Cork County Council

Carrigaline Transport and Public Realm Enhancement Plan

Baseline Report

R001

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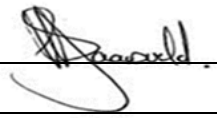
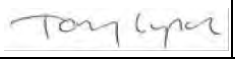
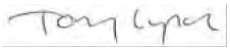
		Signature			
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1 Introduction

1.1 Background

Cork County Council appointed Arup to prepare the Carrigaline Transport and Public Realm Enhancement Plan (TPREP).

The objective of the Carrigaline TPREP is to deliver a framework that provides an integrated approach to transport planning for Carrigaline and its environs, which is focussed on alleviating current congestion while also facilitating sustainable growth and development. The transport strategy will be complemented by a sympathetic public realm enhancement plan for the town centre to make it more attractive to pedestrians and business investment.

The TPREP will deliver an infrastructure investment strategy in line with envisaged growth and sustainability principles set out in national and local planning and policy documents.

The TPREP will consider future development within and around Carrigaline, and it will review the Strategic Land Reserve (SLR) in this context with a view of strengthening local employment opportunities, developing strategies to move away from car dependency and to create an enhanced public space for the residents and visitors to Carrigaline, Co Cork.

1.2 Project Programme

Arup commenced the study in Summer 2020 and an initiation meeting was held on 20 July 2020. A summary of the Carrigaline TPREP project programme is shown in **Figure 1** below:

There are five project stages for the Carrigaline TPREP. Stage 1: Project Initiation has been completed and we are progressing to Stage 2, public consultation.

Stage 1 focused on delivering a baseline study, collecting data, identifying gaps and opportunities and constraints. Stage 1 was also to provide an opportunity to formulate an understanding of the current transportation network within Carrigaline and to understand the transportation demands of its commuters.

In addition, a Vision was developed for Carrigaline with strategic objectives and an evaluation framework with key performance indicators to direct and assist with the delivery of the Vision.

The remaining stages will be carried out over the coming months and includes the first and second public consultation rounds, the strategy development and finalisation of the report.

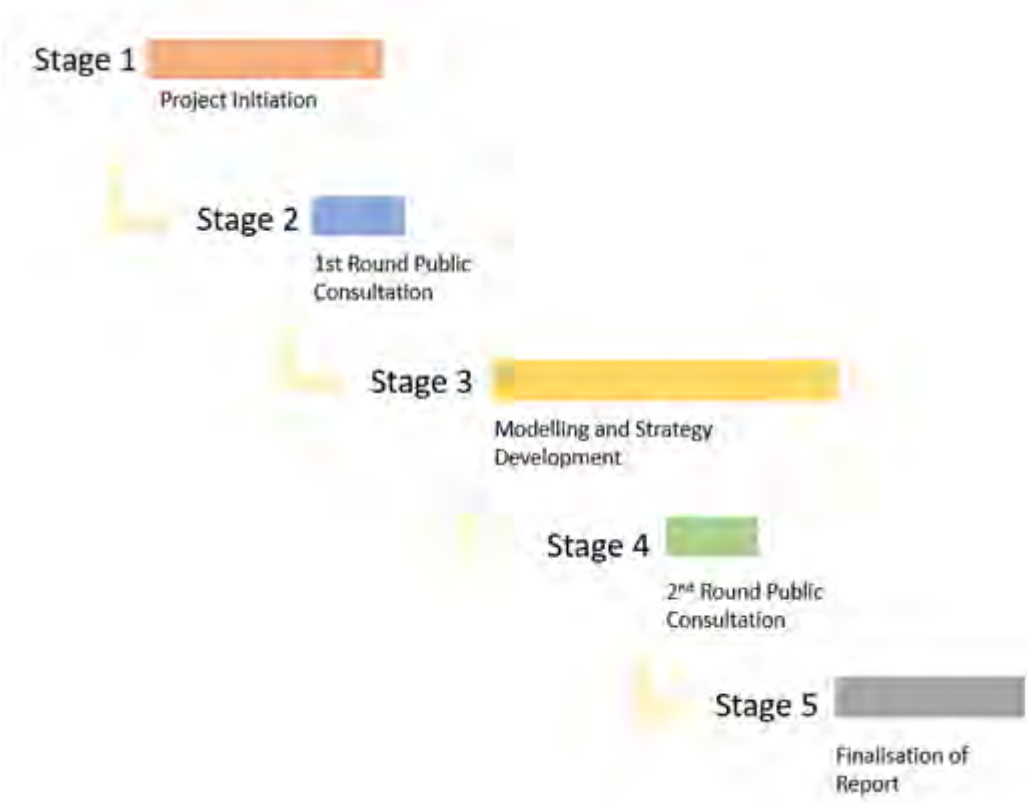


Figure 1: Project Programme

1.3 Purpose of this Report

The purpose of this report is to consolidate the background information and to provide a detailed record of the activities that took place in Phase 1: Project Initiation. The report therefore forms the baseline for the remainder of the project, setting an understanding of the study area and the framework in which it takes place.

A summary of this report will be included within the final report for the project.

1.4 Site Context

Figure 2 shows the location of Carrigaline, within the wider region of County Cork.

