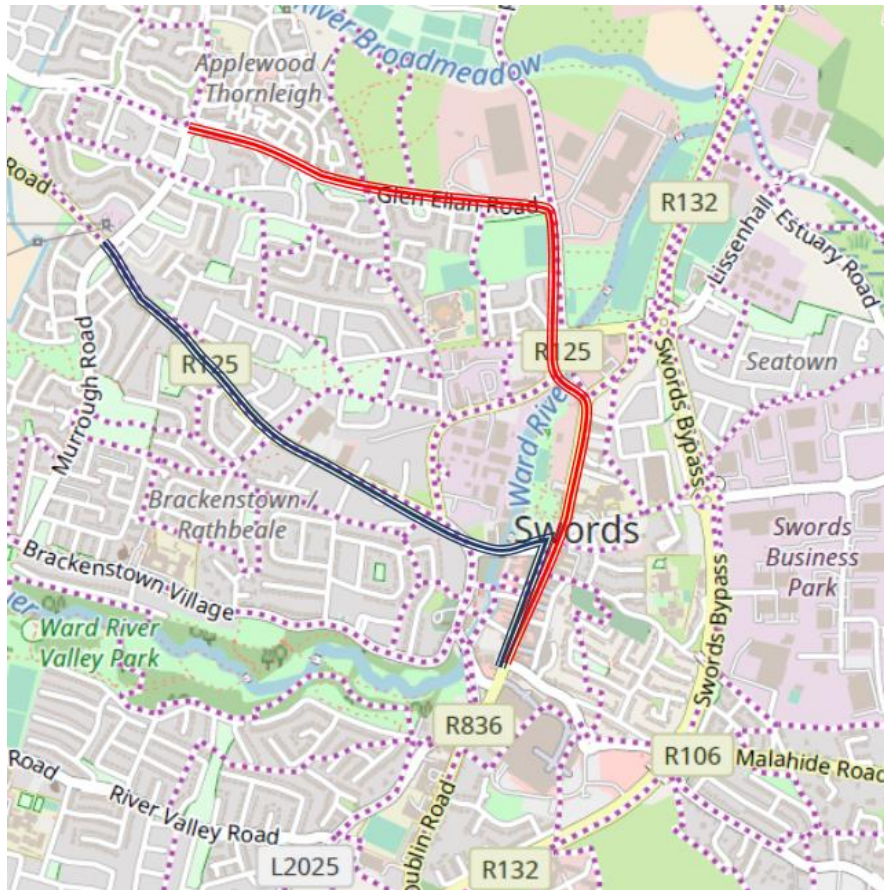


Figure 4.11 Journey Time Routes in Swords

The overall time increases in the Do Min from 6 minutes to 7 minutes, but is reduced to around 6.5 minutes in the GDA Strategy scenario.

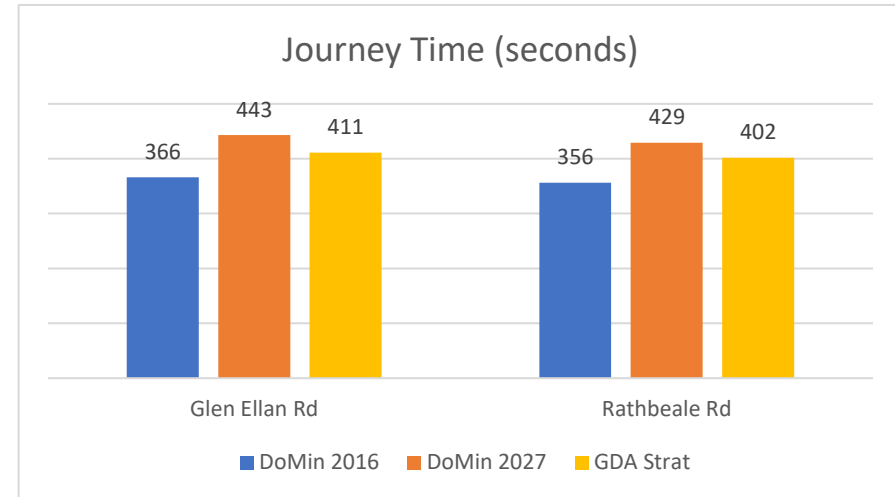


Figure 4.12 Journey times from Swords NW to Main Street

In summary, around 1000 extra car trips from Oldtown/Mooretown contribute to moderately increased delay towards Swords on Glenn Ellan Road and Rathbeale Road. As was identified in the Trip Generation section for Swords NW above, although enhanced PT services help, car trips are higher than today’s levels in this scenario.

This means that to reduce car usage for local trips from Swords NW, investment in cycling infrastructure should be a priority. Given traffic reduction that can be achieved with sustainable mode provision, e.g. GDA Strategy and GDA Cycle Network Plan, overall traffic increases and impacts are not of a scale that would indicate a requirement for additional road capacity.

Recommendation: Increasing the number of traffic lanes on Balheary Road is not required. However, providing bus lanes to enable a high frequency service to run reliably and maintain priority through junctions is required to encourage bus use and to limit car use to near present day levels.

This recommendation is supported in Study 24, V/Cs at key junctions, which indicates that the problems that appear at the Balheary / R125 / North St junctions resolve as a result of the mode shift, rather than any road scheme.

Recommendation: In addition, or complementary, to the services outlined in the Bus Connects consultation document, a feeder service should be provided to Oldtown and Mooretown through the developments and onward to Swords via the Glenn Ellan Road.

As set out in the section *2016 Travel Demand Analysis*, within Swords, trips to local places of work or education are comprised of around 4,600 active mode trips (walking or cycling) and 5,000 car trips. Approximately over 1,800 local car trips are generated in Swords NW, and many of these could potentially switch to cycling with appropriate investment in infrastructure.

Rathbeale and Brackenstown Roads are key arterial routes from Swords NW, and are the most direct routes into Swords for most of the area's population. In their current configurations, they are unattractive routes for cyclists. Implementation of appropriate high quality facilities would likely attract a much greater level of cycling and offset the increase in car trips that are predicted by the model in 2027.

Recommendation: Rathbeale and Brackenstown Roads should be prioritised in advancing the GDA Cycle Network Plan in Swords. As primary cycle routes in Swords, they should be developed to the highest of standards in accordance with the National Cycle Manual.

The delay map shown in Study 3 shows where delays increase the most under the Recognised Development scenario. The most significant increases are on the approach to Church Road from Brackenstown Road, which (as shown in the V/C maps in Study 24), is already over capacity in 2016. As there is no spare capacity and excessive demand any traffic increase worsens delay. The final V/C map in Study 24 shows however that the very high V/C at this junction can be reduced if additional capacity is provided over the Ward River.

Recommendation: Additional capacity is required to relieve Brackenstown Road / Church Road, which is over capacity in the forecast scenarios.

A realignment and widening of the existing narrow Church Road on the western side of Main Street and creation a junction with Brackenstown Road could achieve the desired impact without building an additional river crossing. Alternatively, a new route such as that proposed as the Inner Ward River Crossing would have a similar mitigating effect. Route option development should take cognisance of DMURS, the future function of Main Street and associated traffic calming in the area.

At the time of writing, the primary future Bus Connects routes serving western areas of Swords are the A4 and the 282 at a frequency of one bus every 10 to 15 minutes on both services. No bus lanes exist on the stretches of road used by these services, e.g. Main Street, Rathbeale Road, River Valley, and Forest Road. The reliability required for these services to provide an attractive means of accessing the town centre would necessitate an improvement in bus priority on each of these roads.

Recommendation: It is crucial to provide continuous high quality bus and cycle priority along Ardian Park to Castlevue Ext./ Glen Ellan Rd/Balheary Road route, and the sections of Forest Road and Rathbeale Road that are subject to congestion, in order to provide the necessary priority to attract a sufficient share of trips by bus.

An important section of the network is the Swords Western Distributor Road (SWDR), which, as described in paragraph 3.4.2.1, forms a spine access route through the Oldtown and Mooretown LAP areas. The design of the SWDR within the Oldtown-Mooretown areas should be urban in character and accommodate high quality facilities for walking and cycling as recommended by the LAP, with traffic calming measures to be employed at junctions with Rathbeale Road and Glen Ellan Road. Forecasts of traffic flow on the SWDR support its design as a low capacity route. As such its full extension to Brackenstown Road/Ward River Valley could be considered as a pedestrian and cycle only route. Its northern extension, however, should be progressed to enable access to the future Estuary MetroLink Park and Ride Station, particularly to serve active travel to the station. As it is desirable to encourage active travel to the park and ride and limit additional local car trips in Swords, the extension of the SWDR to Estuary Park and Ride should



consider adopting the same low-capacity urban boulevard type design that is proposed internally to Oldtown-Mooretown.

Recommendation: The Swords Western Distributor Link will form a crucial link from north west Swords to the future Estuary MetroLink station and Park and Ride. From Oldtown-Mooretown to Estuary the road alignment should consider similar design principles as set out in the LAP/Masterplans. Its southern extension to Brackenstown Road/Ward River Valley should be considered as a pedestrian and cycling only route.

4.4.4.2 Swords South West

The trip demand analysis for Swords SW shows that this area will significantly benefit from public transport investment, as future development in the area is closer to a wider range of PT services. Projections out to 2027 indicate that PT share increases from around 26% in 2016 to 37% in 2027 in the GDA Strategy, offsetting increases in car trips in this sector. However, local access to Swords is limited to a single junction from Forest Road, which shows a persistently high level of congestion. When the additional Forest Road link is introduced the performance of the junction improves to a more manageable level.

Recommendation: The Fosterstown Link Road is required as a priority to relieve existing pressures on the approach to Swords on Forrest Road.

With 30% of the Swords population, the Swords SW area generates approximately 1,400 local car trips to work and school on a daily basis. Many of these could potentially switch to cycling with improved infrastructure.

Recommendation: The primary cycle route on Forrest Road should be prioritised in delivering the GDA Cycle Network Plan in Swords. As a primary cycle route in Swords, it should be developed to the highest of standards in accordance with the National Cycle Manual.

4.4.4.3 Swords Centre and East

Main Street functions both as an attractive social and commercial destination and as a through-route for traffic travelling from west Swords. Traffic reduction on Main Street is a stated aim of the Development Plan and will be a requirement of

any scheme which aims to increase priority for non-car modes. As explained in the Transport Schemes section above, Bus Connects levels of frequency will be around 20 buses per hour per direction in Off-peak times. This equates to a bus every three minutes, and during peaks times, this could rise to more than one bus every two minutes. To provide the timetable reliability required for the revised bus network, it is likely that continuous bus priority will be required through Main Street. Furthermore, the primary cycle network envisaged in the GDA Cycle Network Plan includes a primary route on Main Street, which then links to the 2A primary strategic cycle route along the Old Dublin road to the Airport and then the city centre.

The modelling undertaken shows it is possible to reduce traffic flows on Main Street through a system of traffic management which restricts movement through the full length of the street but enables local access. Modelling indicates that a bus-gate system on Main Street could be implemented without negatively impacting the overall network, as many trips could be diverted onto the R132. A traffic management scheme such as this increases the need for an upgrade to Church Road or an Inner Ward River crossing, and for improved access from Forrest Road. The modelling shows the other parts of the network show no adverse impacts.

Recommendation: As part of the traffic reduction required on Main Street, it may be necessary to reduce levels of parking and/or provide parallel parking instead of the current arrangement. Such a reconfiguration would allow more space for the required GDA Cycle Network in addition to the required bus priority, general traffic lanes, and footpaths.

Any loss in on-street parking could be mitigated through the provision of additional parking off Main Street in off-street facilities. Longer term, it would be expected that mode shift away from car and towards other modes would reduce the requirement for current levels of car parking on Main Street.

Recommendation: A comprehensive traffic management plan should be developed to divert through-traffic away from Main Street and onto the R125 and



R132. An outline traffic management plan for Swords is discussed in the section Swords Outline Traffic Management Plan below.

Recommendation: Bus priority and associated cycleway facilities should be implemented on Main Street, Rathbeale Road, Glenn Ellan Road and Forest road. Immediate improvements would be realised for travel from Swords to the city centre through the increases in bus frequency, reliability and accessibility. Access by local traffic to on and off street car parking should be maintained while reducing through trips. The overall level of parking provision should be regularly reviewed to align with the mode share of those accessing Swords Main Street

The R132 provides an opportunity for Swords to rebalance the provision of road space on Main Street towards pedestrians, cyclists, and bus users. On the R132 itself, there are deficiencies with respect to the pedestrian and cycle networks. However, it is not part of the GDA Cycle Network plan, nor are any Bus Connects services planned to run along it.

Whilst the road primarily performs the role of a town bypass for vehicular traffic, in the context of the delivery of MetroLink and the planned expansion of Swords to the east of the corridor, the R132 will need to provide a multi modal function, balancing the needs of through and local movements.

Key design recommendations with respect the R132 in Swords include:

Recommendation: Improve connectivity for pedestrian and cyclists travelling across the R132 from existing and proposed development lands to the town centre. This will be achieved by replacing the existing roundabouts with signalised junctions, incorporating controlled Toucan crossings. This will replace (or supplement) the existing footbridges.

Recommendation: Creation of a more active frontage along the R132 by providing footpaths, segregated cycle facilities and encouraging new developments to face onto the street.

Recommendation: Encouraging higher density mixed use developments adjacent to the MetroLink stations with improved connectivity for pedestrians and cyclists. Provide a controlled level of access to future developments along the R132.

Recommendation: Safeguard the vehicular capacity of the street by retaining the number of trafficked lanes, whilst implementing measures to reduce the speed and dominance of traffic.

Whether done as part of the MetroLink design, or as part of a pre-Metro reconfiguration, the main junctions along the R132 should be signalised, with improved accessibility for pedestrians and cyclists, whilst accommodating the forecasts needs of vehicular traffic.

Recommendation: Junctions on R132 should be improved from a pedestrian and cyclist point of view. The Council should engage with NTA and TII on preliminary designs with a view to developing a complimentary scheme that achieves the required improvements and prepares for the Metro alignment.

The level of movement from western parts of Swords and Main Street to the new MetroLink will be considerable. The network between Main Street and the R132 provides few good quality pedestrian and/or cycling connections. In particular, the section of road that the two proposed cycle routes on Forest Road and Brackenstown Road converge towards is relatively cut off from the future MetroLink alignment by the Swords Pavilions shopping centre.

The Brackenstown Road and Forest Road cycle schemes should ultimately continue uninterrupted around the Swords Pavilions to the MetroLink.

Barrysparks Local Area Plan (2011) lands are located contiguous to Swords town centre, east of the R132 and adjoin the planned MetroLink ‘Swords Town Centre’ stop. The development of Barrysparks LAP (approx. 10 ha in area) will facilitate Swords’ consolidation and growth as a vibrant multi-functional town centre, with a thriving economy, along a sustainable high quality transport route. Currently a Barrysparks-Crowscastle Masterplan is being developed in line with the area covered by the LAP. The development of this area necessitates the completion of the Airside-Feltrim Link Road.



Recommendation: The Barrysparks Link Road (also referred to as the Airside-Feltrim Link Road) should be completed to facilitate the development of the Barrysparks-Crowscaste Masterplan area. The new link should include high quality facilities for pedestrians and cyclists on and across its alignment and where it connects to existing junctions.

Similarly it is necessary to ensure that future connectivity to MetroLink by the population within its catchment is maximised by high quality pedestrian and cycling facilities.

Recommendation: The Barrysparks Masterplan should ensure pedestrian and cycling permeability is maximised between the residential areas around the Feltrim Hall area and MetroLink in the design of its street network. The network should be designed to provide an uninterrupted direct link to the proposed Brackenstown cycle scheme.

4.4.4.4 *Swords Emerging City Vision*

The Swords Emerging City Vision is an adopted component of the latest Fingal Development Plan. It sets out the long-term growth of Swords to a city of 100,000 population, and its proposals include the Swords Western Relief Road and the Green Link across the River Ward from St. Cronin’s Avenue to support this growth.

Recommendation: It is recommended that the Green Link is considered as part of a future overall strategy to improve cycle facilities in Swords, and particularly to improve the connectivity between the extensive neighbourhoods north and south of the Ward River.

The Swords Western Relief Road (SWRR) is proposed to serve this significantly larger future population and to provide a strategic link between the M1 and the western Dublin Airport area/N2 Corridor. Transport modelling undertaken for longer term growth scenarios (e.g. 75,000 population in Swords) has shown that the SWRR can provide a strategic function, by reducing flow on the M1 by around 400 pcu/hr in the AM peak, obtained southbound on the section south of the Lissenhall Junction, representing 13% of the total flow.

Recommendation: The SWRR is not required to enable the growth of Swords in the short to medium term, however in the longer term it should be evaluated as part of the overall roads strategy/policy in the Greater Dublin Area. This would include assessment against the criteria set out in Section 5.8.3 of the NTA Transport Strategy for the GDA, as per Objective MT41 of the FDP as part of a pre-feasibility assessment, followed by more detailed multi-criteria analysis, route options assessment and full economic cost-benefit appraisal.



4.5 Swords Outline Traffic Management Plan

This section describes the assessment of the Outline Traffic Management Plan, referring to more detailed studies included in the appendix.

Study 26 shows the traffic using Main Street southbound in the AM. This highlights that most of the traffic using Main Street in this direction is accessing the R132 or the R125 via the Pinnockhill junction. This traffic could be rerouted onto the R132 Swords Bypass with the proposed traffic management measures.

The proposed traffic management measures involve restricting private vehicular traffic passing through Main Street, whilst retaining access to all parking areas. In addition, a restriction of all non-local traffic is considered in the St Columille's area. Studies 27 and 28 represent respectively the Flow difference and V over C difference with the implementation of these traffic management measures. It can be observed that the flows and traffic pressure are reduced significantly (-500 PCU/Hr on Main Street Southbound).

Study 29 shows the delay difference with the introduction of these measures. Vehicles accessing Main Street from Forest Road vehicles accessing Church Road from Brackenstown Road face a significant increase in delay. These 2 junctions were already over capacity and any increase in pressure on these junctions due to the revised system will bring significant increase in delay.

Study 30 shows the delay difference when, in addition to the mitigation measures, the Fosterstown Link and the Inner Ward River Crossing are included. The biggest impact of these 2 Road schemes is to prevent the increase in delay from Forest Road into Main Street and from Brackenstown Road into Church Road. Delay however increases at the Pinnockhill junction, but this could be resolved with localised optimisation.

Studies 31 and 32 demonstrate the importance of the Inner Ward River Crossing and the Fosterstown Links. The information shown represents respectively the Flow difference and V over C difference with the introduction of the Inner Ward River Crossing. Traffic flows and saturation are reduced on Main Street with the inclusion of the scheme. Study 33 also shows that there is a reduction in delay in the Main Street area.

Study 34 shows the Delay difference with the inclusion of the Fosterstown Link. It brings significant reduction in delay on the parallel links which are Forest Road and the L2300. There is however a significant increase in delay for vehicles approaching the Pinnockhill junction.

In summary, findings of modelling the outline traffic management plan in Swords include:

- Around 500-600 car trips pass through Main Street southbound,
- A bus gate can be implemented on Main Street to remove all through-traffic
- Delays increases at Church Road / Brackenstown Road and Forest Road / Dublin Road can be fully mitigated through implementing the Fosterstown Link Rod and upgrading Church Road.

4.6 Scheme Orientated Assessment

This section present an assessment of both the Swords Western Relief Road and the Western Distributor Link Road. Both alignments are shown in Figure 3.4 and again in the figure on the right.

The Swords Emerging City document, the Oldtown-Mooretown LAP, and the FCDP mention the schemes and their intended functions and objectives. The tables below collate these objectives, which are then assessed using the ERM Road model.

4.6.1 Swords Western Relief Road (SWRR)

Table 8 below details the SWRR assessment. In summary, the SWRR has been proposed as a means of reducing traffic on Main Street, as a short-cut to the Airport box from areas north of Swords on the M1 corridor (thereby reducing M1 traffic), and as an additional outlet for traffic from western Swords.

The modelling assessment was undertaken for the Recognised Development scenario. As shown in Study 11 Flow Difference; SWRR / No SWRR, the SWRR does not reduce traffic on Main Street. Traffic increases on routes out of Swords to the north, such as northbound on Balhearly Road, and decreases on routes going west, such as on Rathbeale Road. About half the traffic on the route is bypassing traffic, and a quarter originates from Swords, where mode share for car increases with the route in place.

Overall, local movement is not improved by the scheme, but some traffic reduction benefits are realised on the M1. However, the cost of the scheme is likely to outweigh those benefits.

4.6.2 Swords Western Distributor Road (SWDR)

Table 8 below details the SWDR assessment. The SWDR is effectively an extension of the internal street networks proposed for Oldtown and Mooretown. One of the objectives noted for the scheme is that it can act as an alternative to Main Street to north-south traffic. However, this function would be limited capacity offered by the local street-like nature of the scheme within Oldtown and Mooretown. The modelling overall shows that an extension to Brackenstown Road attracts very low

flows (350 PCU/hr 2 ways combined), and has no impact on Main Street traffic. Study 20 shows that most of the traffic using the SWDR extension come from the Mooretown development, as well as a small fraction from the Applewood area. Only a small section of the traffic is accessing the Swords City Centre, while the majority of trips are going to the Airport box.

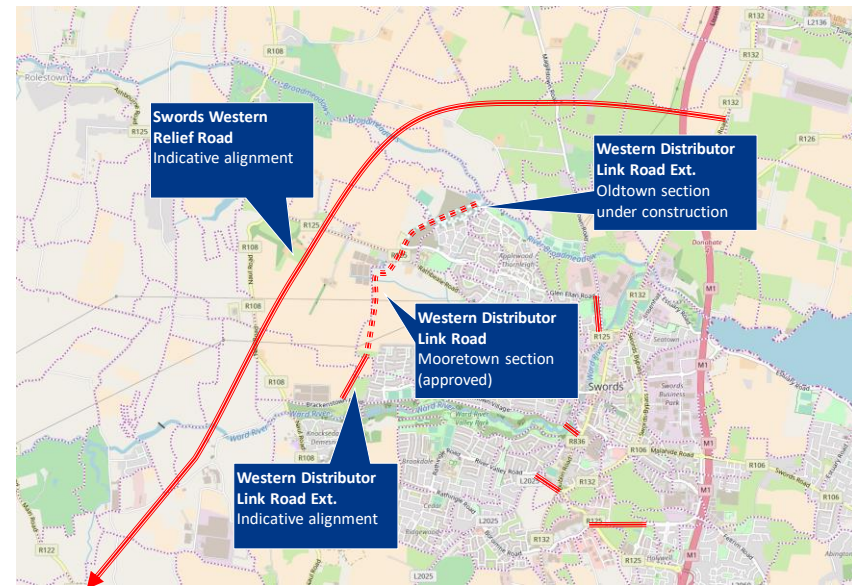


Figure 4.13 SWRR and SWDR Alignments

As is shown in Study 18 and Study 19, extending the SWDR from Mooretown to Brackenstown Road has limited effect on overall traffic operating efficiency in Swords, although it might provide a useful route for some local traffic to get to the roads around the Airport.

The findings of the studies and modelling analysis are further summarised in Table 9 below.



Table 8 Swords Western Relief Road Assessment

Scheme Objectives	KPI's	Assessment
Remove significant volumes of traffic from Swords Town Centre area and allow for the addition of sustainable modes of transport on the new road as well as in the town centre	Reduction in peak hour traffic volumes on R132, Main Street and adjoining side streets Reduction in v/c ratios on critical TC junctions along R132	As shown in Study 11, south to north movements in Swords town centre show an increase because of traffic travelling north to get on the SWRR. Traffic on North Street and Main Street increase in the northbound direction. All other changes are negligible.
Reduce traffic on the M1, south of the Lissenhall interchange, and on sections of the M50	Proportion (& Volume) of traffic reduction on the M1 and M50 on implementation of the Road	The Western Bypass induces a reduction of flow on the M1 of around 400 pcu/hr, obtained Southbound on M1 Section south of the Lissenhall Junction, which represents 13% of the actual flow. The maximum reduction in flow on the M50 is obtained on the section between the M50/M1 junction and the Ballymun junction (90 pcu/hrs which represents a reduction of 2%).
Serve the proposed strategic park and ride	Qualitative statement (non-modelled) on access from Strategic road network to the P&R	Local trips from Swords should not be encouraged to drive to the Metro. For non-local trips, the SWRR alignment is such that it would serve the Park and Ride with a potentially wider catchment to the west from beyond Swords. However, getting to the Park and Ride from anywhere in this catchment would be at least a 5km drive through unpopulated areas. It is unlikely that any such trip would save time by opting to switch to the Metro, instead of taking a high speed bus into the city from say Blanchardstown, which will be available by the time Metro is built.
Efficient route from the M1 to the proposed Dublin Airport Box	Proportion (& Volume) of traffic on the Road travelling to the Airport Box	As shown in Study 14, 50% of the traffic the busiest point of the road in the AM peak (between Balheary Avenue and Rathbeale Road in the Southbound direction) has come from the M1, and uses the SWRR as a short cut to areas west of the Airport.

Conclusion

For the reasons outlined above, the SWRR offers little to improve local traffic conditions in Swords, even with new development (Recognised Development) included in the modelling. As a scheme for facilitating short trips from the M1 Corridor to west of the Airport it has some merit, and may help to reduce the need to travel on the busiest section of the M1. That said, demand management reduction measures are being pursued by TII that could achieve the same result, without requiring the SWRR. Overall, the modelling and analysis does not support the scheme against the stated objectives for the scheme.



Table 9 Swords Western Distributor Road Extension Assessment

Scheme Objectives	KPI's	Assessment
To provide suitable access to major development areas on the northern and western edge of Swords	Quantum of peak hour traffic on the proposed road and proportion accessing new/existing developments	<p>The sections in Oldtown and Mooretown provide this function for local traffic. From Oldtown traffic can access Rathbeale Road and Glenn Ellan Road. In Mooretown, unless the extension is implemented, traffic must all enter and exit on Rathbeale Road.</p> <p>The modelling shows that the extension onto Brackenstown road has a limited effect, which is logical considering Brackenstown Road has no spare capacity during peak times.</p>
Remove significant volumes of traffic from the Swords Town Centre area and allow for the addition of sustainable modes of transport on the new road as well as in the town centre	Reduction in peak hour traffic volumes on R132 bypass, Main Street and adjoining side streets Reduction in v/c ratios on critical town centre junctions and along R132	This effect is not substantiated by the modelling; this is also logical as Main Street and the SWDR are unlikely to be good substitutes for each other.
Conclusion	<p>The SWDR, as an integral part of Oldtown and Mooretown, should be protected from traffic redistributing from elsewhere in Swords to complete north-south or orbital movements. An extension to Brackenstown Road does not jeopardise this function and would mainly serve as an additional exit from Mooretown. However, the operation of the already over-capacity Brackenstown Road would marginally worsen because of this.</p>	

5 Conclusions and Recommendations

- There is significant potential to increase the level of walking and cycling in Swords, due to the high number of trips with distances travelled of less than 4km.
- The low public transport mode share within Swords could be improved by providing more frequent services.
- The GDA Cycle Network Plan should be rolled out in Swords, prioritising routes from the west on Rathbeale Road, Brackenstown Road, Glenn Ellen Road, and Forest Road. Rathbeale Road provides a direct route into Swords Centre for much of the substantial Swords North West catchment, and should therefore be prioritised.
- It is crucial to provide continuous high quality bus and cycle priority along Ardcian Park to Castlevew Ext. / Glen Ellan Rd / Balheary Road route in order to attract a sufficient share of trips to bus and cycle.
- In addition to the services outlined in the Bus Connects consultation document, a feeder service should be provided to Oldtown and Mooretown through the developments and onward to Swords via the Glenn Ellen Road.
- The road space on Main Street should be rebalanced away from car parking and towards cycle lanes and bus lanes, enabling at least 20 buses per hour per direction off-peak, and double this number in the peak periods and providing fully integrated cycle routes from western Swords into and through the town centre.
- Bus priority should be provided on Main Street, to improve the environment for non-car users and make way for increased bus priority.
- The Swords Western Distributor Road would provide additional resilience to the local network in the context of diverting traffic from Main Street, and in addition to providing direct access to the MetroLink Park and Ride at Estuary.
- Future interchange to the MetroLink from other modes, including bus, walk and cycle, should be considered as part of any redevelopment of Swords Main Street and the R132 Swords bypass.

- Balheary Road does not exhibit excessive pressure in the Recognised Development scenario in Swords, and therefore widening of this road is not recommended in the Recognised Development scenario.
- The R132 in Swords should be reconfigured as a local street with more active frontage and with junctions reconfigured to provide a safe environment at grade for non-car users.
- The Swords Western Relief Road is an objective of the Fingal Development Plan with a strategic function to provide a link between the M1/M50 and Dublin Airport to support the long term growth of Swords. As such, a detailed evaluation of the scheme should be undertaken in line with the latest hierarchy of project appraisal guidance issued by Department of Public Expenditure and Reform, Department of Transport, Tourism and Sport, and TII.
- The full suite of SFTS Swords recommendations should be taken forward as a single or small number of packages, leading to a more detailed transport assessment of the town, and the preliminary design of individual schemes. This package(s) of measures would ideally be combined with a public realm strategy for the town centre and should be aligned with future opportunities and constraints presented by the emerging MetroLink route in Swords.

Recommendations are further summarised on the map in Figure 5.1 below.



5.1 Swords Recommendations Summary Map

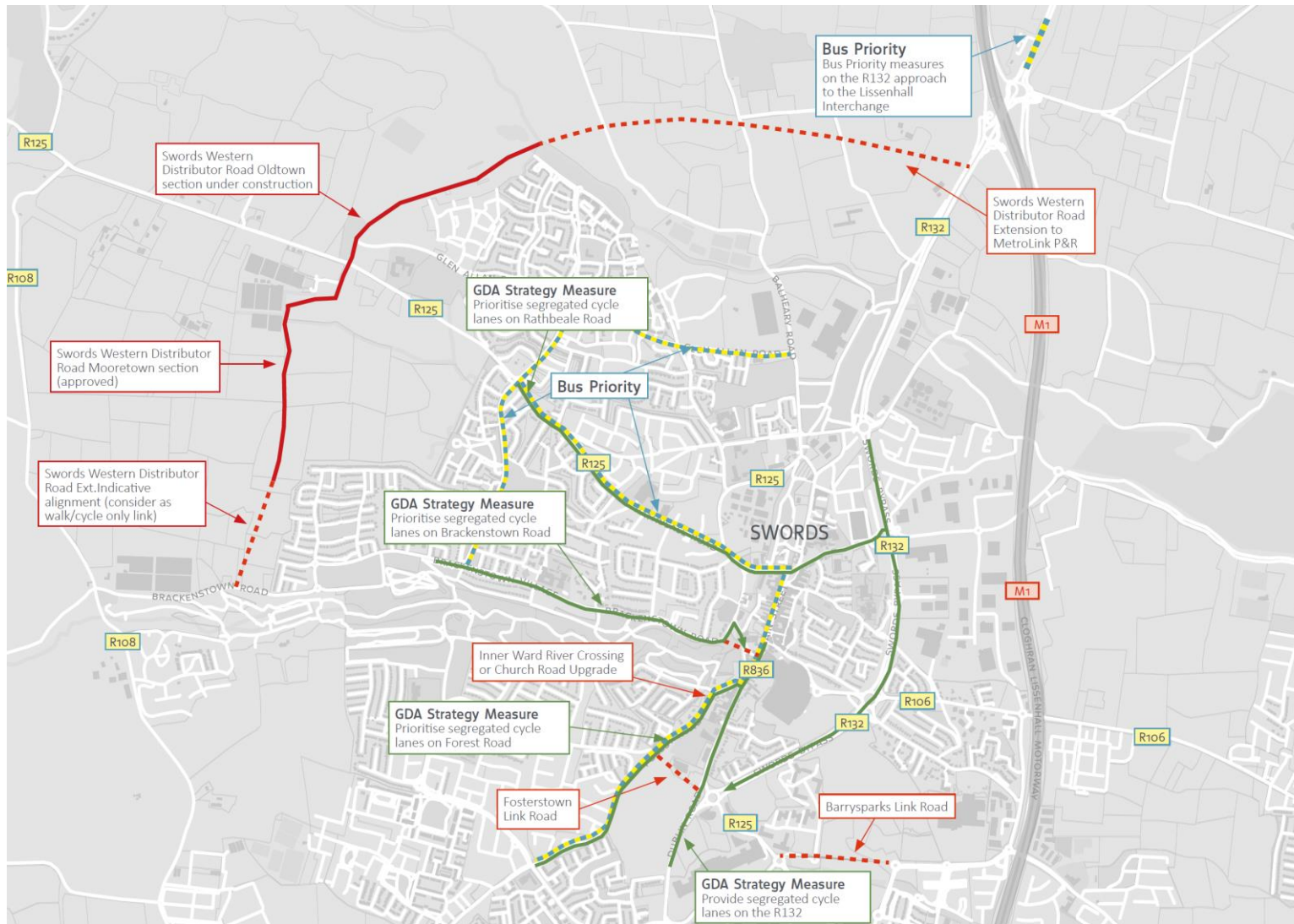


Figure 5.1 Swords Recommendations Summary Map



6 Appendix

- Recognised Development Road Impact Studies
- Swords Western Ring Road Studies
- Swords Western Distributor Road Studies

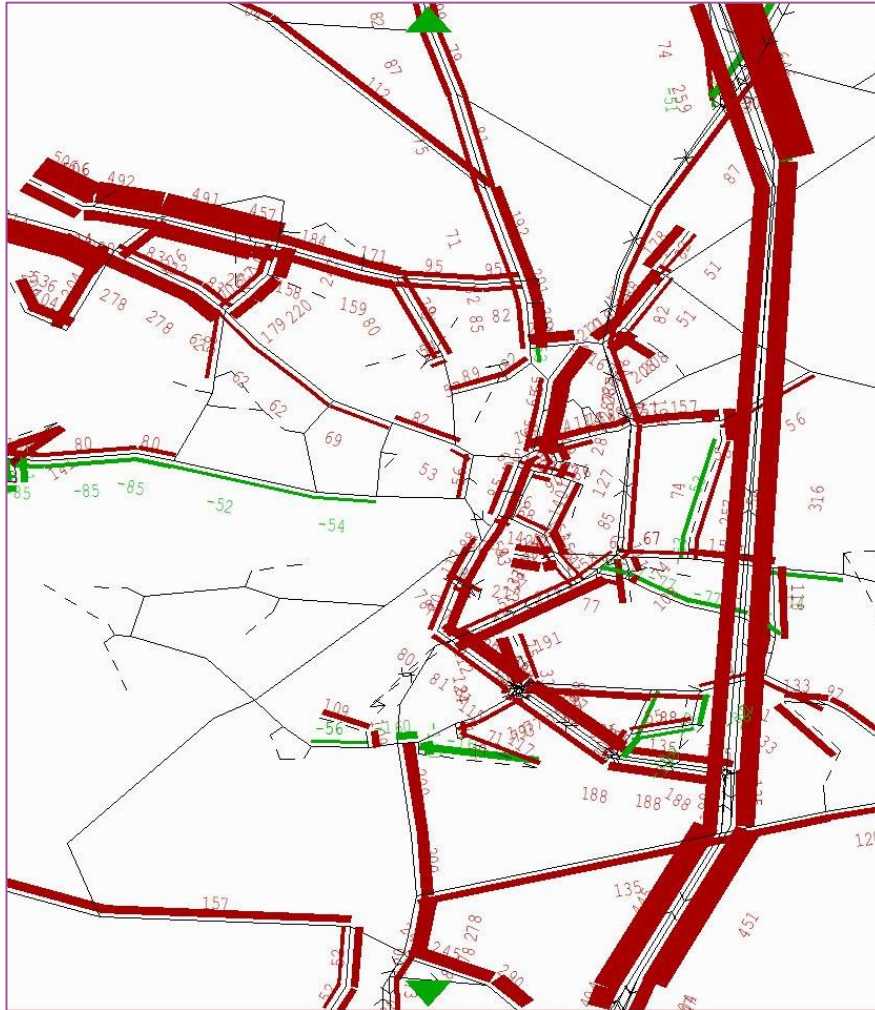


6.1 Swords Road Network – Recognised Development

6.1.1 Study 1 Flows; 2016 vs Do-Min 2027

The image below shows the difference in traffic flow with the increase in development in Swords (i.e., population increasing from 43,000 to 60,000). Traffic increases generally due to increase development. Note that the model includes all of Leinster, so increases elsewhere are also factored in (which explains the increase on the M1).

Changes in flow are shown in the table.



	Link	2016 EB / SB	2027 EB / SB	2016 WB/NB	2027 WB/NB
1	Glenn Ellen (in Oldtown)	63	553	563	885
2	Glenn Ellen (east of Oldtown)	456	551	360	441
3	Rathbeale Road	462	544	398	430
4	Brackenstown Road	520	513	159	142
5	Main Street (north of Bridge St)	390	677	246	311
6	Main Street (south of Bridget St)	599	739	262	347
7	Seatown Road (btwn Main St / R132)	219	343	347	413
8	Malahide Road (btwn Main St / R132)	623	777	492	546
9	Pinnock Hill	695	961	695	776
10	Drinan Link Road	1,309	1,444	1,577	1,765
11	Forest Road	452	492	271	287
12	M1 (south of Lissenhall Junction)	3,410	3,726	1,440	1,697
13	R132 (South of Lissenhall Junction)	1,665	1,746	957	917
14	R132 (Business Park Area)	1,136	1,210	815	849
15	R132 (South of Pinnock Hill Roundabout)	778	816	631	623

EB / SB – Eastbound or Southbound

WB / NB – Westbound or Northbound



6.1.2 Study 2 Flows; 2016 vs GDA Strategy 2027

The image below shows that with the inclusion of the GDA Strategy (particularly Bus Network Improvements) flows still increase although by significantly less than in Study 1 (which does not include the Strategy). The red indicates increased traffic flow. More information on the DoMin vs GDA Strat is presented in Study 5.

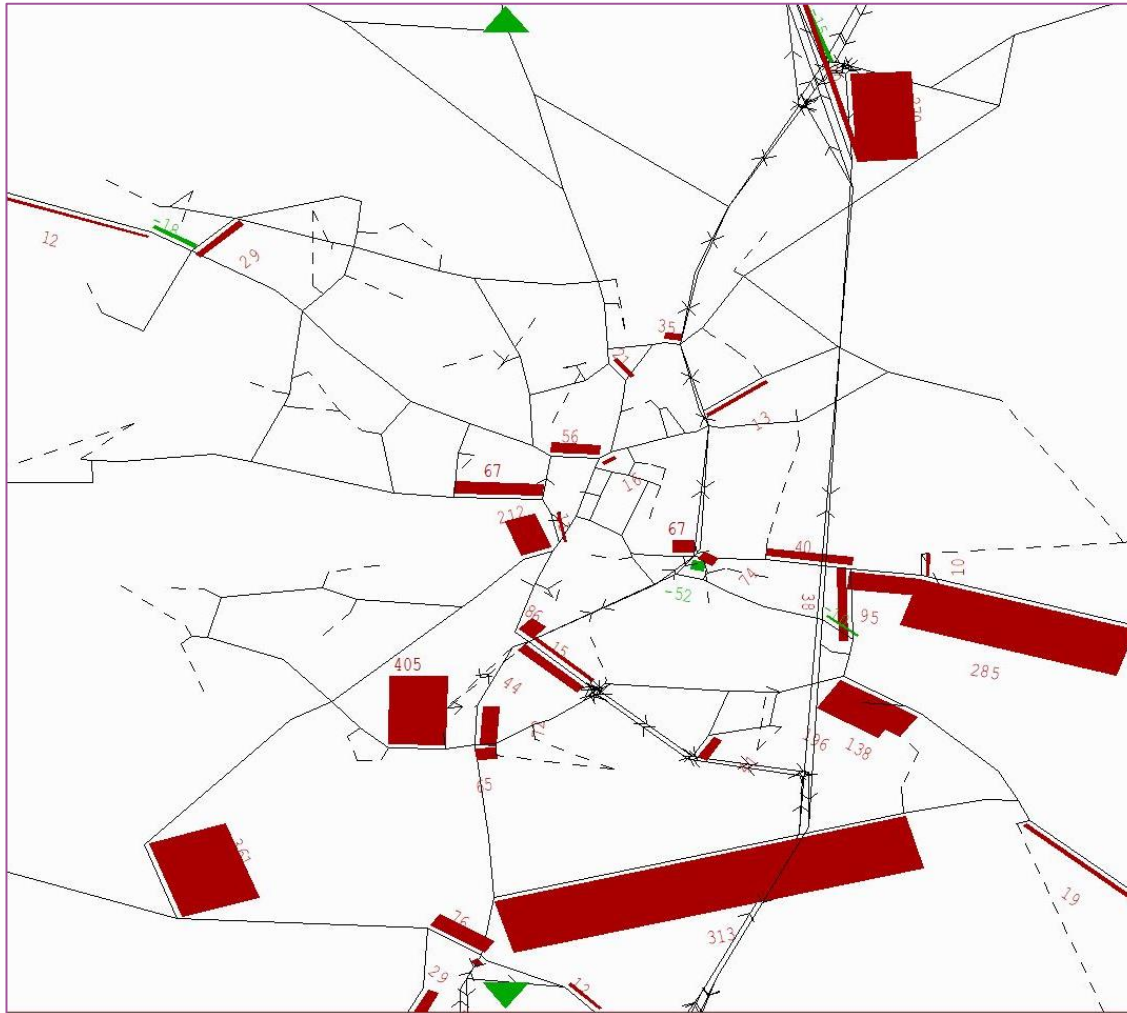


Changes in flow are shown in the table:

	Link	2016 DoMin EB / SB	GDA Strat EB / SB	2016 DoMin WB/NB	GDA Strat WB/NB
1	Glenn Ellen (in Oldtown)	63	455	563	782
2	Glenn Ellen (east of Oldtown)	456	491	360	435
3	Rathbeale Road	462	527	398	416
4	Brackenstown Road	520	519	159	146
5	Main Street (north of Bridge St)	390	546	246	293
6	Main Street (south of Bridget St)	599	683	262	319
7	Seatown Road (btwn Main St / R132)	219	297	347	453
8	Malahide Road (btwn Main St / R132)	623	703	492	494
9	Pinnock Hill	695	849	695	699
10	Drinan Link Road	1,309	1376	1,577	1,690
11	Forest Road	452	451	271	293
12	M1 (south of Lissenhall Junction)	3,410	3659	1,440	1,634
13	R132 (South of Lissenhall Junction)	1,665	1879	957	911
14	R132 (Business Park Area)	1,136	1165	815	788
15	R132 (South of Pinnock Hill Roundabout)	778	798	631	641

6.1.3 Study 3 Delays; 2016 vs Do-Min 2027

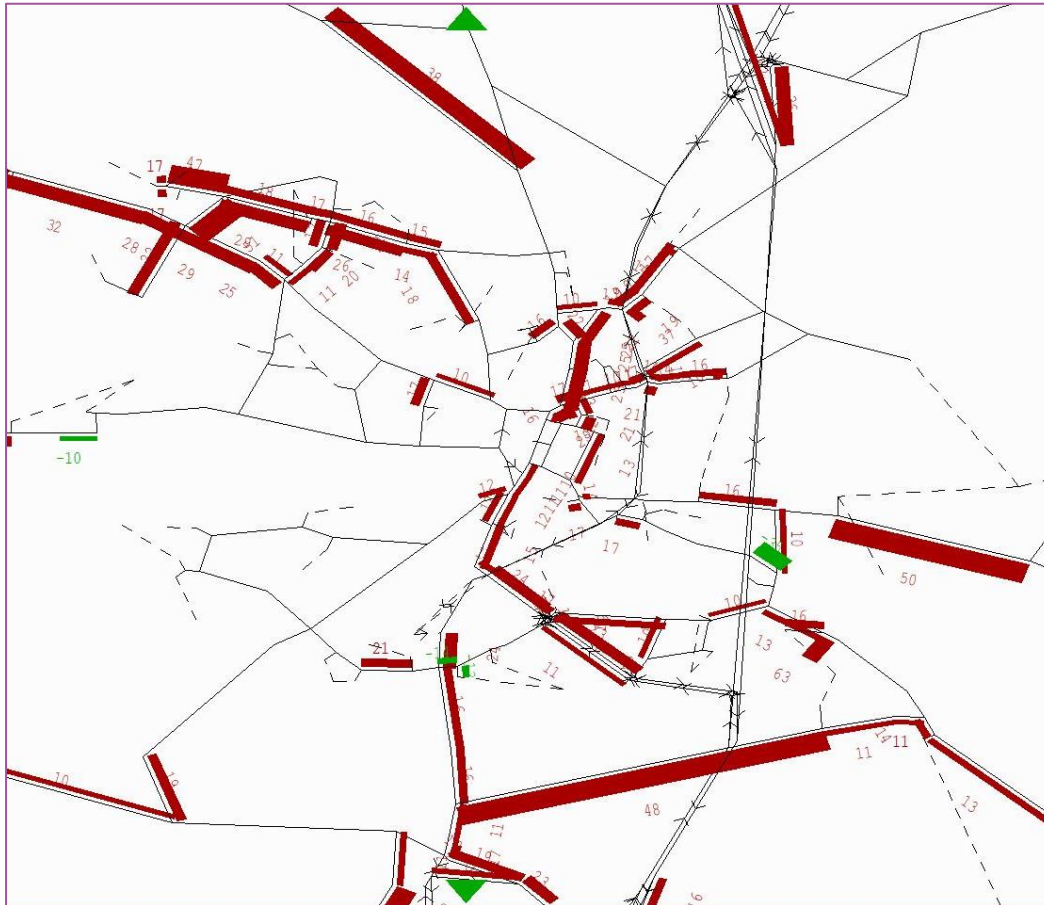
Increased delay is shown in the image below -- given no network improvements and the Recognised Development increase in housing and employment.