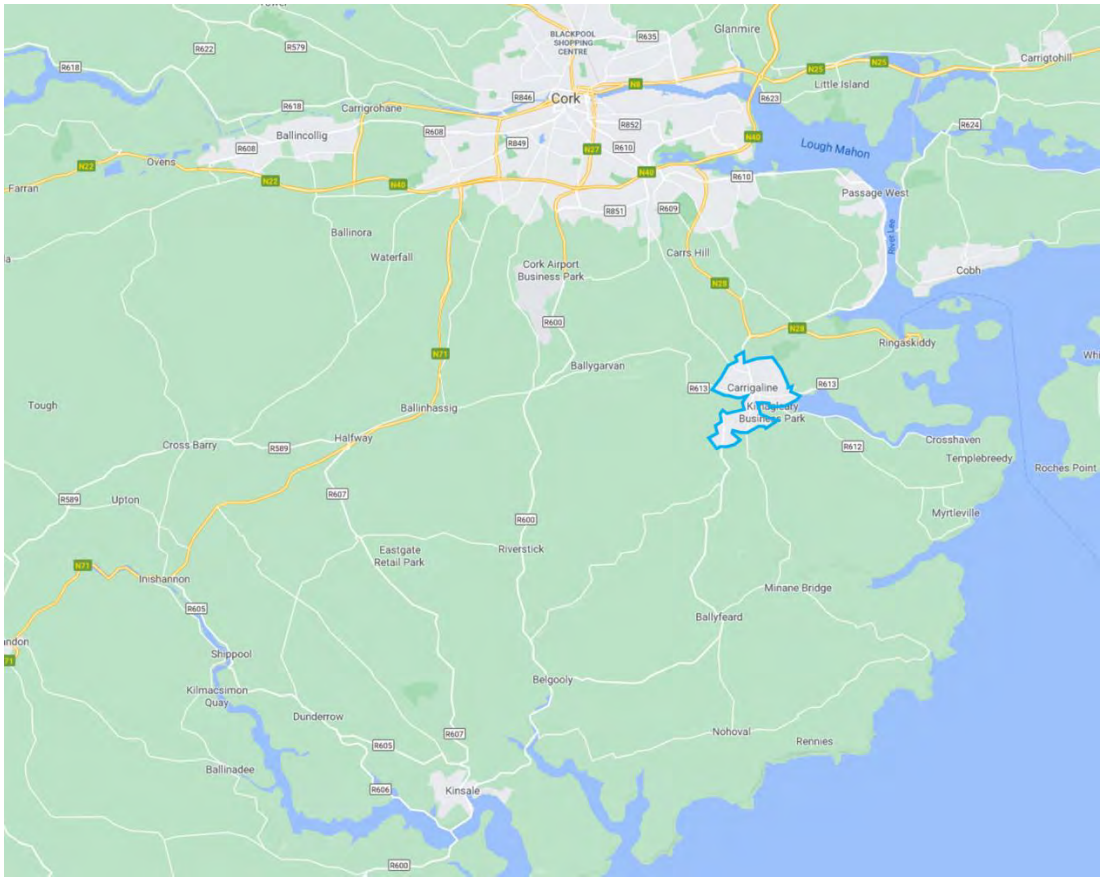


Figure 2: Study Area and Context

Carrigaline is situated 10km to the south of Cork City Centre. There are a number of towns and villages located to the south of Cork with Carrigaline forming the largest town within the County. The second largest town in the area south of Cork is Kinsale which is located more than 20km to the southwest of Cork City Centre. These towns and villages are segregated from one another by agricultural lands which are typically dotted by single residential units along major routes connecting them.

Carrigaline is directly linked to Cork City by the R611 regional road, and the N28 National Primary road. This route follows a northbound alignment through the greenbelt segregating the town and city. The N28 also offers connections from Carrigaline to Ringaskiddy, via the Shannonpark Roundabout.

Although the study area only includes Carrigaline itself, cognisance is taken of the influence of surrounding towns within the area, which affects prevailing traffic patterns.

Carrigaline is an established retail / commercial area which attracts traffic from surrounding towns such as Crosshaven and Myrtleville to the east and Kinsale and smaller settlements to the south. These towns are predominantly residential and typically residents travel to nearby employment centres.

Ringaskiddy, located 5km to the north east of Carrigaline is a significant employment centre within the vicinity and attracts traffic from Carrigaline as well as Donnybrook, Douglas and the wider Cork area.

Carrigaline is defined as a Metropolitan Town within the Cork Gateway area and is situated around the mouth of the Owenabue River. This river forms a valley with steep hills to the north and south of the town which shapes the expansion of the town. Both the estuary and the hilly topography affords the town with considerable scenic beauty which is part of the attraction of living within Carrigaline.

2 Methodology

The approach to the Transportation and Public Realm Enhancement Plan is based on the principles of the Area Based Transport Assessment guidance as publicised by the National Transport Authority (NTA) and Transportation Infrastructure Ireland (TII). These guidelines have been utilised to structure the planning and development of a sustainable transport network to serve the transport needs of Carrigaline.

Following is the methodology used to develop the baseline report.

2.1 Planning Policy Review

Planning policy documentation relevant to Carrigaline was reviewed to develop an understanding of the regional role and function of Carrigaline and how it fits into the wider transport planning environment. This provides guidelines to the type of interventions and recommendations that would be relevant to the study. A summary of the various international, national, regional and local policy documentation is provided in Section 3.