- Most of the increase in delay is coming from junctions which are already saturated in 2016, such as the Main Street/Forest Road Junction or the Main Street/ Rathbeale Road junction.
- There is a slight increase in delay from Oldtown development on the new junction on the Rathbeale Road
- There is an increase in delay along the R108, especially on the arm coming from Brackenstown Road
- The Pinnockhill Roundabout also sees an increase in delays.
- Getting through Swords to the Main Street is inhibited by increased delays the Bridge Street, Brackenstown Road/Church Road and Balheary Road approach
- There are substantial increases in delay coming from the west on Swords Road with potentially regular AM congestion at Mountgory Way / Swords Road.
- Feltrim Road continuing on to Mountgory Way also experiences a large increase in delay.

6.1.4 Study 4 V/C; 2016 vs Do-Min 2027

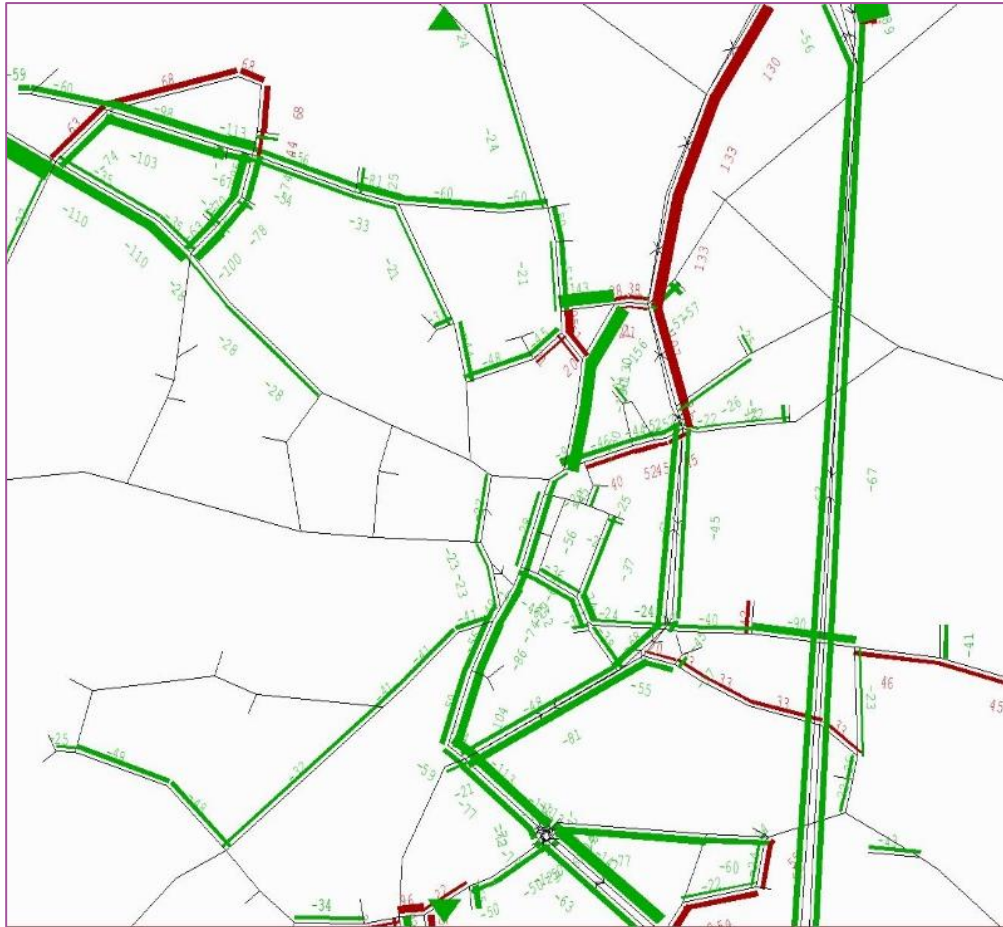
The image below shows where volume over capacity increases significantly. Junctions which are already at a very high V/C in 2016 may not appear in the image below; therefore, the image serves to highlight areas which are currently operating reasonably, but where pressures can be expected to increase in future.



- The new developments in Oldtown/Mooretown induce a significant increase in V/C in the area, especially on the Rathbeale Road in direction of the R108. It doesn't result in large increase in delay yet, but this shows pressure forming on this part of the network
- At already saturated junctions, there is a small increase in V/C, which result in an increase in delay. An example is along the R108, especially on the arm coming from Brackenstown Road
- The Oldtown /Mooretown areas, and the roads just north of Swords town centre come under pressure, but without large increases in delay yet
- The R132 still operates at a reasonable Volume to Capacity ratio.
- In the current modelling, the Balheary section of road in its present configuration does not present a constraint in the network. From Glenn Ellen Road through each junction through to the R132 the relevant turning v/c ratios are: 46% (right on Balheary Road), 35% (straight ahead Balheary Road), 32% (left at Castlegrange), 28% (straight ahead towards R132).

6.1.5 Study 5 Flows; Do-Min 2027 vs GDA Strategy

The image below shows where the reduction in flows that occur on the road network with the inclusion of the GDA Strategy (especially Bus Network Improvements), relative to the above image. The modelling shows a reduction in flow on Main Street, the R132 and the Oldtown/Mooretown area.

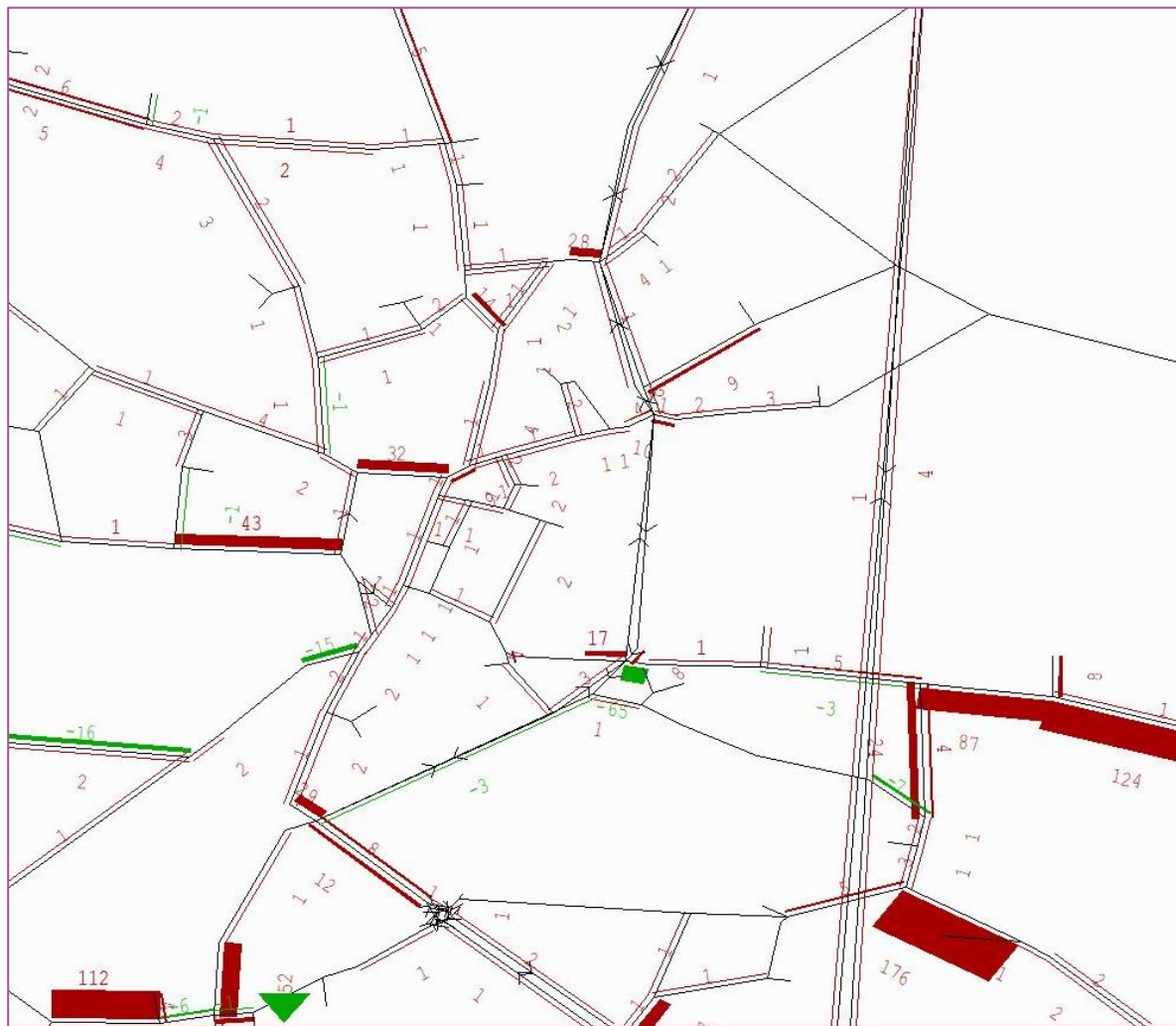


Changes in flow are shown in the table:

	Link	2027 DoMin EB / SB	GDA Strat EB / SB	2027 DoMin WB/NB	GDA Strat WB/NB
1	Glenn Ellen (in Oldtown)	553	455	885	782
2	Glenn Ellen (east of Oldtown)	551	491	441	435
3	Rathbeale Road	544	527	430	416
4	Brackenstown Road	513	519	142	146
5	Main Street (north of Bridge St)	677	546	311	293
6	Main Street (south of Bridget St)	739	683	347	319
7	Seatown Road (btwn Main St / R132)	343	297	413	453
8	Malahide Road (btwn Main St / R132)	777	703	546	494
9	Pinnock Hill	961	849	776	699
10	Drinan Link Road	1,444	1,376	1,765	1,690
11	Forest Road	492	451	287	293
12	M1 (south of Lissenhall Junction)	3,726	3,659	1,697	1,634
13	R132 (South of Lissenhall Junction)	1,746	1,879	917	911
14	R132 (Business Park Area)	1,210	1,165	849	788
15	R132 (South of Pinnock Hill Roundabout)	816	798	623	641

6.1.6 Study 6 Delay; 2016 vs GDA Strategy 2027

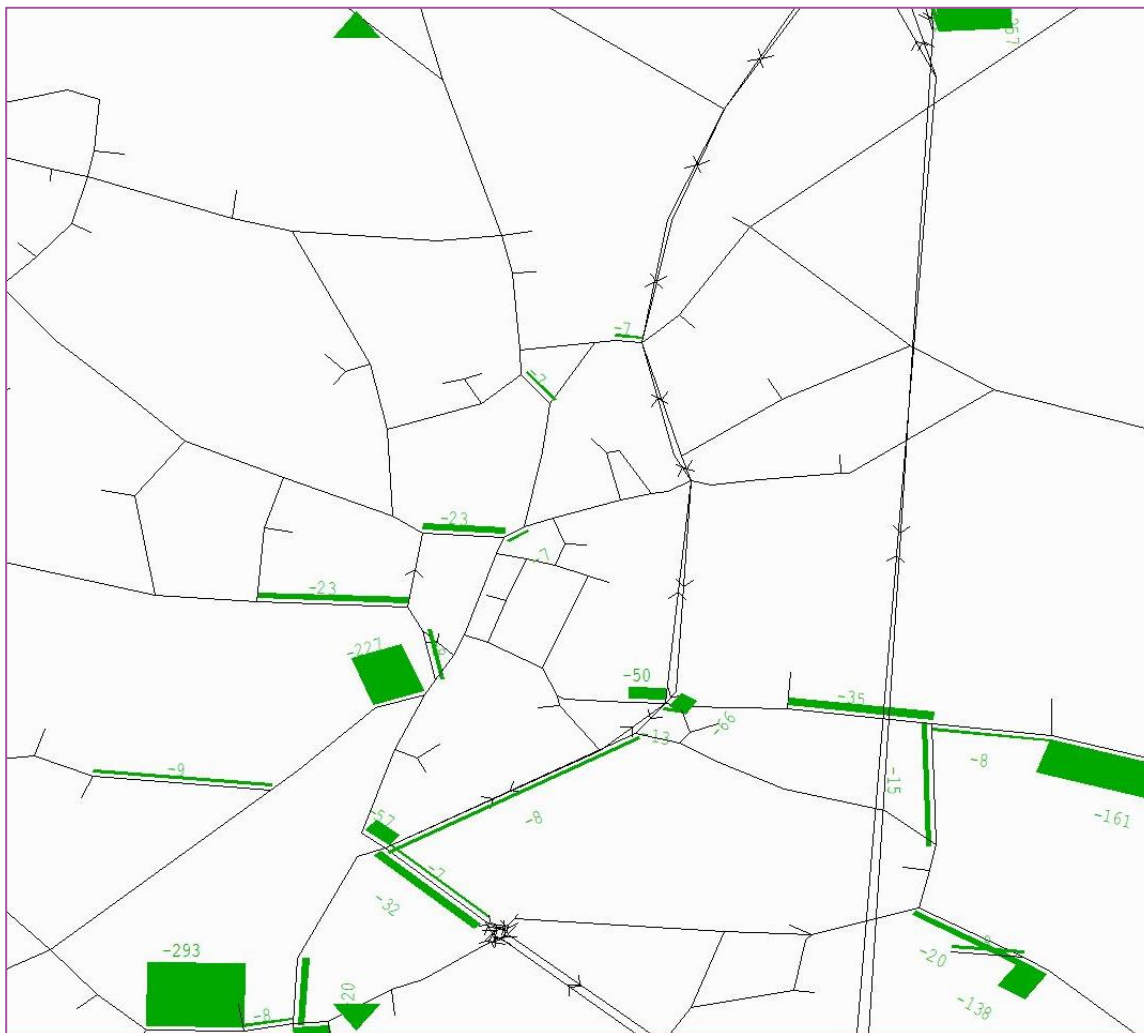
The image below shows where the largest increases in delay occur on the road network from 2016 to 2027. This scenario includes the GDA Strategy Bus Network Improvements.



- Traffic coming from Swords North West onto Main Street still experiences an increase in delay, less though than in the scenario in which no additional Bus service is implemented.
- The Lord Mayors Junction, however doesn't see an increase in delay with the additional bus Service
- The increase in delay at the Pinnockhill Roundabout is quite limited compared to the situation with no improvement to the Bus Network.

6.1.7 Study 7 Delay; Do-Min 2027 vs GDA Strategy 2027

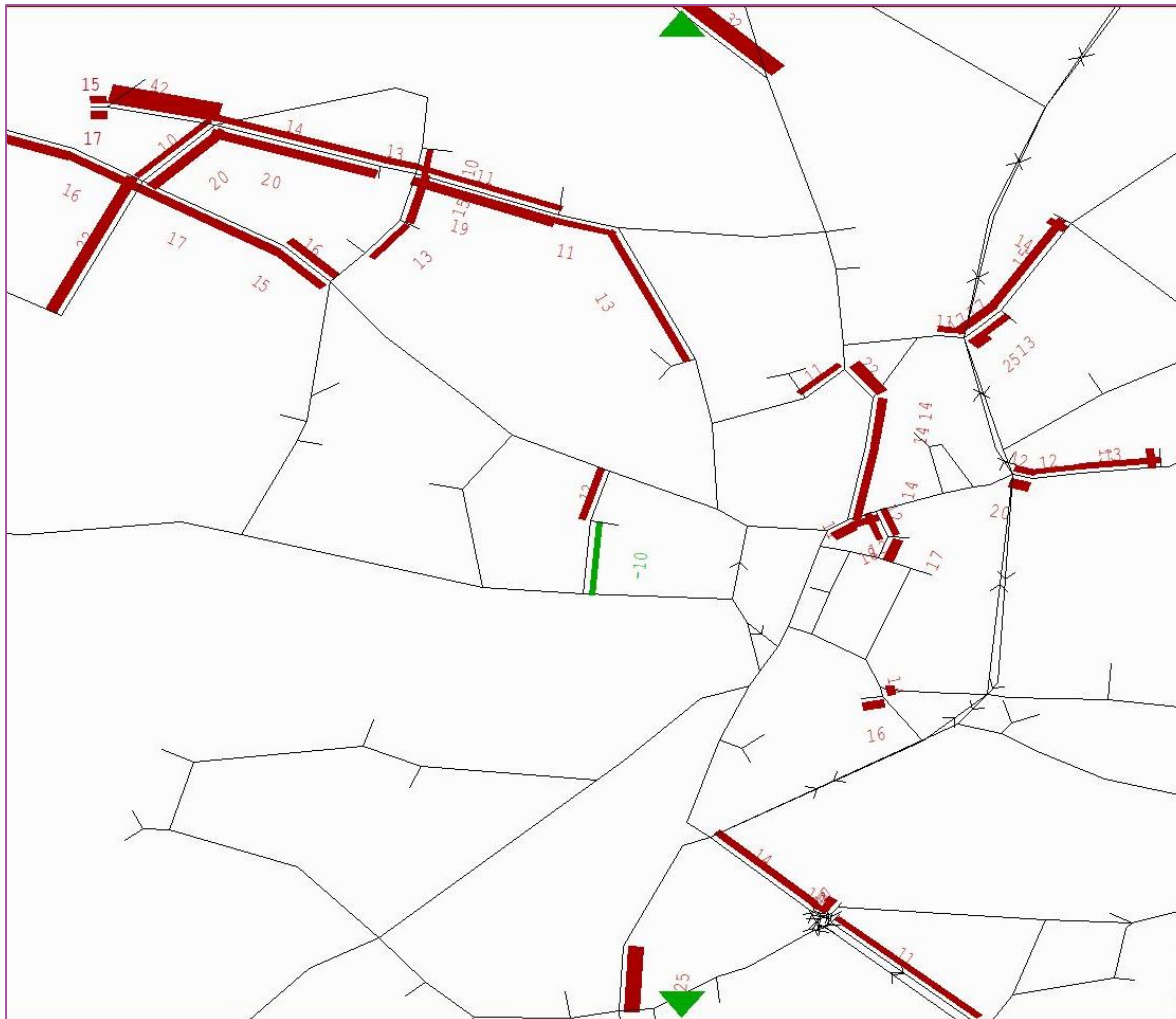
The image below shows where the largest reduction in delay occur on the road network in 2027 with the inclusion of the GDA Strategy (especially Bus Network Improvements)



- The Bus Network improvement induce a reduction in delay for a number of junctions, which were saturated with the additional traffic resulting from new developments as the arms coming from the development areas in Swords North West into Main Street
- The Lord Mayors Junction, as well as the Pinnockhill Roundabout also see a reduction in delay
- People travelling to Swords on the Malahide Road also see a reduction in delay

6.1.8 Study 8 V/C; 2016 vs GDA Strategy 2027

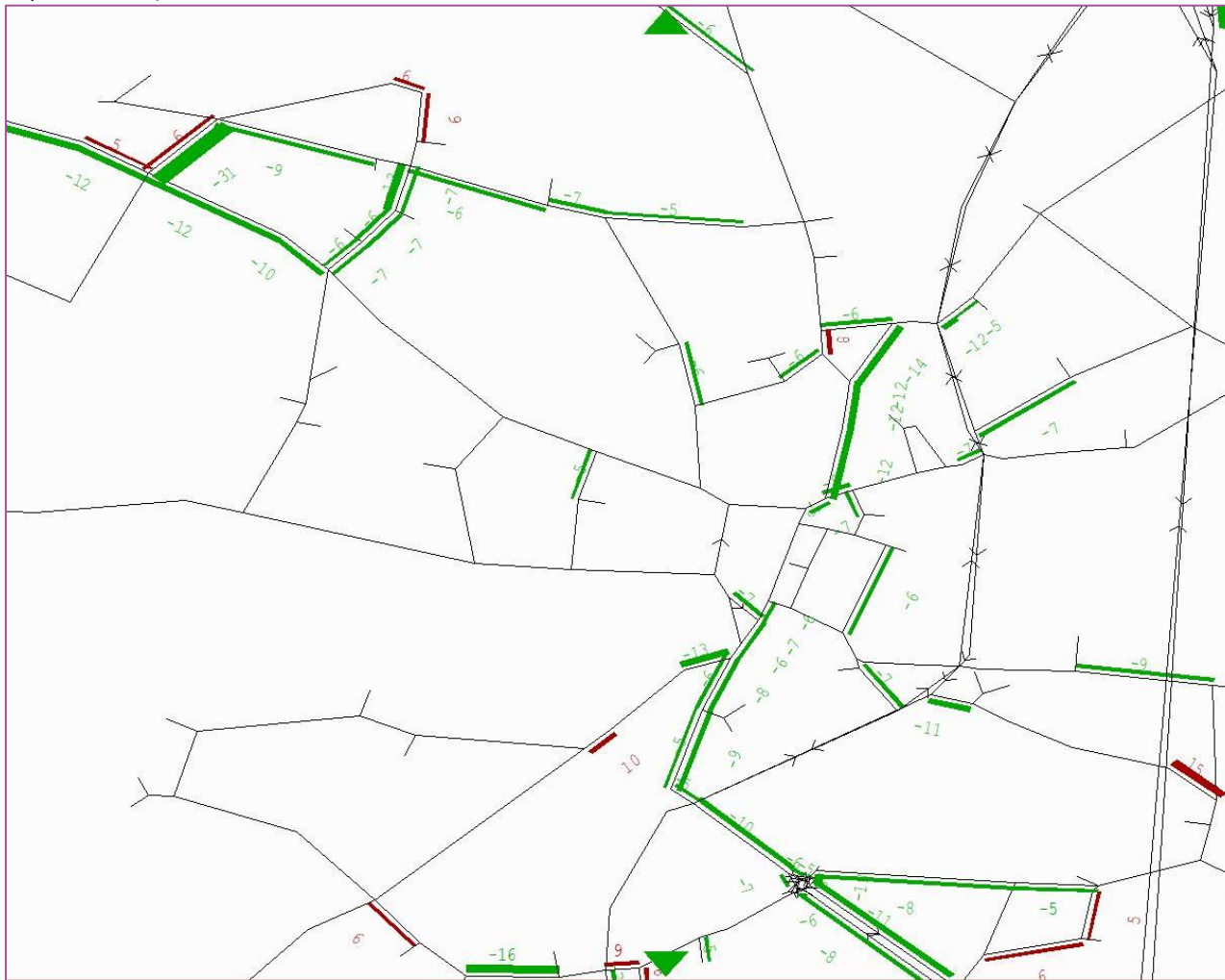
The image below shows where volume over capacity increases significantly going forward from 2016 to 2027.