2.2 Review of existing information

The baseline assessment includes a review of available information on the study area including CSO census data and POWSCAR data on the town, review of available mapping and aerial photography and information received from Cork County Council and other sources.

This information defined the context of the town, revealed travel patterns and travel behaviour and provided an understanding of Carrigaline's current transportation demands.

2.3 Data Collection and Traffic Review

In agreement with Cork County Council Transportation Section, Arup have revised the methodology to take account of the COVID-19 restrictions by using historical traffic data. The data was collected from recent previous projects that were carried out within the Carrigaline area.

The data collected was used to develop a view and understanding of the current traffic movements within the town and to calibrate and validate the transport model being developed.

Parking surveys will be carried out to understand the current utilisation or turnover of both on and off street parking in the town when COVID-19 restrictions are lifted. In addition, to understand the needs of businesses in the town centre, the utilisation of loading bays will be monitored.

2.4 Transport Audits

A number of transport audits were carried out to review the existing condition of the existing transport systems. The audits include the following:

2.4.1 Pedestrian Network Audit

This audit included a review of the extent of the pedestrian network, the quality of the surfacing, safety of road crossings and suitability of universal access. Pedestrian infrastructure associated with community facilities such as schools, shops, doctor surgeries, public transport stops etc will be used to identify current walking catchments to determine which parts of the town falls within the 10 minute catchment of various facilities.

2.4.2 Cycle Network Audit

This audit also reviewed the extent of the network, quality of the surfacing and current safety issues identified. Similar to the pedestrian audit, community facility catchment analysis will be carried out. The audit is based on the requirements of the National Cycle Manual.

2.4.3 Public Transport

The public transport network includes the Bus Eireann routes and stops. The audit focussed on the current bus services and proposed changes contained in CMATS. The audit also reviewed journey times the catchment of existing services, the spacing of the bus stops along the service routes and universal access to the bus stops.

2.4.4 Roads Ownership

Roads ownership of the existing road and street network were established by extracting it from the Cork County Council GIS data base. The accuracy of the information was confirmed by the Transport and Traffic Department to ensure that it is correct.

2.4.5 Road Classification

The existing roads in Carrigaline were reviewed and classified in line with the Design Manual for Urban Roads and Streets to understand the functionality of the various roads.

2.5 Opportunities and Constraints

Following the various aspects of Carrigaline reviewed from a planning policy, data collection, baseline development and auditing viewpoint, opportunities and constraints have been identified. The process of identifying opportunities and constraints provides the chance to reflect on and digest the information gathered and to structure it to form the start of a framework to formulate a strategy.

2.6 Development of a Vision for Carrigaline

After reviewing the planning policy and baseline information for Carrigaline, the next step was to prepare a vision for Carrigaline in conjunction with Cork County Council. This vision, of a revitalised town centre, is based on the premise of managing car dependency and placing greater emphasis on pedestrians, cyclists and public transport to ensure alignment with the national and regional planning policy. The vision also recognises that car transport will continue to play a role in connecting Carrigaline to opportunities in the greater Cork Area.

Following from the vision, a set of objectives and principles were developed. The role of the objectives and principles are important, as any recommendations emerging from this study will be evaluated against them.

3 Planning Policy Review

3.1 Introduction

This section outlines the planning policy applicable to Carrigaline from a national, regional and local level. The policy documents are the drivers for future change and contains structuring elements and proposals that will alter the way development takes place, infrastructure is provided and towns and cities are shaped. It is crucial to outline the impact of these documents on the study area and to use this as broad guidance in the development of this strategy.

3.2 National and International Policy

3.2.1 Project Ireland 2040 National Planning Framework (NPF)

This document outlines the strategic planning and development for the Country up until 2040. The NPF outlines 10 National Strategic Outcomes (NSO's) and although probably most are relevant to Carrigaline, the following are specifically relevant to transportation and the improvement of the quality of public space:

- Compact growth, by managing the sustainable growth of compact cities, towns and villages to achieve density and consolidation through streamlined and co-ordinated approach to their development;
- Enhanced Regional Accessibility by reinforcing accessibility between key urban centres of population and their regions; and
- Sustainable Mobility by continuing to enhance Ireland's public transport and environmental sustainability of our mobility systems.

The NPF highlights the urgent requirement for a major uplift of the delivery of housing within the existing built up areas of cities and other urban areas and particularly targets brownfield development, targeting derelict and vacant sites which has fallen into disuse.

The challenge comes from the housing challenge where it is expected that by 2040 the population of Ireland is expected to reach 6 million with a need of 550,000 more homes and the creation of 660,000 additional jobs to achieve and maintain full employment.

The purpose of the NPF is to enable all parts of Ireland, whether rural or urban, to successfully accommodate growth and change, by facilitating a shift towards Ireland's regions and cities other than Dublin. Therefore, as part of the National Policy Objective (NPO) 1a that for the Southern Region, around 340,000 to 380,000 additional people should be planned for, bringing the population of the region up to almost 2 million and with this an additional 225,000 additional people to be employed to bring the total employment up to 880,000 (NPO) 1c.

More relevant to the study area, NPO 3b states that at least 50% of all new homes should be delivered in the five cities and suburbs of Dublin, Cork, Limerick, Galway and Waterford, within their existing built-up footprints.

3.2.2 National Development Plan (NDP) 2018 - 2027

The NDP is a spatial planning guide setting out the investment priorities underpinning the NPF and will drive its implementation over the next ten years. This plan is currently under review and will set the vision for the next decade, beyond 2027.

The plan will guide national, regional and local planning and investment decisions in Ireland to cater for an expected population increase of over 1 million people. The current plan recognises the need to address the issues of unrestricted urban sprawl, lengthy commute times and slow progress and that a new approach is required.

While the National Strategic Outcomes (NSOs) represent the overarching priorities which the NPF is designed to achieve, the purpose of the NPF is to set out the new configuration for public capital investment to secure realisation of each of the NSOs. This is being achieved by the identification of Strategic Investment Priorities for 2018 to 2027.

For NSO 1: **Compact Growth** is to secure the sustainable growth of more compact urban and rural settlements supported by jobs, houses, services, rather than continued sprawl and unplanned, uneconomic growth. This will require streamlined and coordinated public investment to realise the potential of infill development to bring scope for greater densities and bring life and economic activity back to communities. The NDP allows for specific New Regeneration and Development Funds for brownfield development facilitation, community and public realm development and addressing town and village infrastructure deficits.

The core priority for NSO 2: **Enhanced Regional Accessibility** is to enhance and upgrade the accessibility between urban centres of population and their regions. One of the inter-urban road schemes prioritised under NSO 2 is the proposed M28 Cork to Ringaskiddy motorway. This scheme is currently under judicial review and is pending a decision on whether development of the motorway can proceed.

NSO 4: **Sustainable Mobility** aims to create an environmentally sustainable public transport system to enable growth and change, meet the significant increase in travel demand and urban congestion while also contributing to the national policy vision of a low-carbon economy. Public investment in public transport will add greatly to the choice and experience of the travelling public, connecting more people with more places and ease congestion. This objective is relevant to Carrigaline, where traffic congestion continues to grow.

3.2.3 Cork Metropolitan Area Transport Strategy (CMATS)

3.2.3.1 Introduction

The NPF 2040 envisages that Cork will become the fastest growing county in Ireland with a projected increase of its population of 105,000 – 125,000 people within the Cork City and Suburbs area up to 2040. The projected population and associated economic growth will result in a significant increase in the demand for travel, which needs to be managed and planned for carefully to safeguard Cork's attractiveness to live, work, visit and invest in.

CMATS is a coordinated land use and transport strategy for the Cork Metropolitan area and sets out a framework for the planning and delivery of transport infrastructure and services to support the envisaged growth.

3.2.3.2 Challenges

CMATS identifies a list of current challenges across the wider Cork Metropolitan area. Not all of these are relevant to Carrigaline, but the following could be considered to be applicable to Carrigaline:

- The projected population growth within the Metropolitan area will also affect Carrigaline and lead to an increase in demand for travel;
- The legacy of dispersed patterns of residential and employment could be applied to Carrigaline;
- Future growth in Carrigaline is affected by waterways, floodplains and geographical features such as steep topography;
- Sustainable transport infrastructure connecting to nearby centres of employment such as Cork City and Ringaskiddy;
- There is competing demand for limited kerbside and road space by different road users;
- HGV traffic do not have a choice but to move through the town centre of Carrigaline as no outer bypass routes are available;
- There is an over reliance on private car for short trips with opportunities to increase the mode share of cycling and walking;
- Public transport tends to have long journey times and some delays in built up areas;
- Car parking is well provided for, which reduces the attractiveness of other modes of transport;
- The environment and attractiveness of towns like Carrigaline is at risk due to ongoing congestion and insufficient sustainable travel nodes.

3.2.3.3 Vision and Principles

It is the vision of CMATS to deliver an integrated transport network that addresses the needs of all modes of transport, offering better transport choices, resulting in better overall network performance and providing capacity to meet travel demand and support economic growth.

The vision is based on guiding principles including the following:

Principle 1: To support the future growth of the CMA through the provision of an efficient and safe transport network;

Principle 2: To prioritise sustainable transport and reduce car dependency;

Principle 3: To provide a high level of public transport connectivity;

Principle 4: To identify and protect key strategic routes for the movement of freight and services;

Principle 5: To enhance the public realm through traffic management and transport interventions;

Principle 6: To increase public transport capacity and frequencies where needed to achieve the strategy outcomes.

All of these principles are relevant to Carrigaline and will address the current issues encountered within the town. These principles will underpin and guide the development of the Carrigaline TPREP Vision and Strategy.

Chapter 4 of CMATS outlines the response to the NPF 2040 population growth target stating that it is in support of the targets for Cork Metropolitan area of 172,000 persons 125,000 for Cork City and 47,000 for the County Metropolitan area). CMATS prioritises development along its identified high capacity public transport corridors but has also identified Ringaskiddy for employment growth which can have an impact on travel patterns within the vicinity of Carrigaline. The growth will be facilitated by the redevelopment of the Docklands and relocation of the industrial uses and major port facilities. Further growth of Cork International Airport in close proximity of Carrigaline to enhance it as a gateway for business and tourism through transatlantic flight routes will also have an impact on local traffic patterns.