- Even with the additional Bus Services, saturation levels increase compared to the existing situation in 2016, especially on the Oldtown/Mooretown area
- Increase in V over C is witnessed in the North area of Swords, on North Street, the Estuary Junction as well as the Seatown Road Junction coming from the East.

6.1.9 Study 9 V/C; Do-Min 2027 vs GDA Strategy 2027

The image below shows where the largest reduction in volume to capacity ratios occurs on the road network in 2027 with the inclusion of the GDA Strategy (especially Bus Network Improvements)



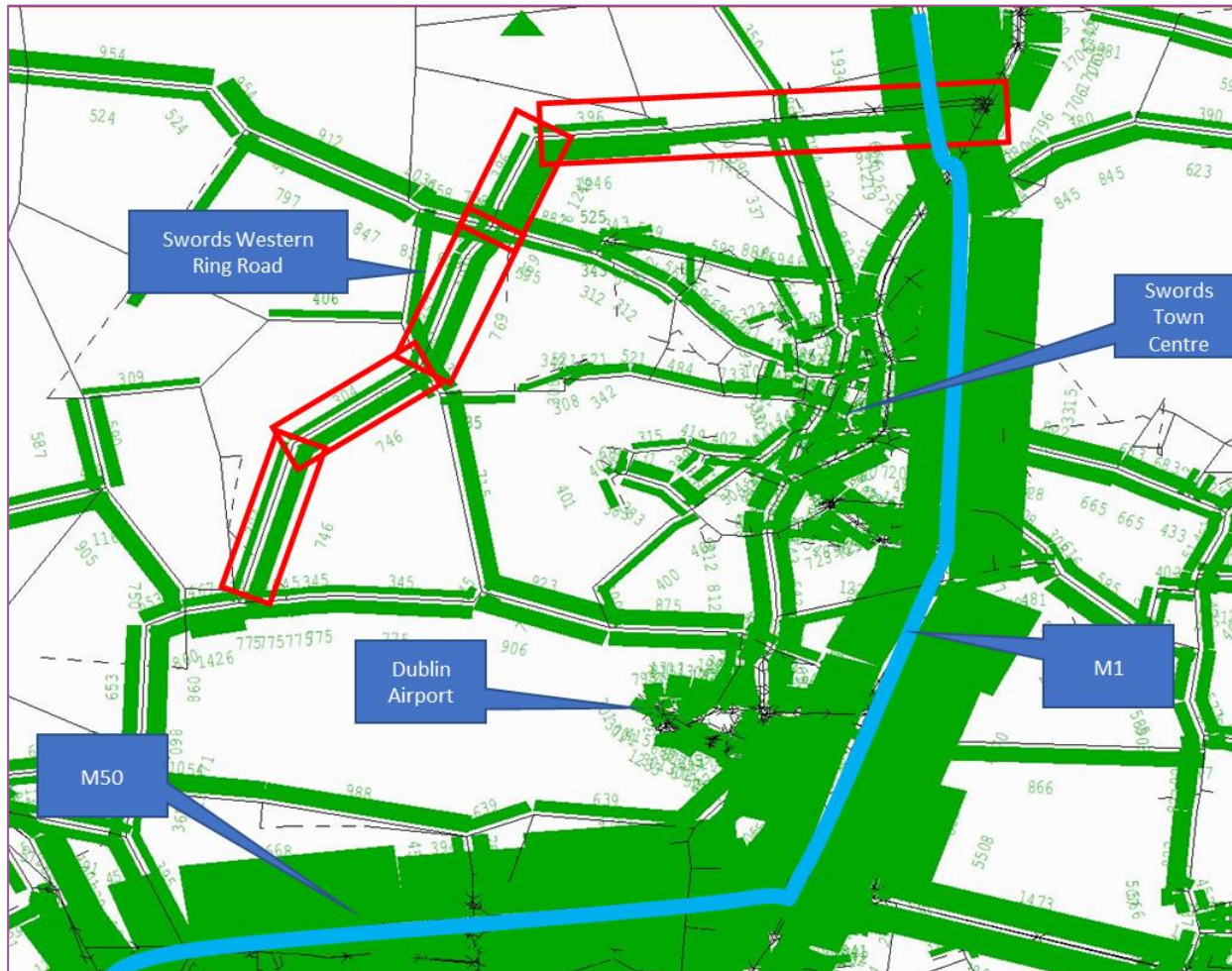
- The Bus service relieves some of the pressure on the Oldtown/Mooretown local network
- There is also a relief in pressure on Main Street as well as on the section between Pinnockhill Roundabout and the M1



6.2 Swords Western Relief Road Assessment – Recognised Development

6.1.10 Study 10 Flows; SWRR Recognised Development

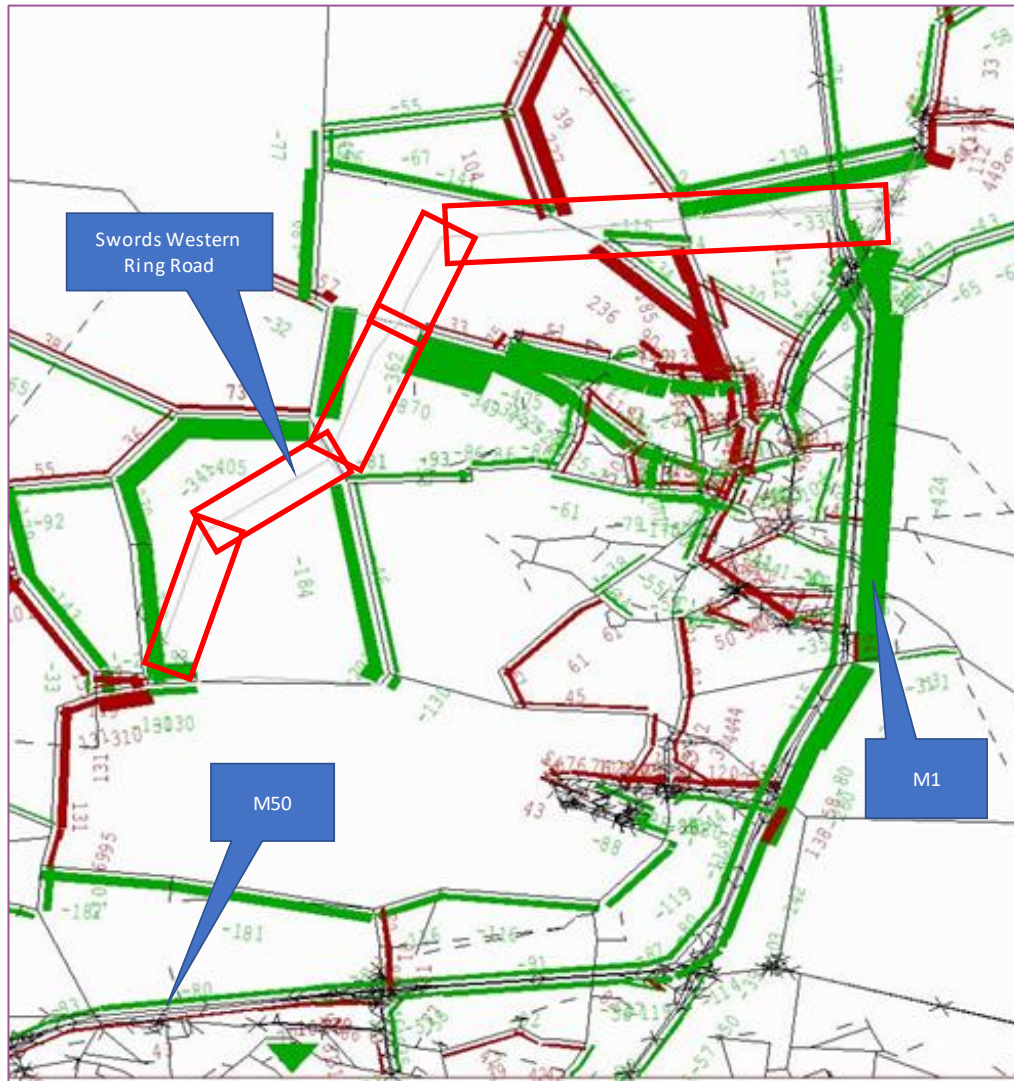
The **Swords Western Ring Road (SWRR)** is shown below in red outline. Road flows are represented by the thickness of the green lines in proportion to the amount of traffic flow on a link. The M1 and M50 are shown in blue.



- The maximum flow of around 1300 pcu/hr) on the SWRR is on the section between Balheary Avenue and Rathbeale Road in the Southbound direction.
- On the section south of Rathbeale Road, the flow is around 750 pcu/hr.

6.2.1 Study 11 Flow Difference; SWRR / No SWRR

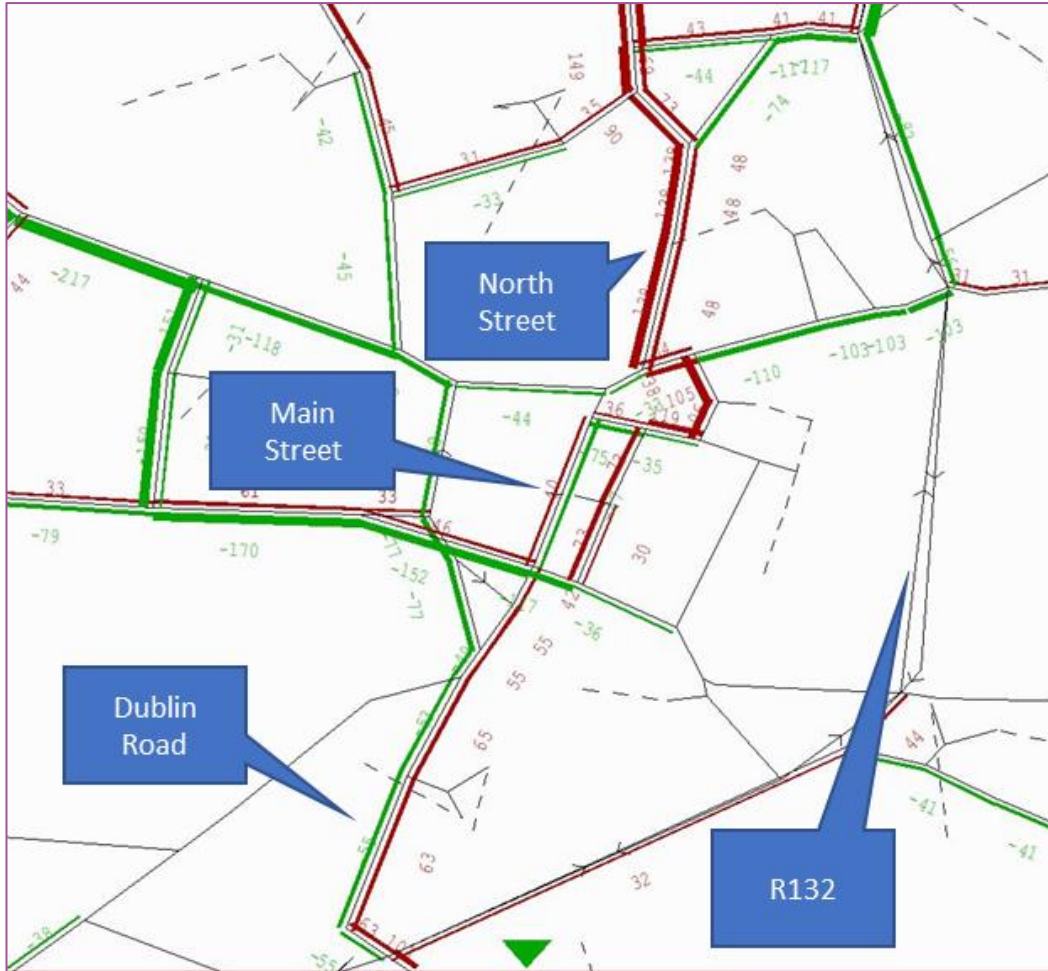
This map shows the road Flow difference in the network with and without the **Swords Western Ring Road**. In this map green represents a decrease in traffic and red represents an increase.



- The Western Bypass induces a reduction of flow on the M1 of around 400 pcu/hr, obtained Southbound on M1 Section south of the Lissenhall Junction, which represents 13% of the actual flow
- The maximum reduction in flow on the M50 is obtained on the section between the M50/M1 junction and the Ballymun junction (90 pcu/hrs which represents a reduction of 2%).
- In Swords, south to north movements show an increase because of traffic travelling north to get on the SWRR. Traffic on North Street and Main Street increase in the northbound direction.
- East to west movements (to/from Main St) show a decrease in flow, because traffic which is travelling e.g. west on Rathbeale Road now travels north via Balheary Road and proceeds around via the SWRR.

6.2.2 Study 12 Flow Difference; SWRR / No SWRR

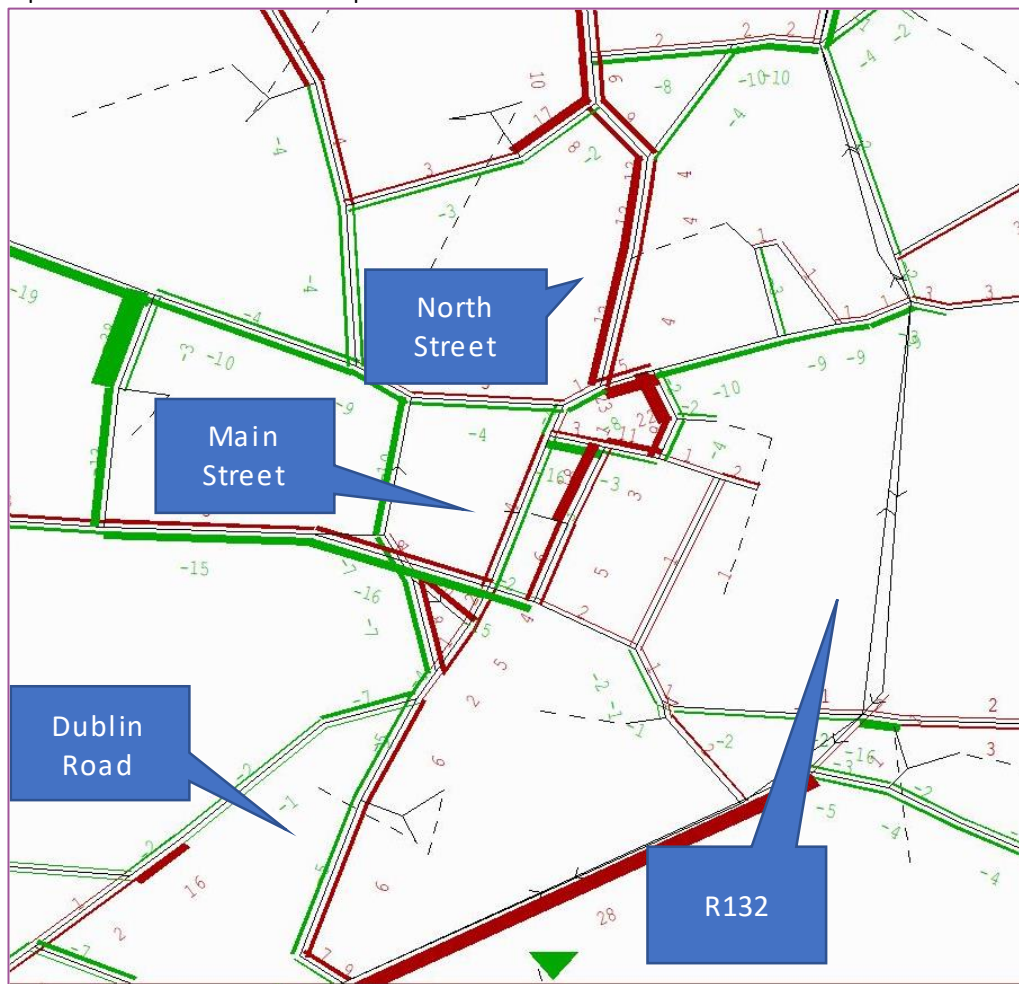
This map shows the road Flow difference in the network with and without the **Swords Western Ring Road**. In this map green represents a decrease in traffic and red represents an increase. This map zooms in on Swords Town Centre.



- In Swords, south to north movements show an increase because of traffic travelling north to get on the SWRR. Traffic on North Street increases in the northbound direction.
- East to west movements show a decrease in flow, because traffic which is travelling e.g. west on Rathbeale Road now travels north via Balheary Road and proceeds around via the SWRR.

6.2.3 Study 13 V/C Difference; SWRR / No SWRR

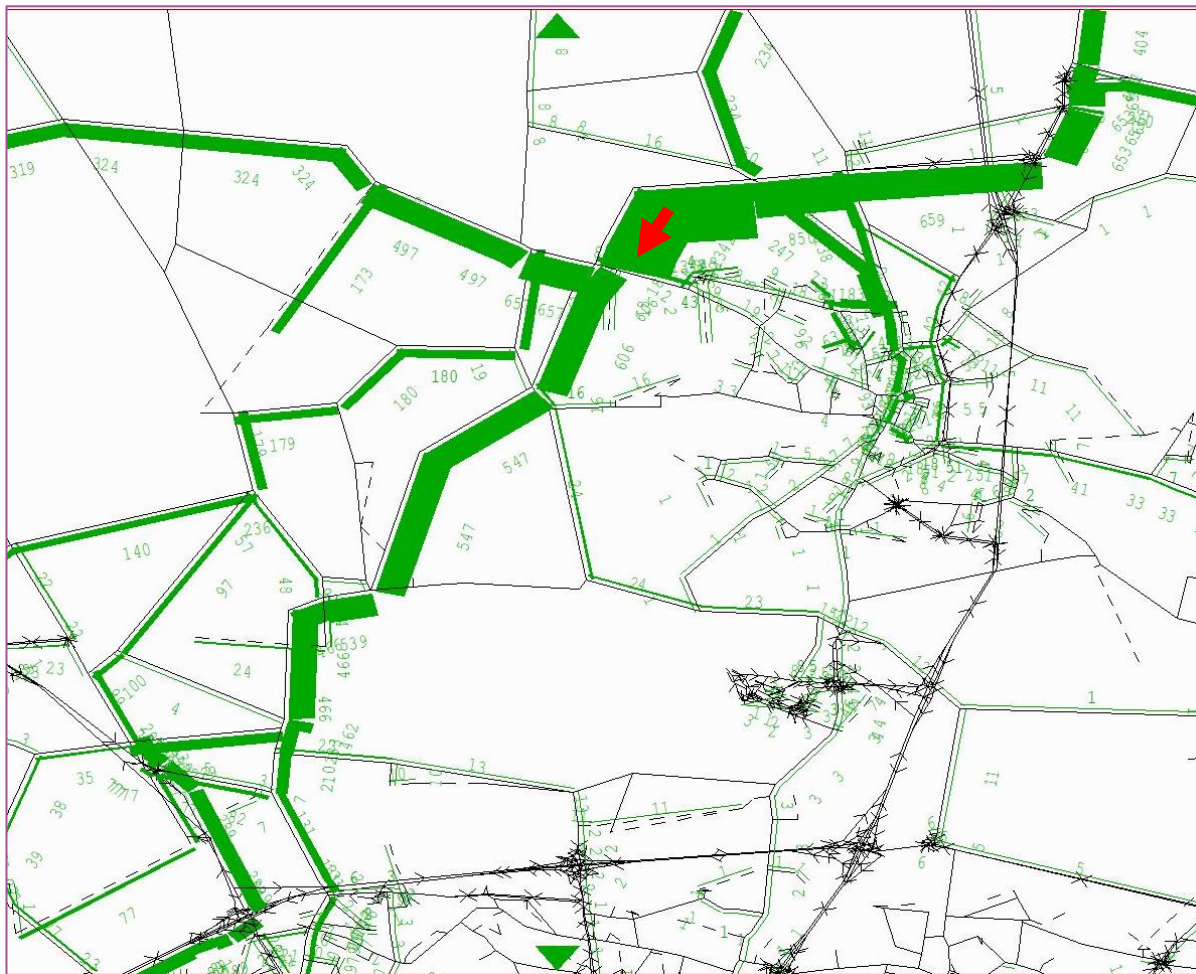
This map shows the road **volume over capacity** difference in the network with and without the **Swords Western Ring Road**. In this map green represents a decrease in v/c and red represents an increase. This map zooms in on Swords Town Centre.



- Traffic Saturation has increased at several junctions on North Street

6.2.4 Study 14 Traffic Routing on SWRR

This map shows where traffic at the busiest point (between Balheary Avenue and Rathbeale Road in the Southbound direction) is routing from and to. The location is indicated by the red arrow. The green represents traffic flow.



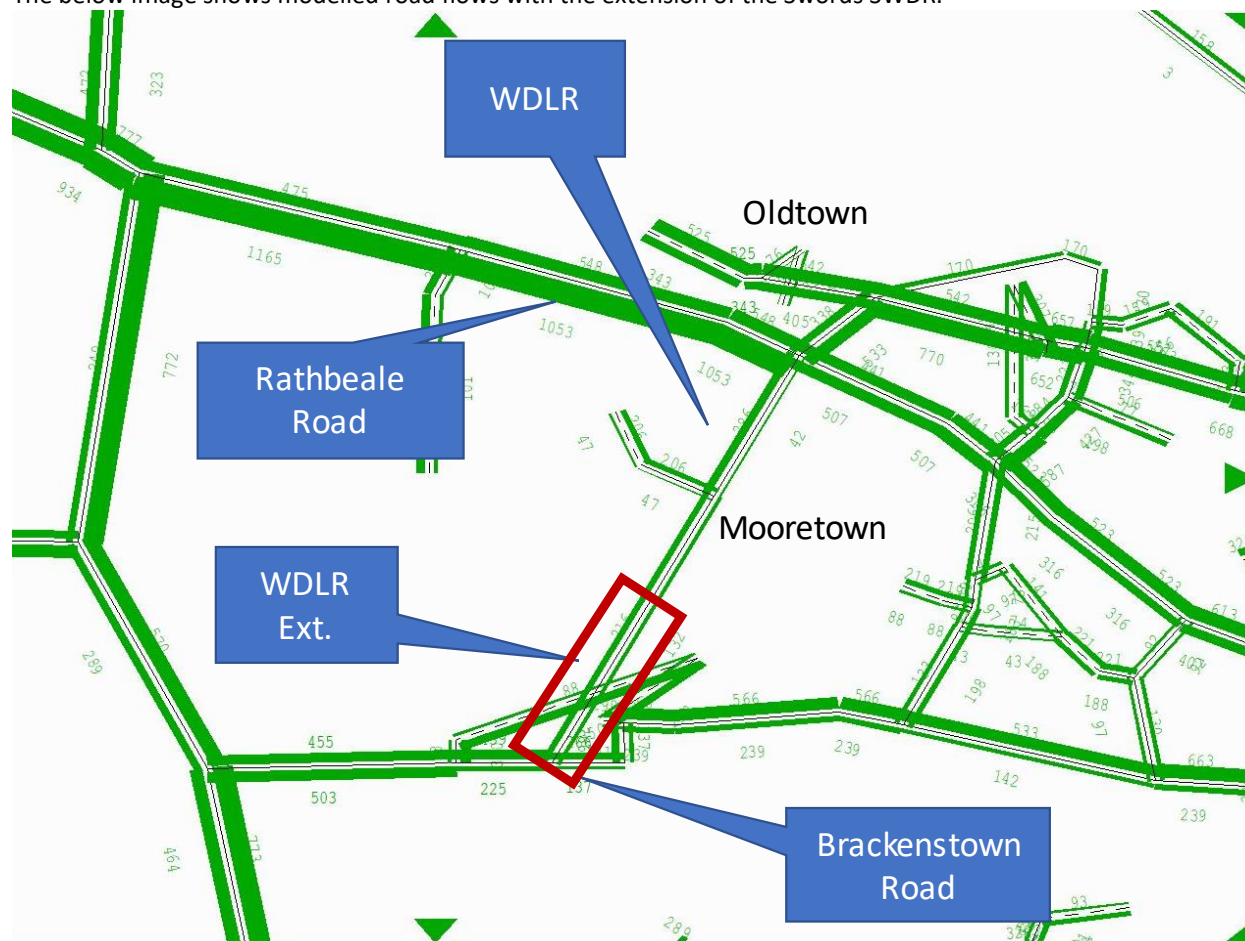
- Of the southbound flow (approx. 1200 pcu/hr), around half of it (600 pcu/hr) is accessing the Airport box
- The other half (600 pcu/hr) uses the Western Bypass to either access the R125 or to go in direction of West Fingal, especially by the R121
- Half of the traffic using the Western Bypass is coming from the R132 north of the M1 Junction
- Another 25% comes locally from Swords.
- The remaining 25% comes from northern Fingal.

6.3 Swords Western Distributor Road (SWDR) Recognised Development Assessment

This section examines the Swords Western Distributor Road with respect to the objectives and KPIs noted in the table above.

6.3.1 Study 15 Flows with SWDR

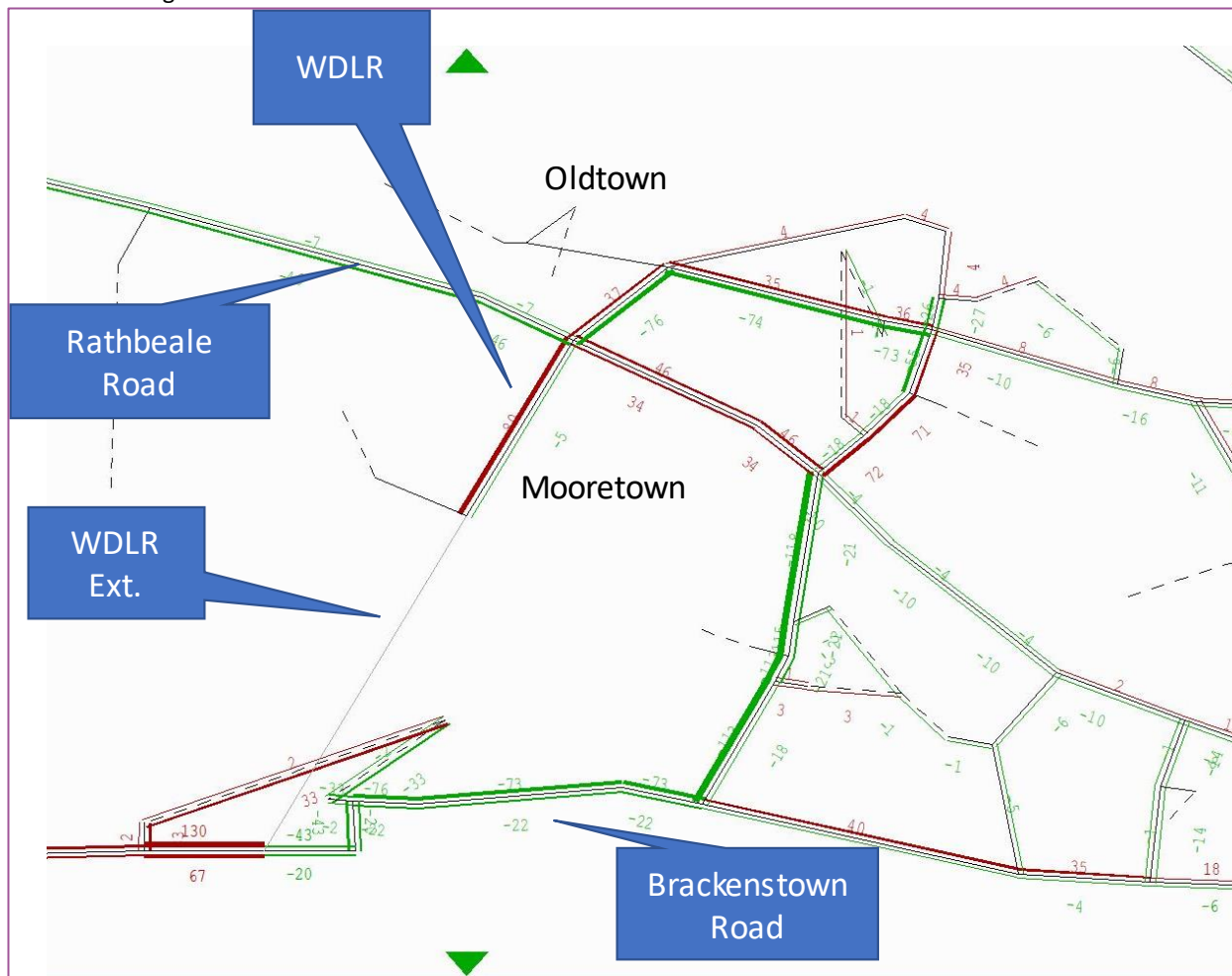
The below image shows modelled road flows with the extension of the Swords SWDR.



- The Swords Western Distributor Road (shown in the red box in the image on the left) exhibits low flows (350 pcu/hr 2-ways combined) when it is extended to the Brackenstown Road.
- The extension section is not heavily used by traffic coming from Oldtown or Mooretown.

6.3.2 Study 16 Flows Difference; With and without SWDR Extension

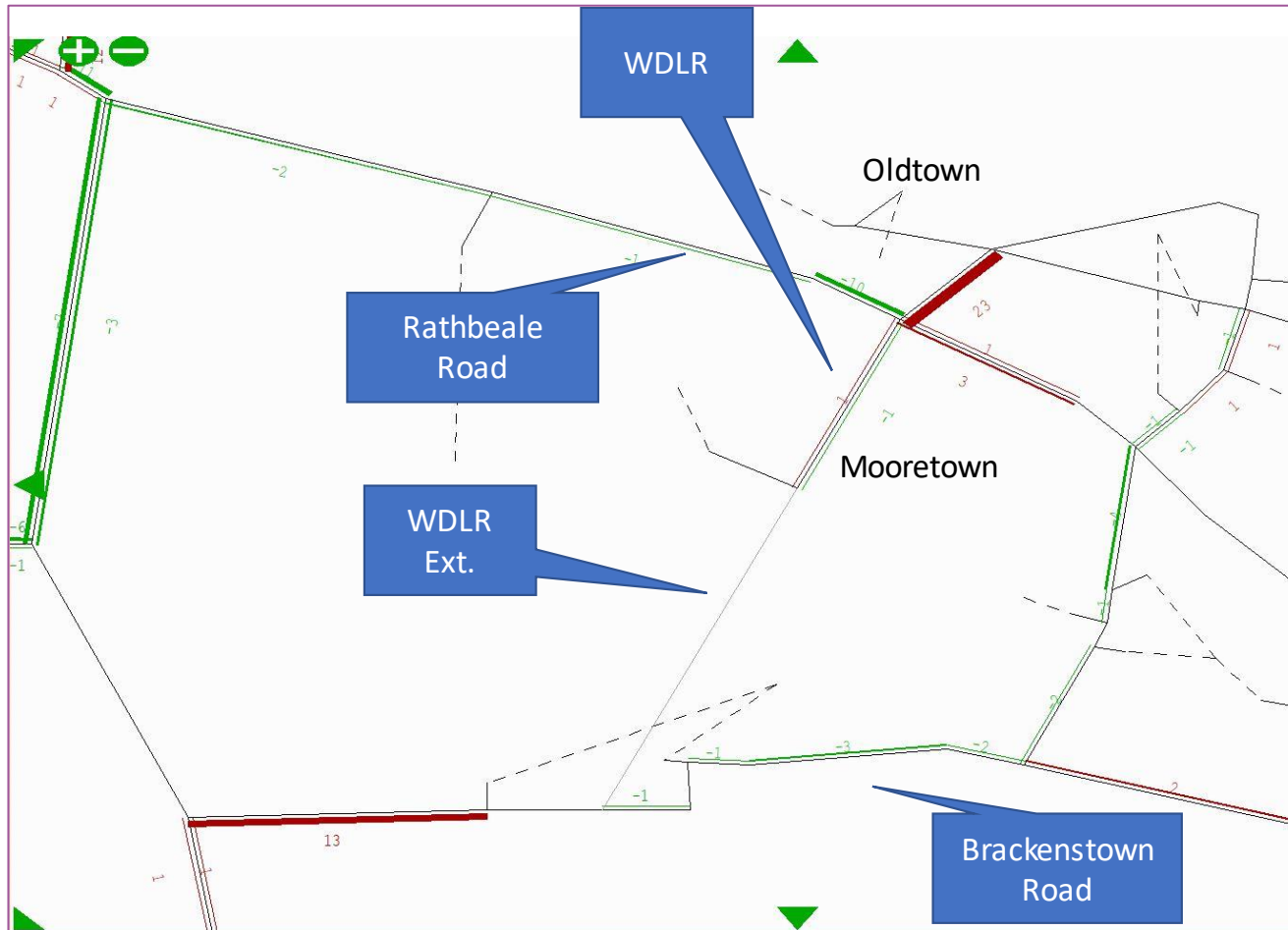
The below image shows modelled difference in flow with and without the SWDR extension.



- The SWDR extension induces a slight increase in road flow (+80 pcu/hr) on the section between Mooretown and Rathbeale Road
- There is a reduction in flows on the Brackenstown Road section east of the distributor Road, as well as on St Cronan's Avenue (-120 pcu/hr)

6.3.3 Study 17 Flow Difference; With and without SWDR Extension

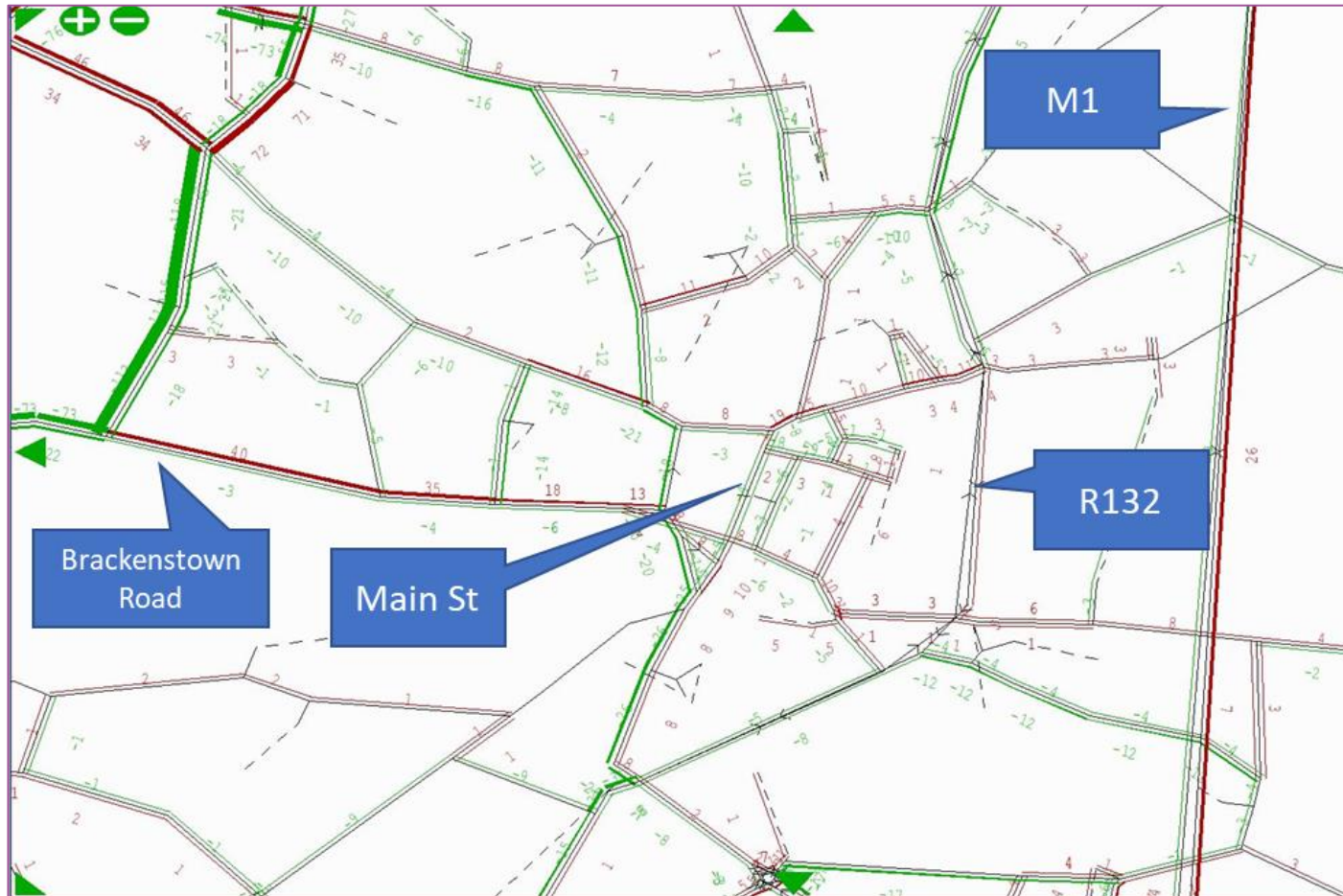
The below image shows modelled difference in flow with and without the SWDR extension.



- The extension of the Western Distributor does not result in significant variation in junction delays in the Swords North West area

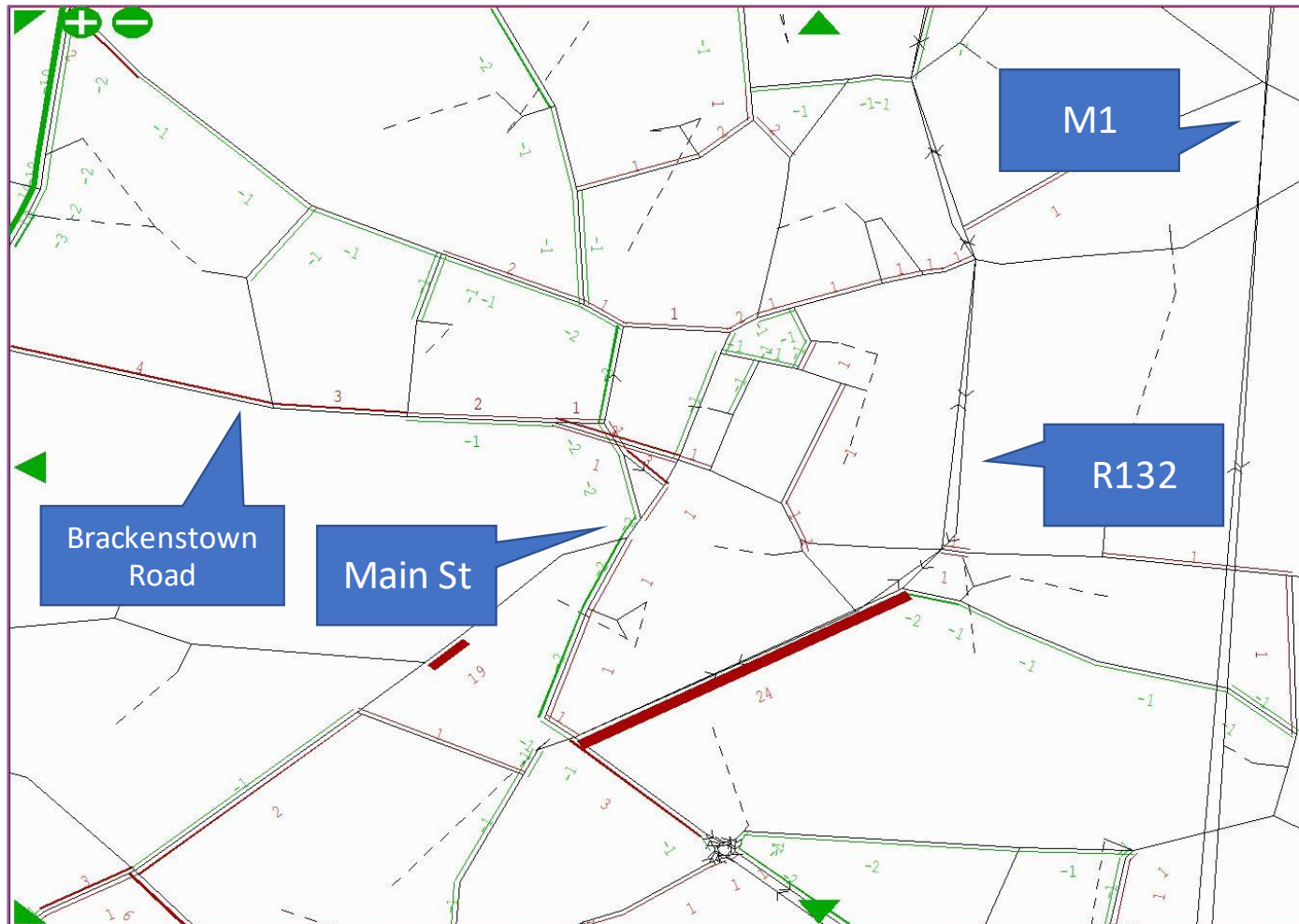
6.3.4 Study 18 Flows Difference; With and without SWDR

The below image shows modelled difference in flow with and without the SWDR extension in Swords Centre



- There is no significant reduction in flow with the extension of Western distributor