3.2.3.4 Land Use Distribution

Figure 3 below is an extract from the CMATS 2040 Land Use Distribution within the vicinity of Carrigaline. The map shows the employment growth locations as mentioned above at Ringaskiddy and the Airport. The map also shows the intention to provide additional housing within Carrigaline through infill and brownfield development. A land bank to the north east of Carrigaline has been identified for potential future expansion of the town and is currently under consideration. This development land lies to the south of the N40 and the current built up area of Carrigaline.

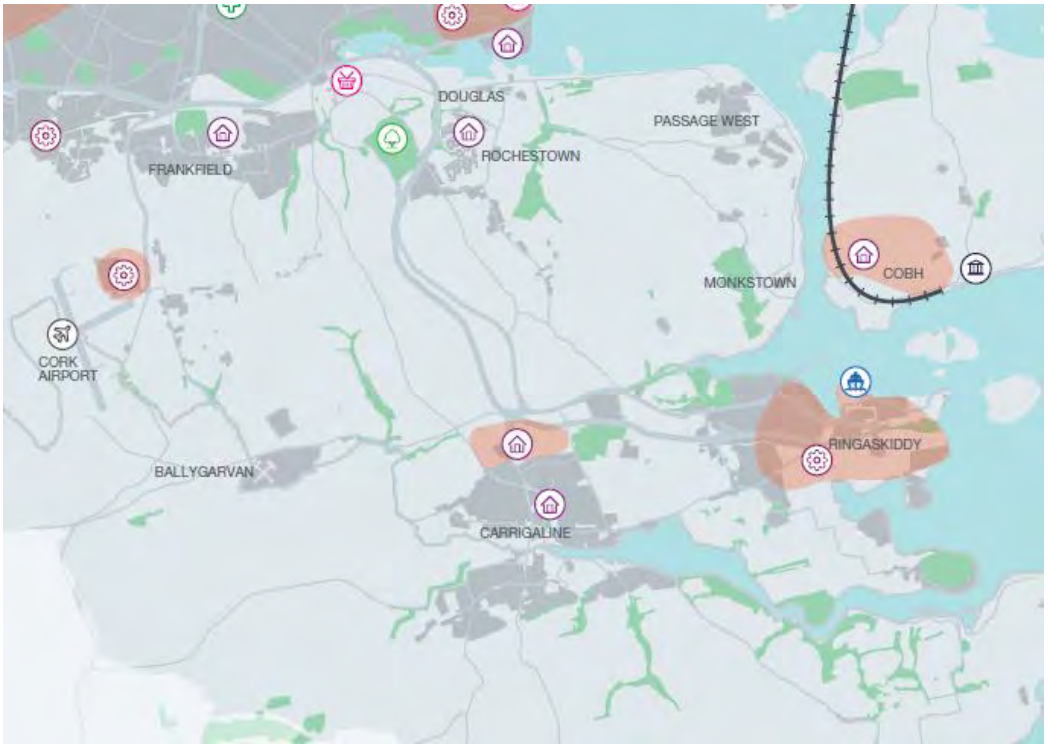


Figure 3: CMATS 2040 Land Use Distribution

3.2.3.5 Public Transport

The CMATS Strategy was prepared by first developing the public transport network based on the six core principles outlined above. Following the development of the public transport network, the cycling and walking networks were subsequently developed. The public transport network formed the indicative framework before more detailed network development was carried out.

Figure 4 shows the indicative public transport network that was developed. It shows the rail corridor to be the central spine of the public transport network, which is complemented by core bus corridors which spirals radially out of Cork City in all directions. Towards the south a radial route is proposed to Cork Airport and another to Ringaskiddy. A spur route is proposed off the Ringaskiddy radial which links into Carrigaline.