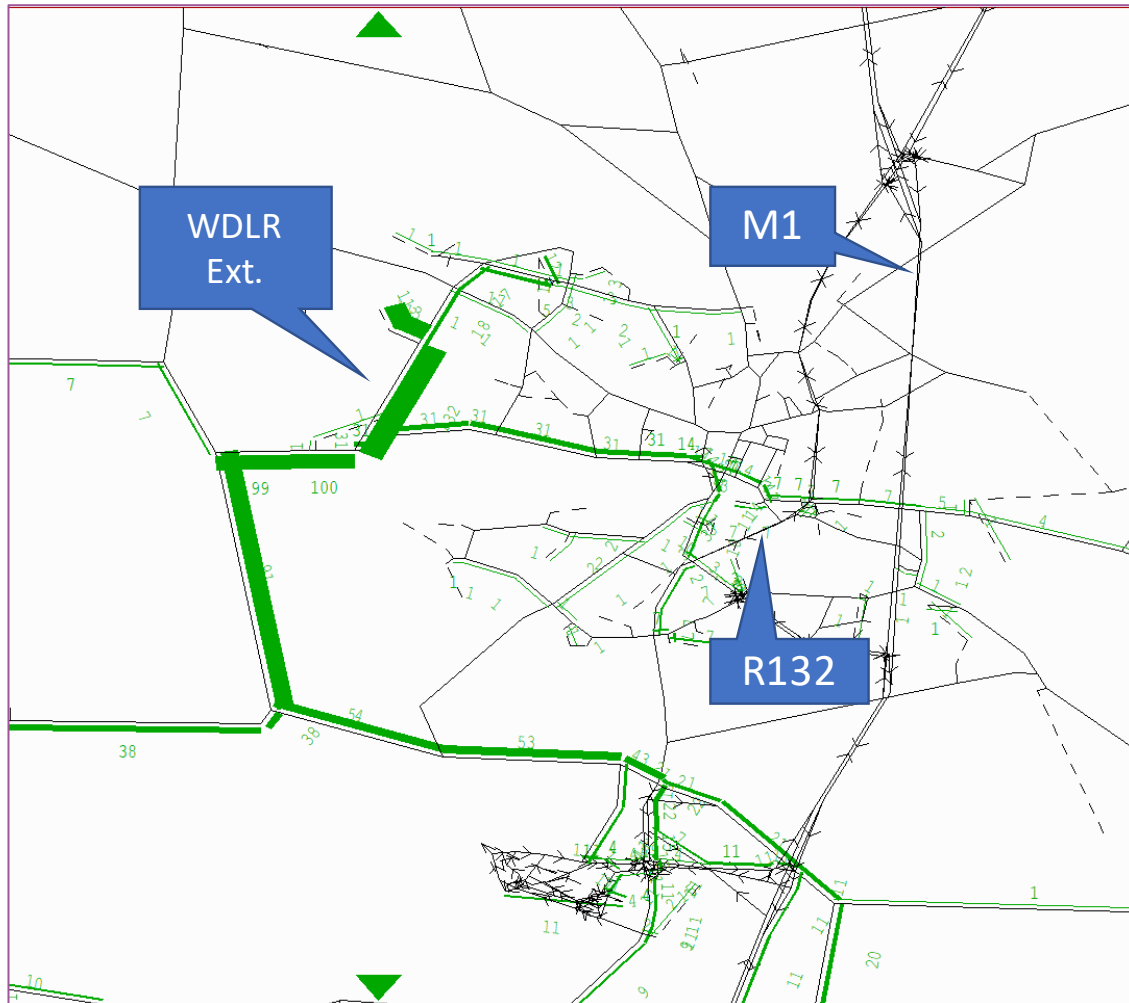
6.3.5 Study 19 V/C Difference; With and without SWDR
Swords Centre V/C Difference between DoMin and DoSomething



- At the Pinnockhill junction, there is a reduction in V/C (-24%) for the arm coming from the R132 North East

6.3.6 Study 20 Routing, SWDR

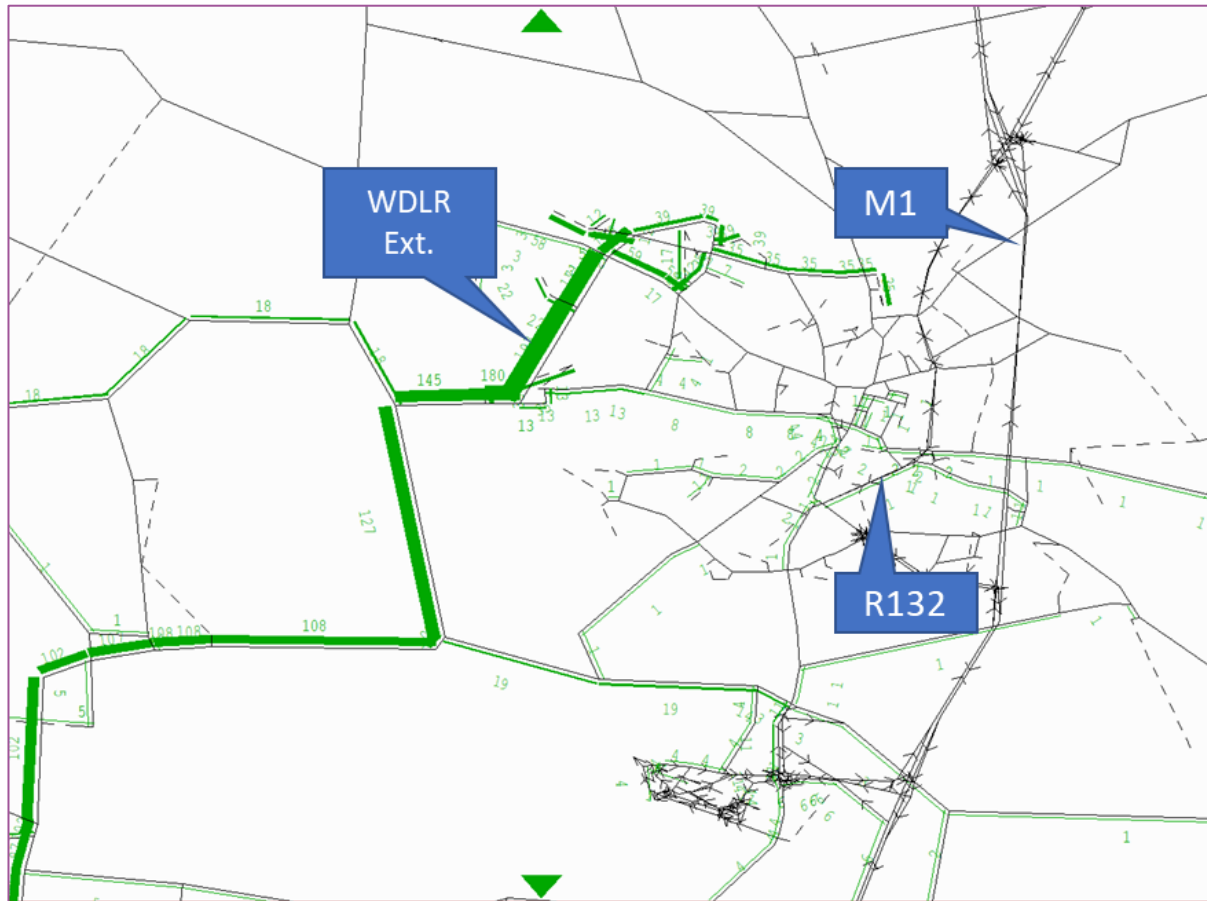
Select Link Analysis on the Western Distributor Road extension in the Southbound direction



- Most of all the traffic using the Western Distributor Road extension are coming from the Mooretown development, as well as a small fraction from the Applewood area
- Only a small section of the traffic is accessing the Swords City Centre, while the majority of trips is going accessing the Airport box.

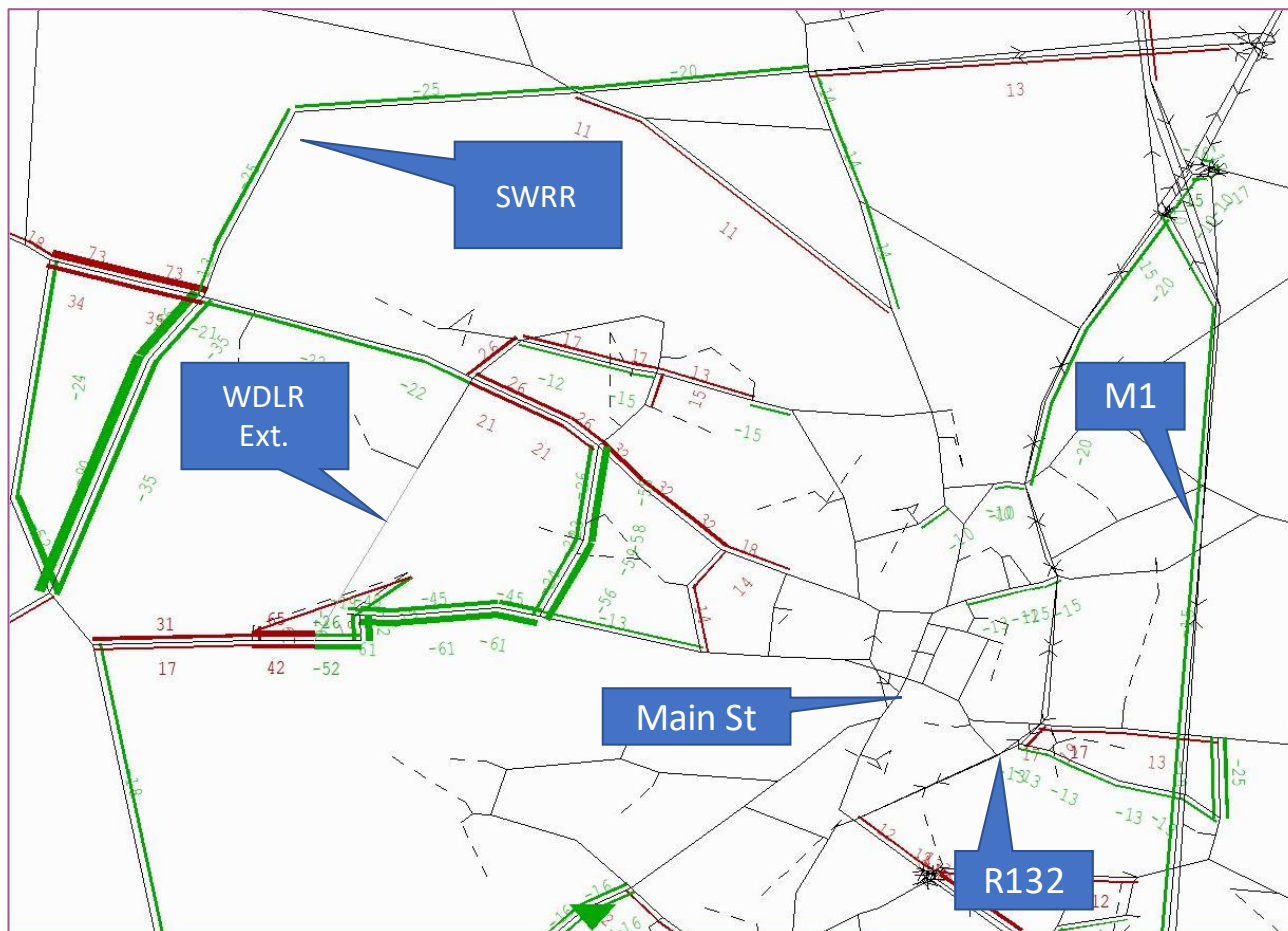
6.3.7 Study 21 Flows SWDR Swords Western Distributor

Select Link Analysis on the Western Distributor Road extension in the Northbound direction



- The network plot on the left shows routes taken by traffic on the SWDR going northbound.
- It is evident that a significant proportion of the traffic originates from western areas, and some of the traffic proceeds to the new development areas, and some is destined for Swords.

6.3.8 Study 22 Flows SWDR Swords Western Distributor
 The SWRR – Flow Difference with or without the Western Distributor Link Road



- Change in flow on the Swords Western Relief Road with the inclusion of the Distributor is limited
- The two road schemes have limited influence on each other.

6.4 Area Based Assessment

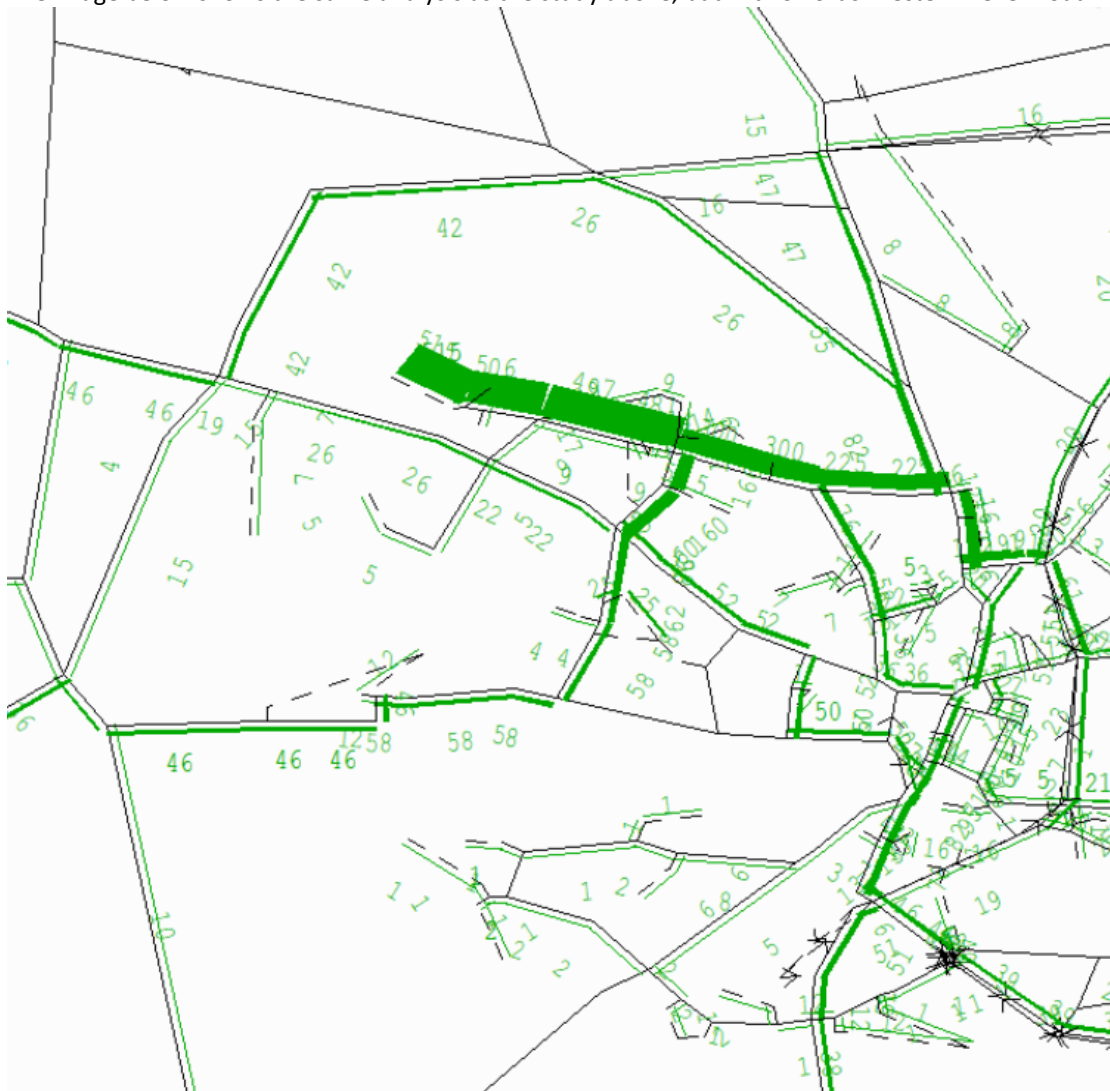
This section examines the Swords Western Distributor Road with respect to the objectives and KPIs noted in the table above.



6.4.2 Study 23 Oldtown Mooretown Traffic Distribution with SWRR

The image below shows the same analysis as the study above, but with Swords Western Relief Road in place.

- Almost no traffic from the development uses the SWRR



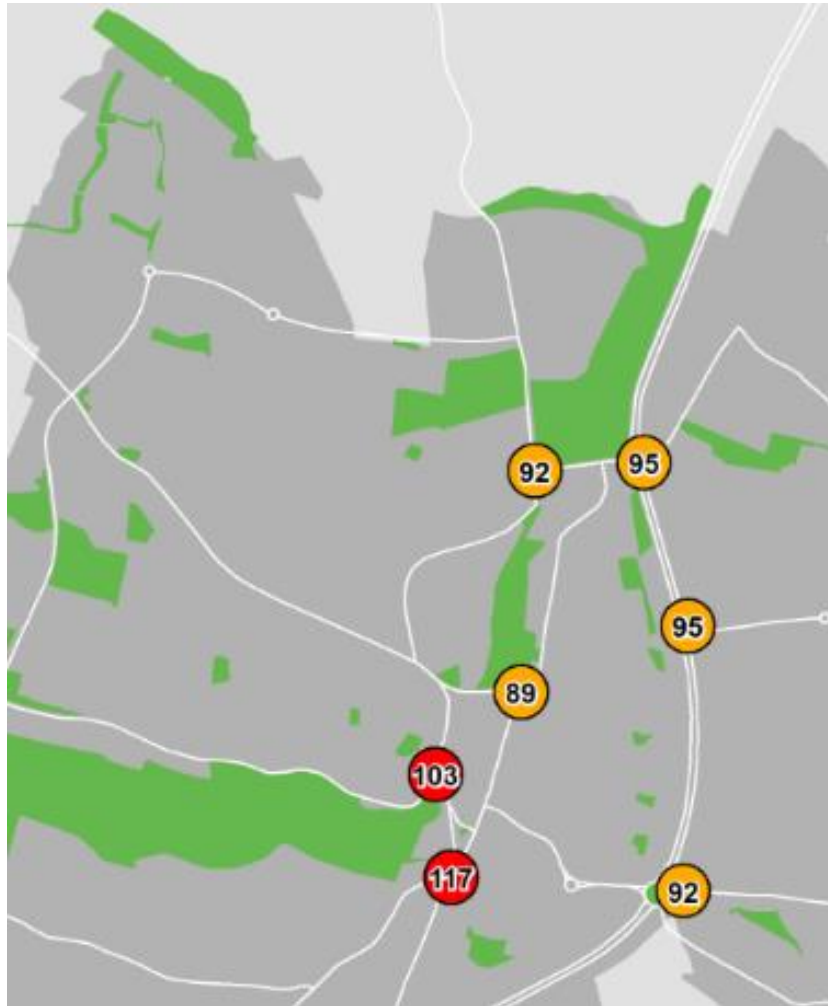
6.5 Volume / Capacity Maps

The maps below show the performance of the Swords network going from present day (2016), to the future with Recognised Development in place. The data presented includes car mode share per model zone (white boxes) and volume to capacity at junctions (in coloured circles, on V/C greater than or equal to 70% are shown). The image on the right shows worsening traffic conditions due to the additional 1,500 car trips generated largely from Oldtown/Mooretown.

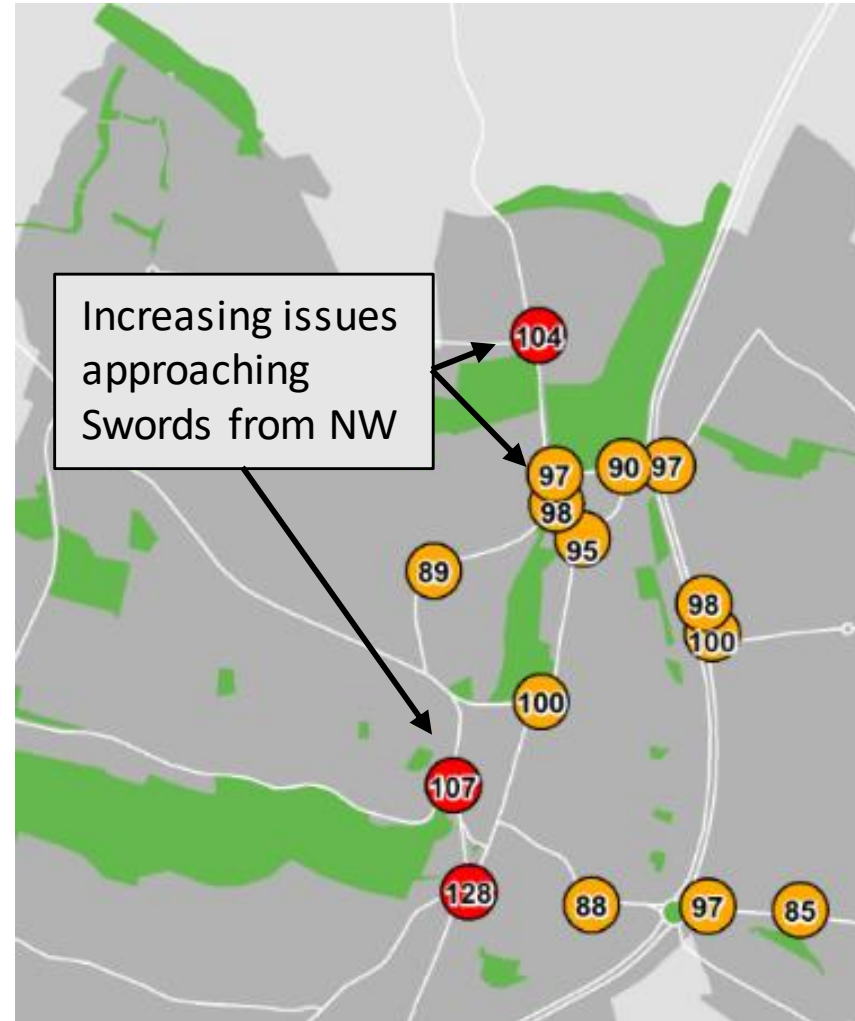
The images below present volume to capacity ratios that are above 85% (which is considered to be an indication that junction operation needs attention) for the 3 main scenarios. Key points to note are:

- In the 2016 model the sections of road from Balheary Road / Castle Grange Green and onward to the R132 experience congestion in the AM peak hour, with V/Cs over 90%, which implies a build-up of delay.
- With increased development (in the Do Min 2027) more car traffic causes more junctions in the vicinity to appear above the 85% threshold. In the second image the R125 and the North St. junctions, and each end of the narrow section of Balheary Road near North St, also show potential issues
- With mode share decreasing in car under the Enhanced Bus scenario, the problems that appear at the Balheary / R125 / North St junctions seem to resolve due to the general reduction in car traffic.
- The following junctions remain however,
 - Section of Balheary Road to North Street
 - Brackenstown Road to Church Road and vice-versa
 - Forest Road to Dublin Road remains very congested.
 - Malahide Road Roundabout

Do Min 2016



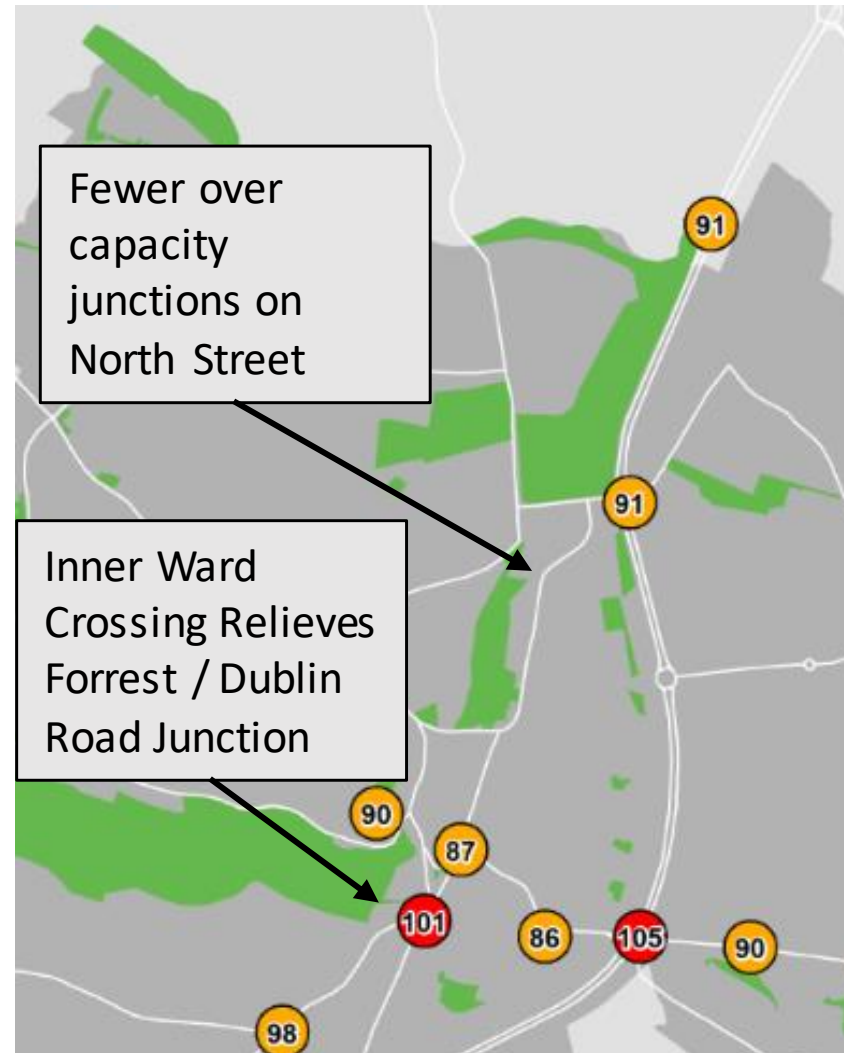
Do Min 2027



GDA Strat 2027



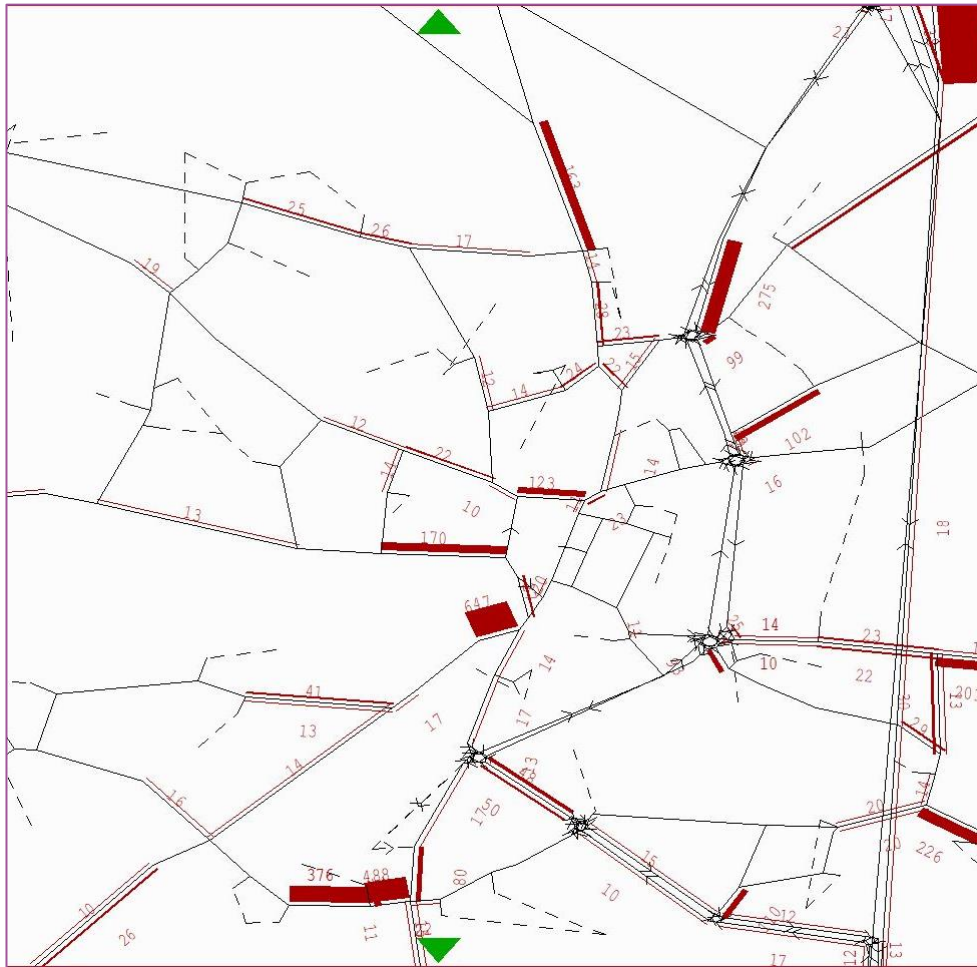
FCDP Roads 2027



6.6 Swords Outline Traffic Management Plan

6.5.2 Study 25 Swords Off Peak Comparison

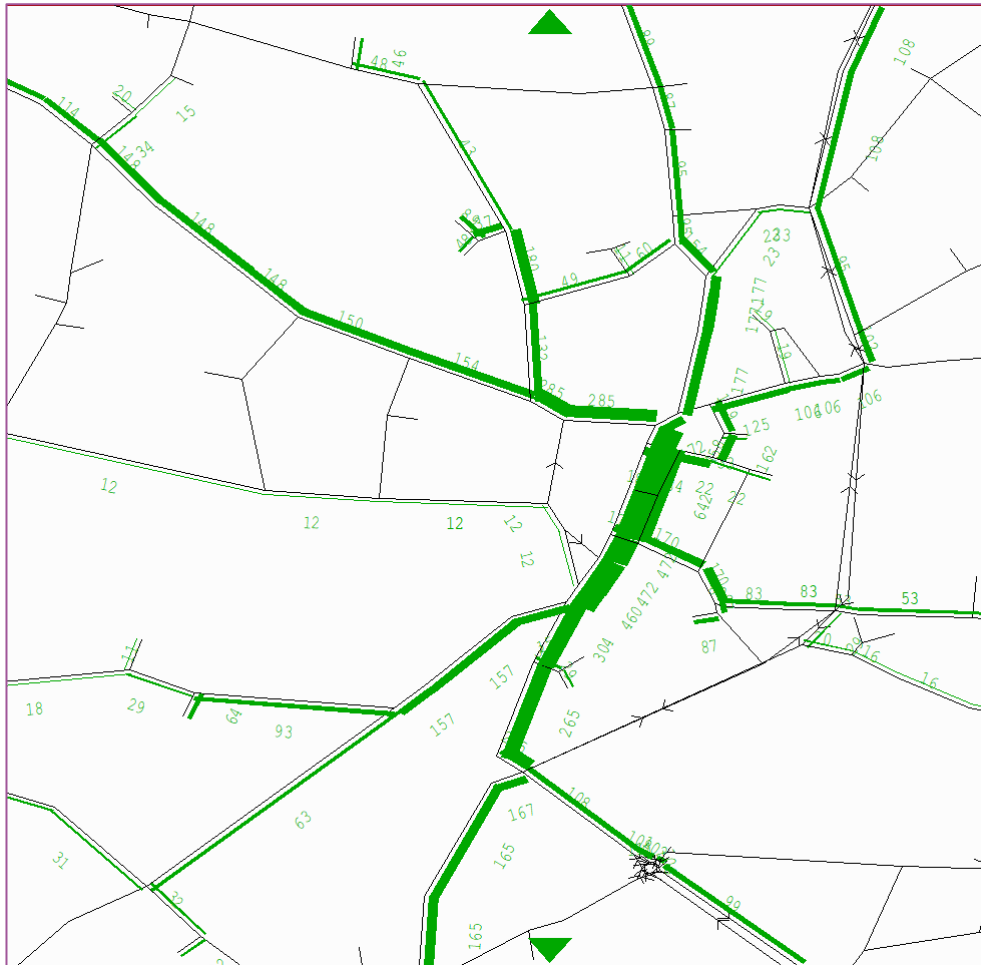
Delay Difference between Off Peak Network and AM Peak Network



- The difference in delay between the Off Peak Network and the AM Peak Network highlights the problematic junctions of the network

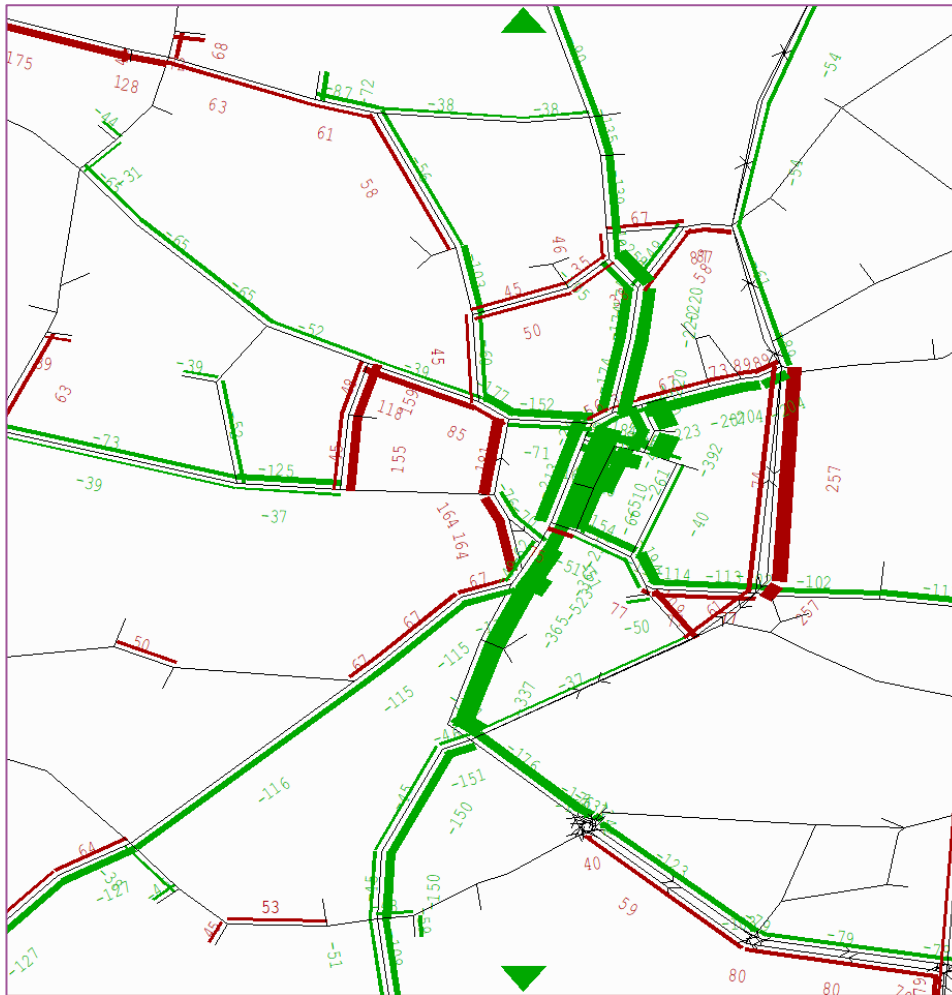
6.6.1 Study 26 Swords Main Street Through Traffic

Select Link Analysis on Main Street Southbound for the existing 2016 Situation



- Most of the traffic using Main Street Southbound access the R132 or the R125 via the Pinnockhill junction.
- This traffic could be rerouted onto the R132 Swords Bypass using mitigation traffic measures
- A significant section of the Main Street traffic is accessing the River Valley residential areas. The Fosterstown Link Road could help this traffic access the R132 Swords Bypass

6.6.2 Study 27 Main Street Bus Gate Reduction in Flow Flow Difference with the implementation of traffic management measures

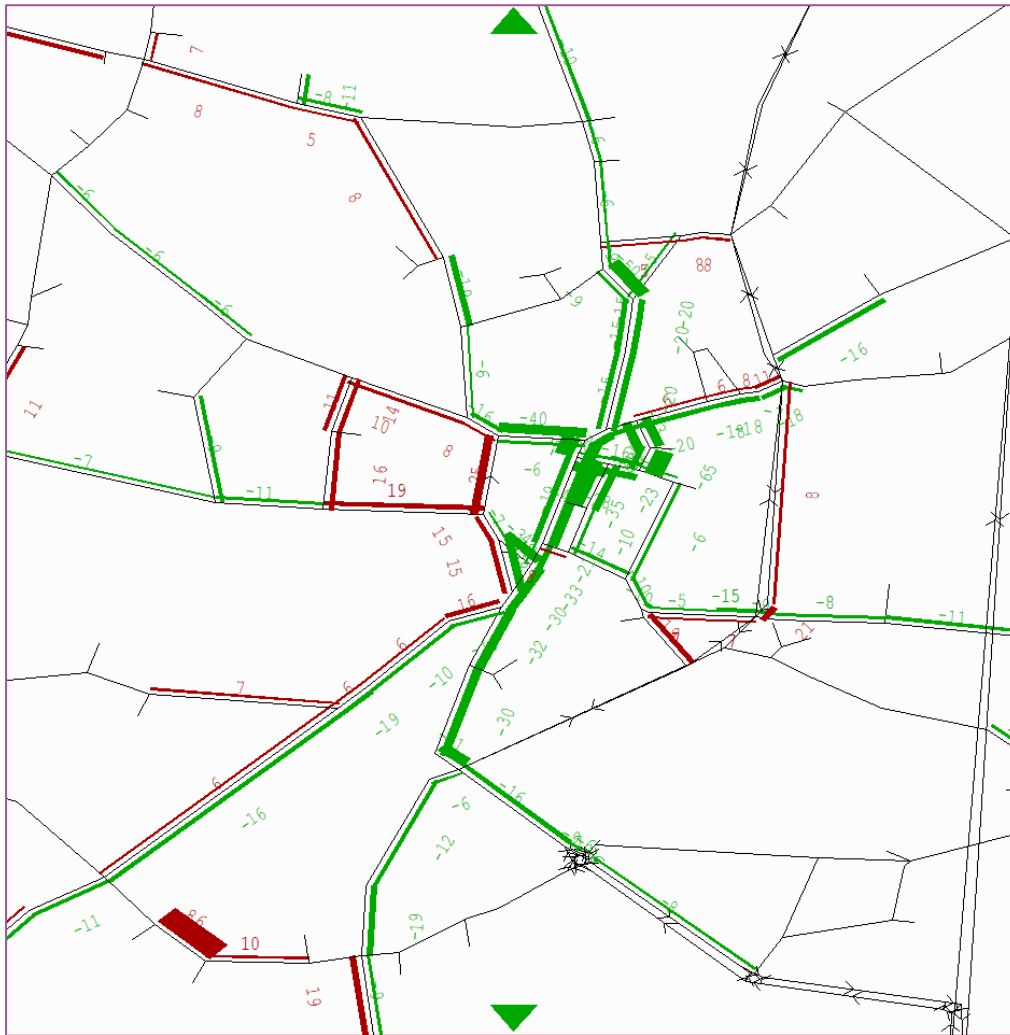


- There is a significant reduction in flow on Main Street and its area (-500 pcu/hr on Main Street Southbound)
- Traffic is increased on the R132 Swords Bypass (250 pcu/hr)
- There is an increase in traffic on Church Road Northbound (+150 pcu/hr)



6.6.3 Study 28 Main Street Bus Gate V/C Changes

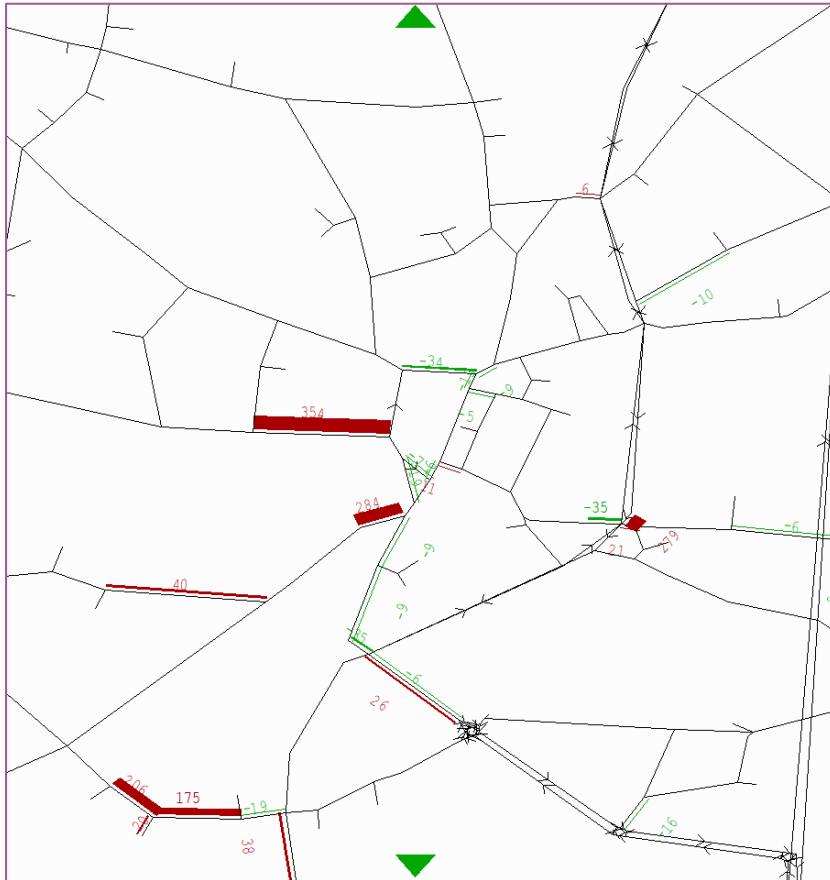
Volume over Capacity Difference with the implementation of traffic management measures



- The traffic pressure on Main Street area is decreased with the traffic management measures
- There is slight increase in V over C in the Brackenstown area



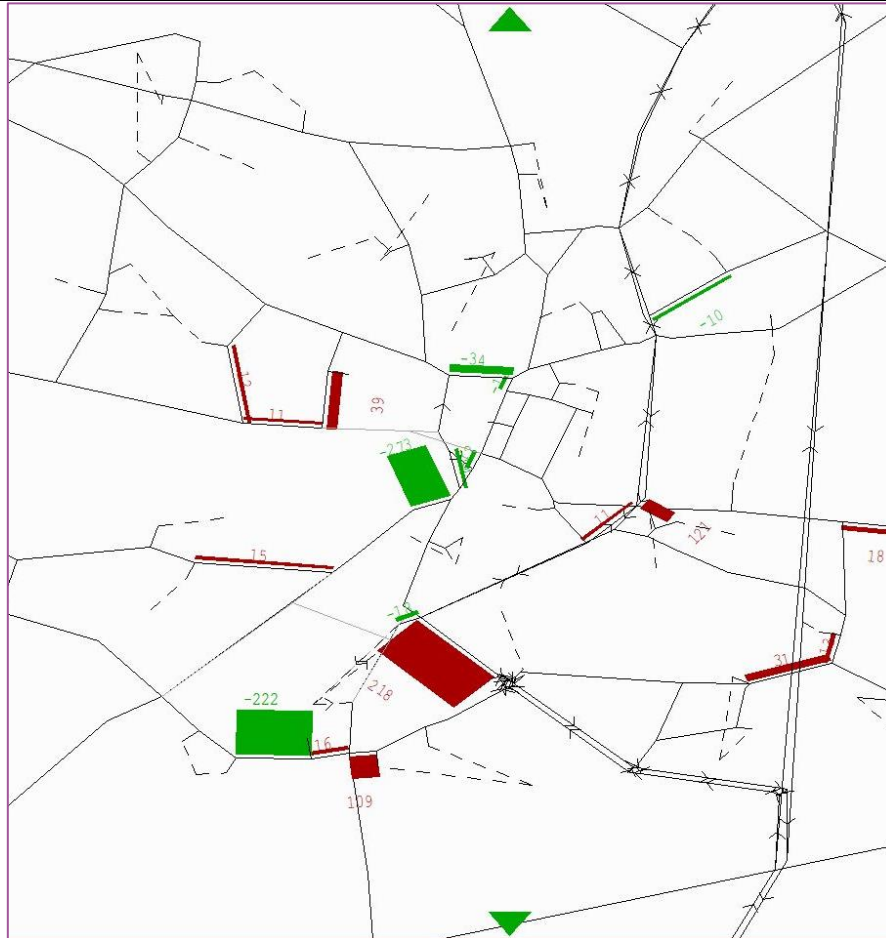
6.6.4 Study 29 Main Street Bus Gate Delay Changes Delay Difference with the implementation of traffic management measures



- Vehicles coming from Brackenstown Road into Church Road and Forrest Road into Main Street face an increase in traffic with the traffic management measures
- Improvements of these junctions' layouts could reduce delays.