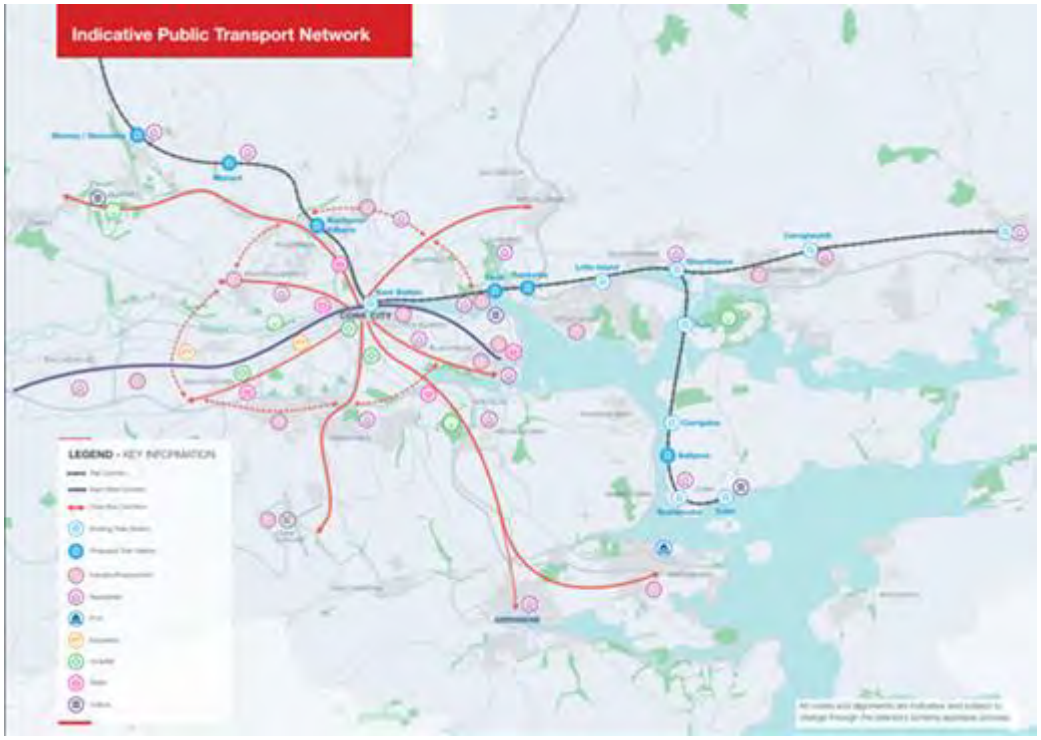


Figure 4: Indicative Public Transport Network

The Strategy recognises buses as an extremely efficient mode of transport which will serve the majority of the Cork Metropolitan area. It proposes a BusConnect network which will include a network of cross city and orbital routes which will interconnect with rail services and park and ride facilities. Supporting radial bus services is proposed to ensure comprehensive network coverage. This includes the strategic employment pharmaceutical cluster at Ringaskiddy which will be served by a new bus service to Cork City via Carrigaline. It is envisaged this bus service will operate at a 20 minute frequency.

Figure 5 shows the BusConnect route map within the vicinity of Carrigaline. The map shows that there are two routes serving Carrigaline. Both originate from Ringaskiddy and continue through Carrigaline albeit slightly different routes. The RI-AP route however runs to Cork Airport via Ballygarvan before going to Cork City Centre.

BusConnect is expected to have a significant impact on current bus operation within Carrigaline. These services will need to be integrated or replaced by BusConnects services. A critical feature for the success of this new public transport is bus priority. Bus priority is required to ensure the delivery of an efficient, frequent and reliable bus system and is a major part of the overall BusConnect scheme. Bus priority in Carrigaline along its main streets will involve significant reconfiguration to accommodate it and the Carrigaline TPREP will review options in how this can be achieved.

It is noted that the bus routes identified in CMATS are subject to updating and are currently under active review by the National Transport Authority.

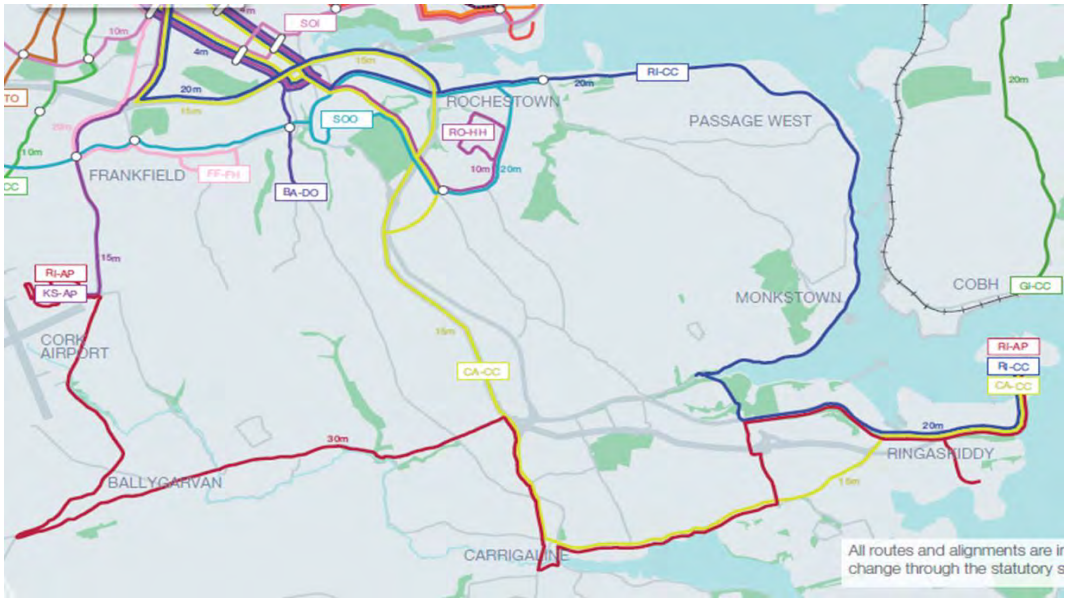


Figure 5: Bus Connect Route Map within the vicinity of Carrigaline

3.2.3.6 Park and Ride

CMATS also proposes strategic Park & Ride locations within the Metropolitan area. The locations of these Park & Ride facilities are shown in **Figure 6**. Carr's Hill Park & Ride is located approximately 6.0km to the north of Carrigaline and is intended to serve the catchment of Carrigaline and Ringaskiddy.

Park & Ride involves the provision of high capacity car parking facilities at designated public transport interchanges to provide onward access to the City Centre and other key destinations via high frequency public transport services.

Complimenting Park & Ride facilities is the provision of mobility hubs which may include formalising existing surface or multi-storey car parks. Typically, a mobility hub will be supported by frequent public transport, quality walking and cycling networks and include complimentary facilities including public transport stops, high capacity cycle parking, bicycle sharing systems, dedicated car club spaces, carpooling spaces, electric charging facilities and taxi drop off facilities.

The location and capacity of the mobility hubs will be considered in the Carrigaline TPREP.

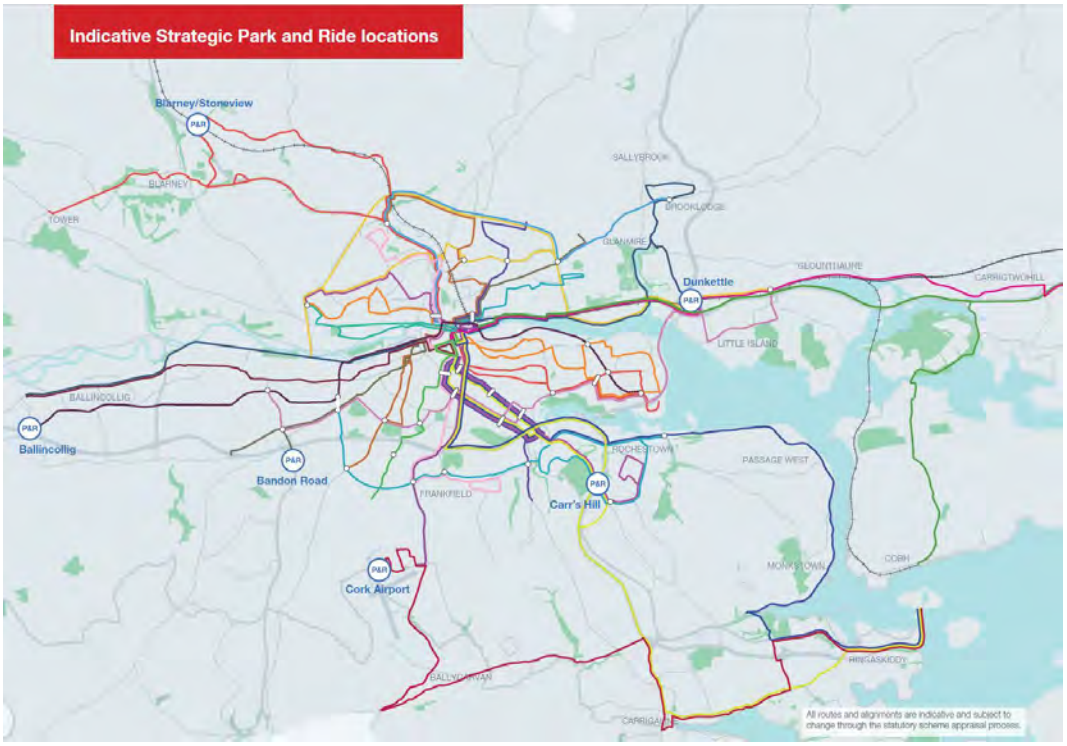


Figure 6: Indicative Strategic Park and Ride Locations

3.2.4 Parking Management

The availability and price of parking are major determinates of the relative attractiveness of the private car versus sustainable transport options and an extremely effective demand management tool. Parking management measures can include pricing, supply and enforcement controls. Maximum parking standards can be set to limit the provision of spaces and therefore decrease the availability of car parking. New developments can also set a car low or car free zone where restrictions are put onto occupants by having to apply for permits.

CMATS also envisages that on street parking in town centres will decrease over time to accommodate a wide range of sustainable transport measures including bus priority, laybys, safer pedestrian crossings, seating, contraflow cycle lanes, bicycle share schemes and cycle parking.

Where spaces are retained to support economic functions of town centres it will support quick turnover of spaces to ensure that spaces are readily available for businesses that rely on them.

The main objective of off-street parking is to free-up kerbside space within town centres. CMATS proposes that town centres should implement a string of high capacity long stay Park & Ride facilities outside the main approach roads to the town, served by high frequency buses, complimented by mobility hubs, connected by walking and cycling. Parking charges should be applied to all parking to manage the demand for these spaces.

3.2.5 Walking

CMATS notes that all journeys begin or end with walking and that walking is successful when it is associated with high quality public realm spaces. CMATS acknowledges that the success of the broader Strategy is highly dependent on greater levels of walking trips, undertaken more often and linked up with other modes of transport. A successful walking strategy should include an increase in walking levels for work, education and leisure, addressing safety issues and barriers that prevents walking, supporting a high quality and fully accessible environment to all abilities and ages, link walking to public transport and promote a high standard of urban design in new developments and road design to prioritise pedestrian movement.

CMATS proposes a walking strategy for urban areas where a walking network that connects neighbourhoods, origins and destinations, increases the permeability of the built environment and creates an attractive, safe environment that prompts more people choosing to walk, resulting in a healthier population, a more attractive and sustainable town and stronger communities.