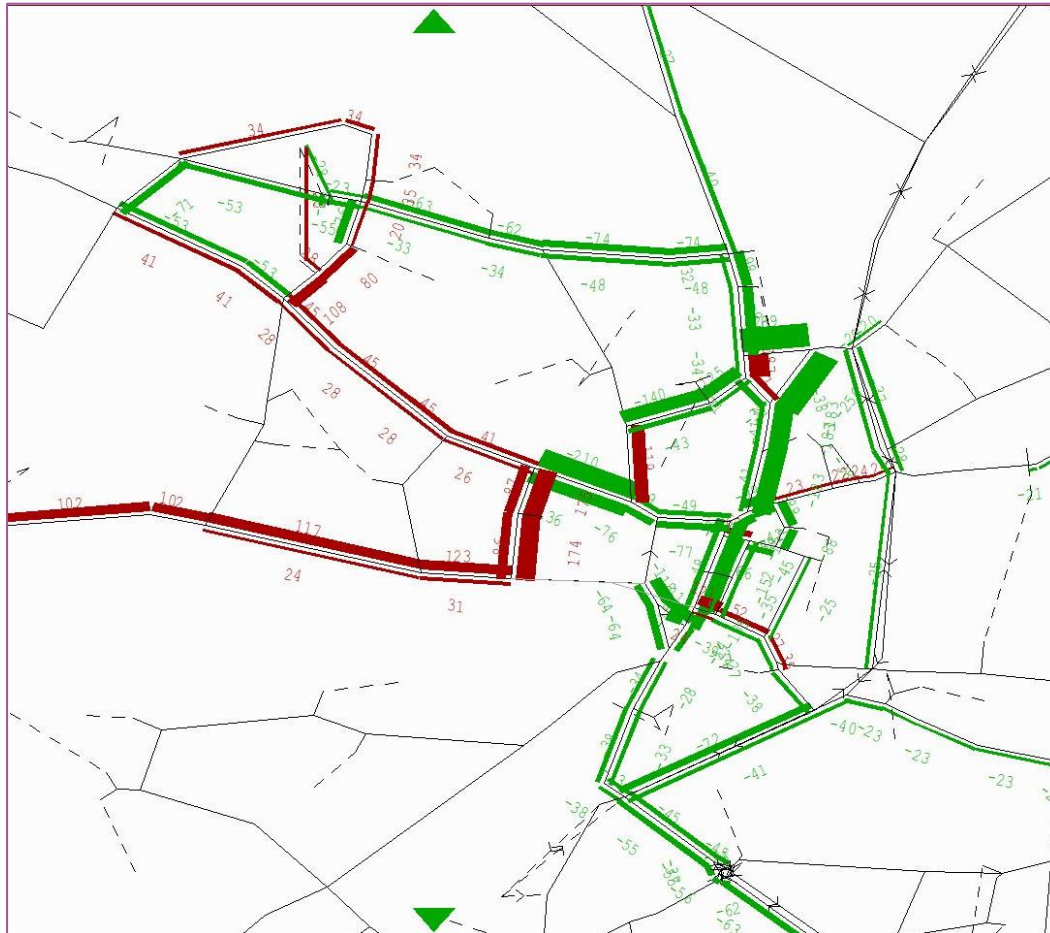
6.6.5 Study 30 Main Street Bus Gate + Junction Improvements

Delay Difference with the implementation of traffic management measures + Fostertown Link and the Inner Ward River Crossing



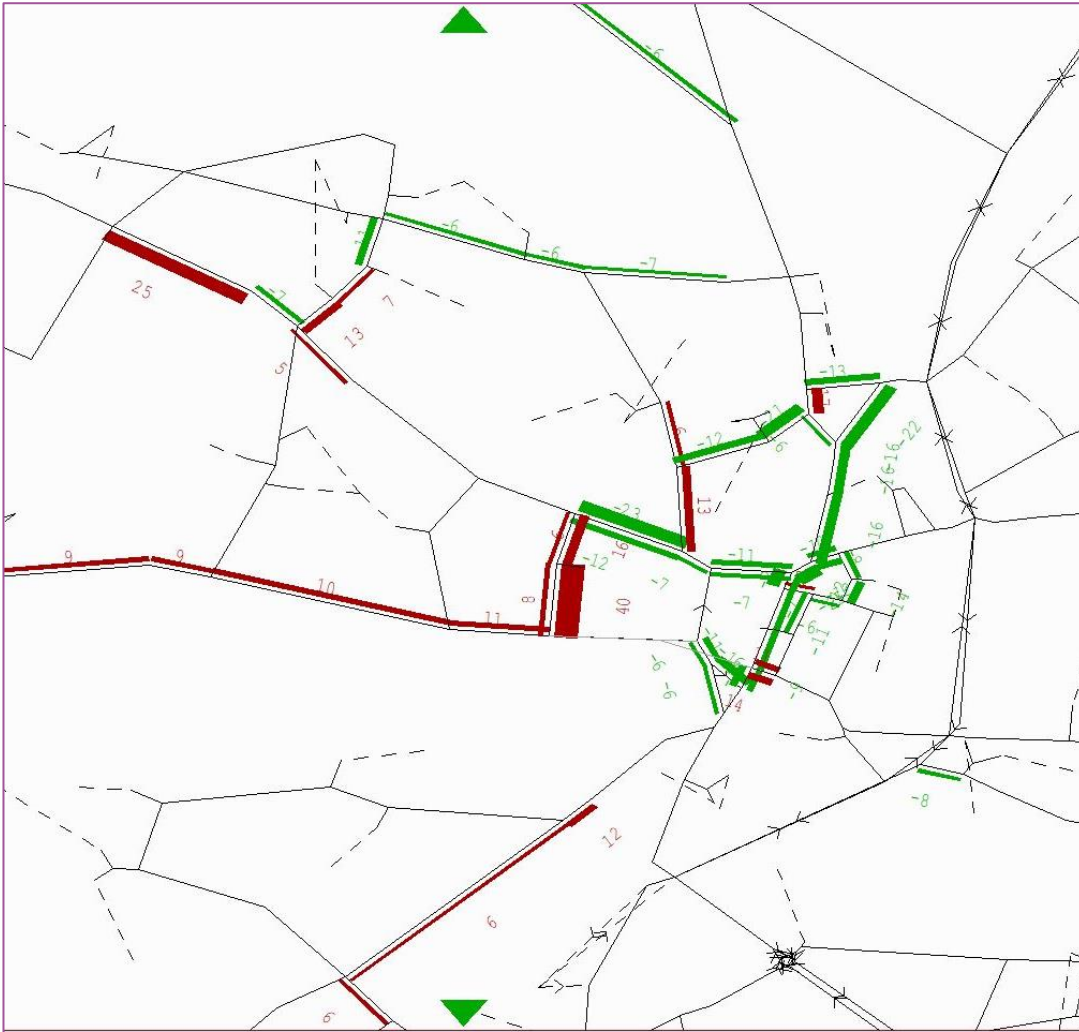
- Vehicles coming from Brackenstown Road into Church Road and Forrest Road into Main Street face an increase in traffic with the traffic management measures
- Improvements of these junctions' layouts could reduce delay

6.6.6 Study 31 Flow Diff; Swords Inner Ward River Crossing Flow Difference with the inclusion of the Inner Ward River Crossing



- There is a reduction of flow on Main Street (-150 pcu/h Southbound), as well as on North Street and on the Rathbeale Road section just before Main Street
- Traffic flow on Brackenstown Road is increasing in the Eastbound direction (+ 120 pcu/hr)

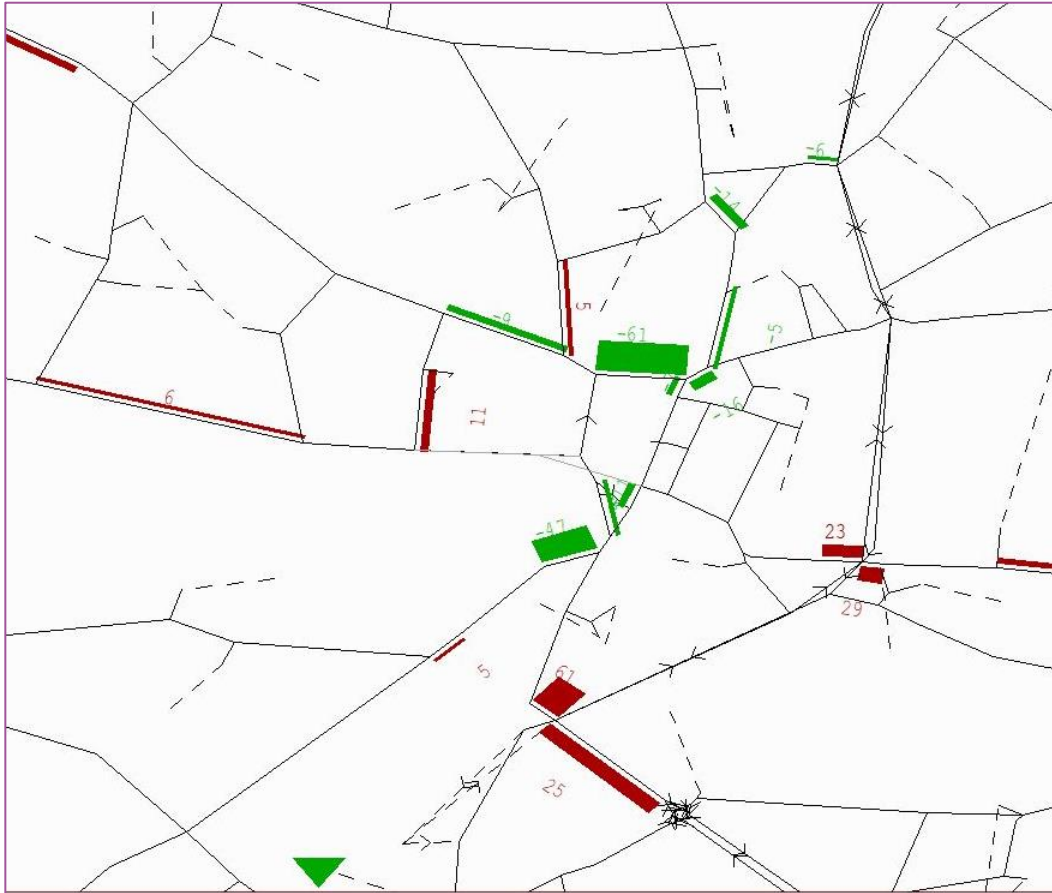
6.6.7 Study 32 V/C Diff; Swords Inner Ward River Crossing Volume over Capacity Difference with the inclusion of the Inner Ward River Crossing



- V over C Ratio is decreasing in the Main Street area
- V over C Ratio is increasing slightly on Brackenstown Road



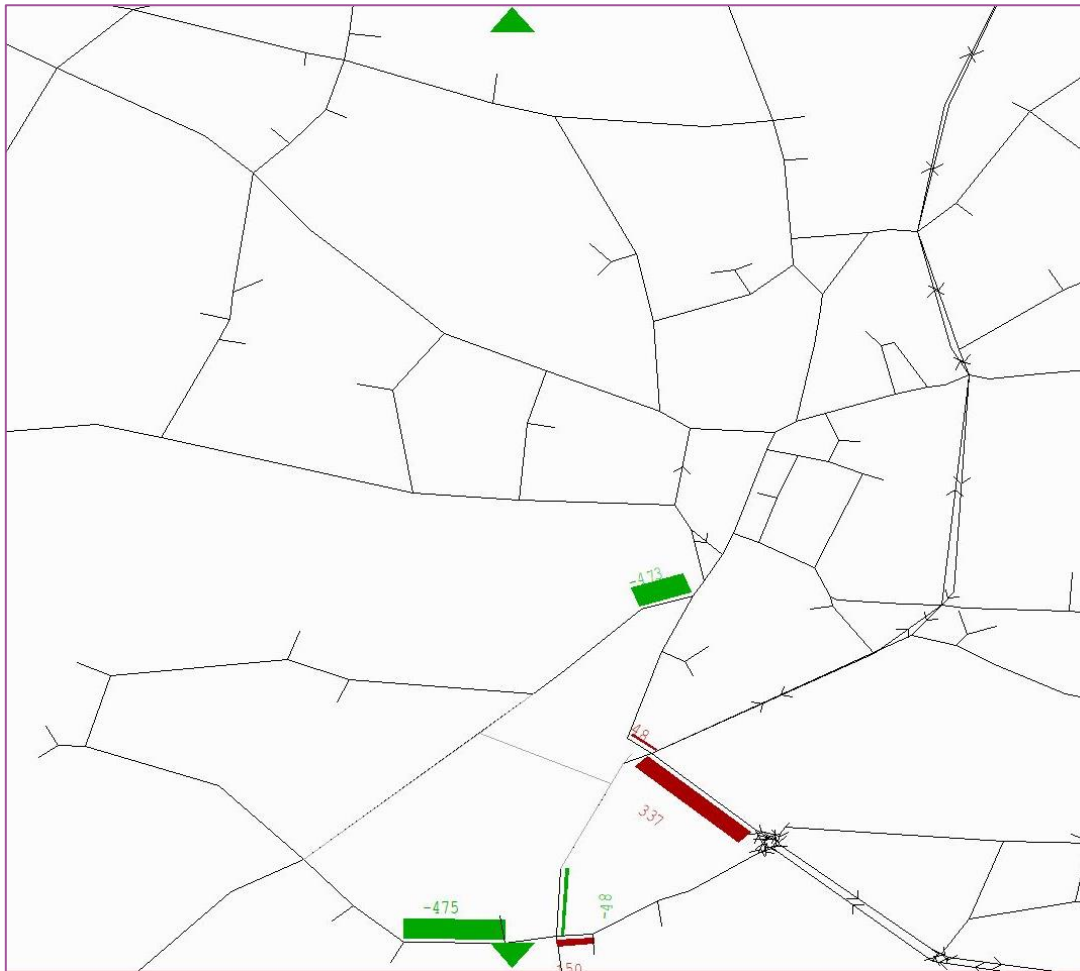
6.6.8 Study 33 Delay Diff; Swords Inner Ward River Crossing
Delay Difference with the inclusion of the Inner Ward River Crossing



- There is a significant reduction in delay approaching the Main Street area

6.6.9 Study 34 Delay Diff; Fosterstown Link

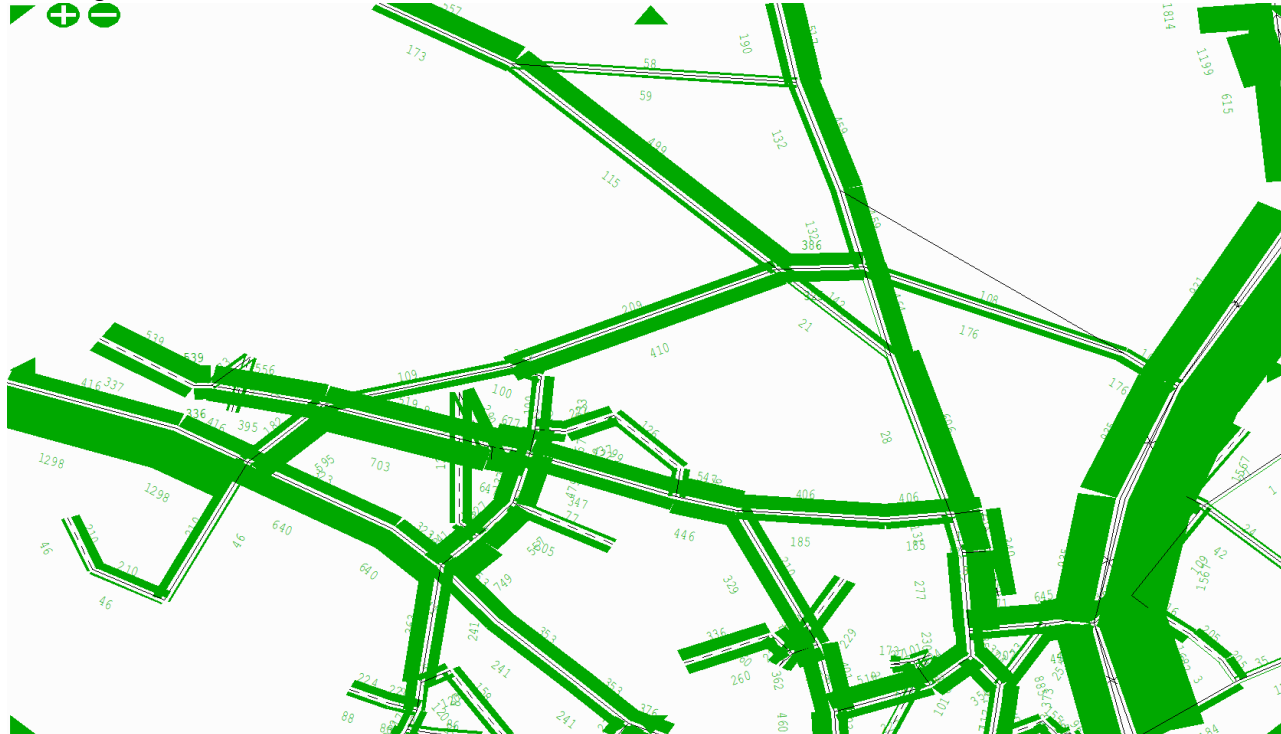
Delay Difference with the inclusion of the Fosterstown Link



- The inclusion of the Fosterstown Link brings significant reduction in delay on the parallel links which are Forest Road and the L2300
- However, delay increases at the Pinnockhill junction, which may require further optimisation

6.6.10 Study 35 Flow; Northern Section of the SWDR

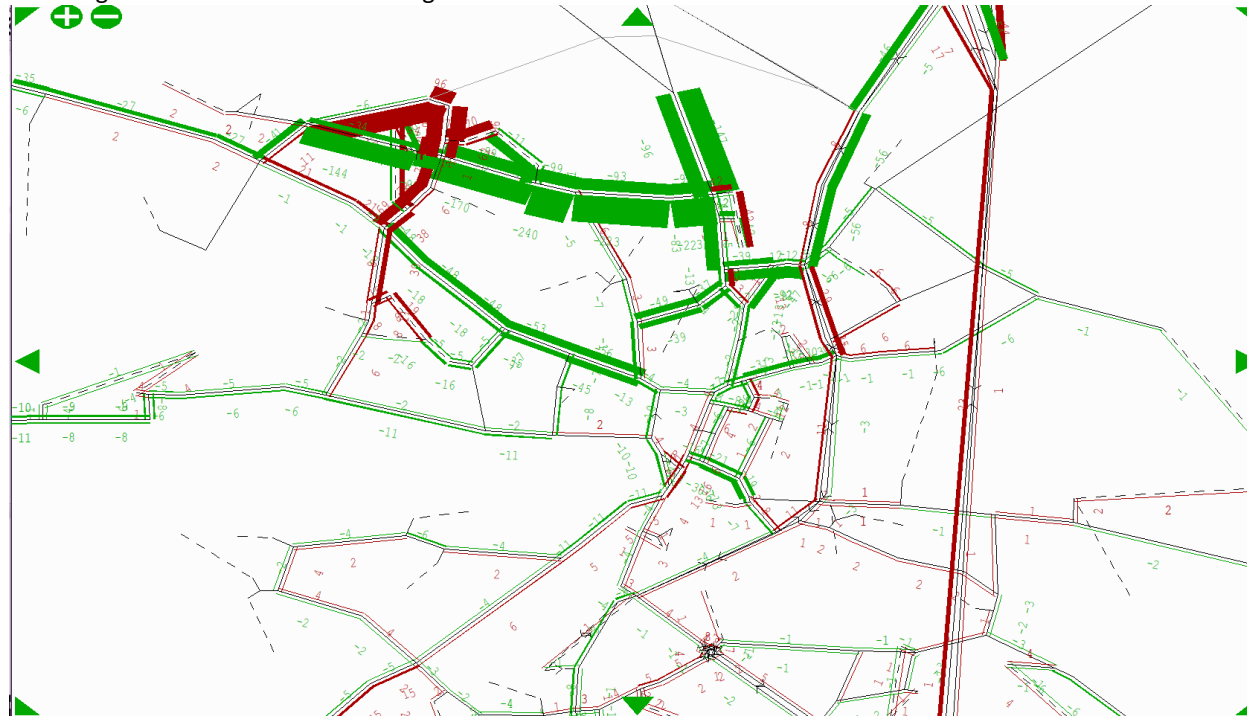
The image below shows the actual flow with the introduction of the Northern Section of the SWDR.



- Flow on the Northern Section of the SWDR is quite low with a maximum of 400 pcu/hr Westbound between Balheary Road and the Oldtown area and 200 pcu/hr Eastbound.
- Flows on the section between Balheary Road and the R132 are very low (with 180pcu/hr Westbound and 110 pcu/hr Eastbound)

6.6.11 Study 36 Flow Difference; Northern Section of the SWDR

The image below shows the flow changes with the introduction of the Northern Section of the SWDR.



- The introduction of the Northern Section of the SWDR brings reduction in flow on Glen Ellan road (-240 pcu/hr)
- The flows on the Ashton Distributor Road are however increased
- Flows on Rathbeale Road are slightly reduced with the introduction of the new road
- The link will become more important with the introduction of Park and Ride at Lissenhall, the additional resilience it would provide to the overall network by enabling easier bypass of the town centre and less reliance on the Glenn Ellan road.