3.2.6 Cycling

CMATS proposes a vision for the Cork Metropolitan area to provide a coherent, safe and attractive cycle network that will support a shift from private car to cycling. High quality cycle links are proposed to connect with public transport including BusConnect and will be designed to National Cycle Manual standards and where possible segregated from other modes of transport. The strategy proposes a series of route types including:

- Primary Cycle Networks designed to cater for high demand on radial routes to key destinations;
- Secondary Routes provides connection from residential areas and employment to Primary Network;
- Greenway networks is traffic free, using derelict railway lines, routes through parks or alongside rivers.

Figure 7 shows an extract of the CMATS Cycle Route Network within the vicinity of Carrigaline. An inter urban route is proposed from Donnybrook to the north of Carrigaline and this link would be a connector between Cork and Carrigaline, linking to the proposed Park & Ride facility proposed at Carr's Hill. The feasibility of this route will be investigated by transport authorities.

Primary routes are proposed along the R611 Main road through Carrigaline, Bothar Guidel and along the R612 towards the Carrigaline Industrial Estate located to the south of this route. From this position on the route transforms into a green route to link to Crosshaven further to the east. The latter route is already constructed.

Another green route is proposed to link Passage West and Monkstown to Carrigaline along the disused railway line commencing at Bothar Guidel up to the R610 and following the coastal road through Monkstown and Passage West.

The green routes and primary routes are complimented by a number of internal and external secondary routes to form an elaborate network. The routes will require further investigation beyond the planning stage to determine the optimum routes based on analysis of options to deliver a value for money solution.

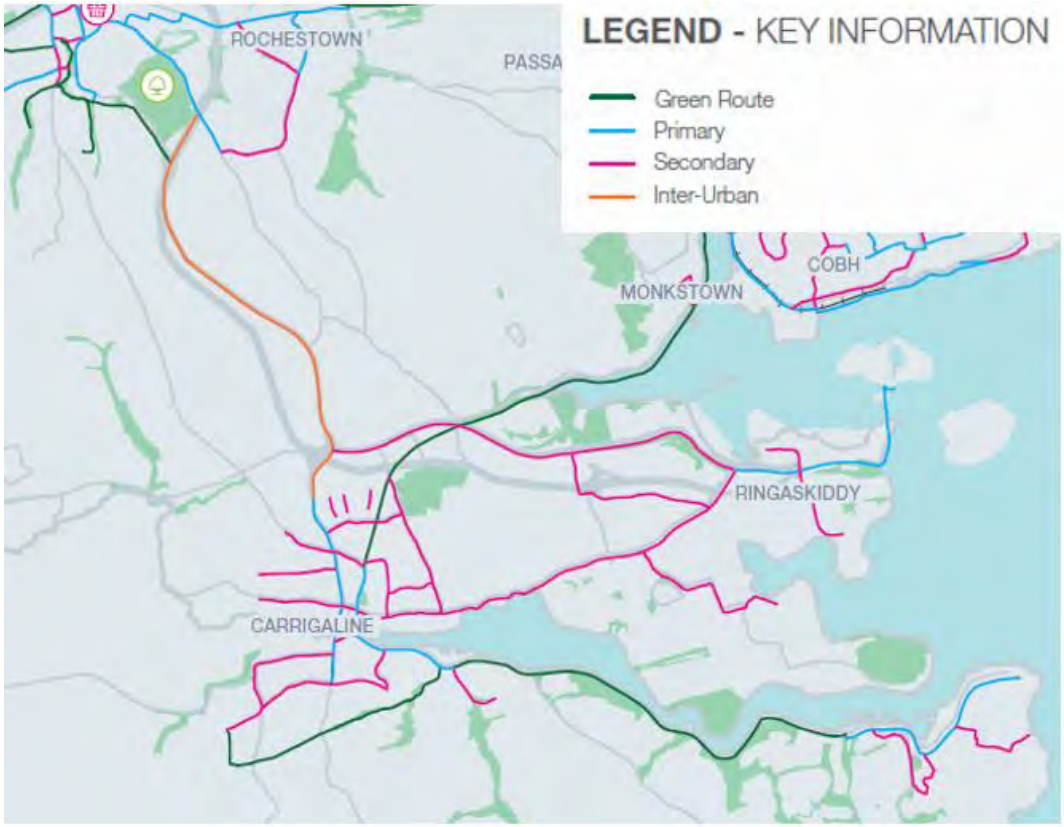


Figure 7: CMATS Cycle Route Network

3.2.7 Proposed Road Network 2040

National roads will play a key role within Ireland's and the Cork Metropolitan area's overall transport system. New road infrastructure within Cork will strike a balance between enabling the CMA to achieve its growth potential and ensuring that any additional road capacity does not simply attract more private car trips.

In Cork the strategic road network supports the movement of goods and essential services including public transport, freight and logistics movements to markets and provides direct access to the relocated Port of Cork at Ringaskiddy and Cork International Airport.

The M28 will serve a number of strategic purposes including enabling the relocation of the Port of Cork's activities from the City Docks to Ringaskiddy and providing Ringaskiddy Port with the capacity to handle increased freight activity associated with Brexit. According to CMATS, the importance of improving strategic road access to the Ringaskiddy Port is of national economic priority and is a long-term strategic objective. **Figure 8** shows the proposed Road Network 2040 and the M28 Cork to Ringaskiddy link traversing to the north of Carrigaline which links into the N40 bypassing Cork.

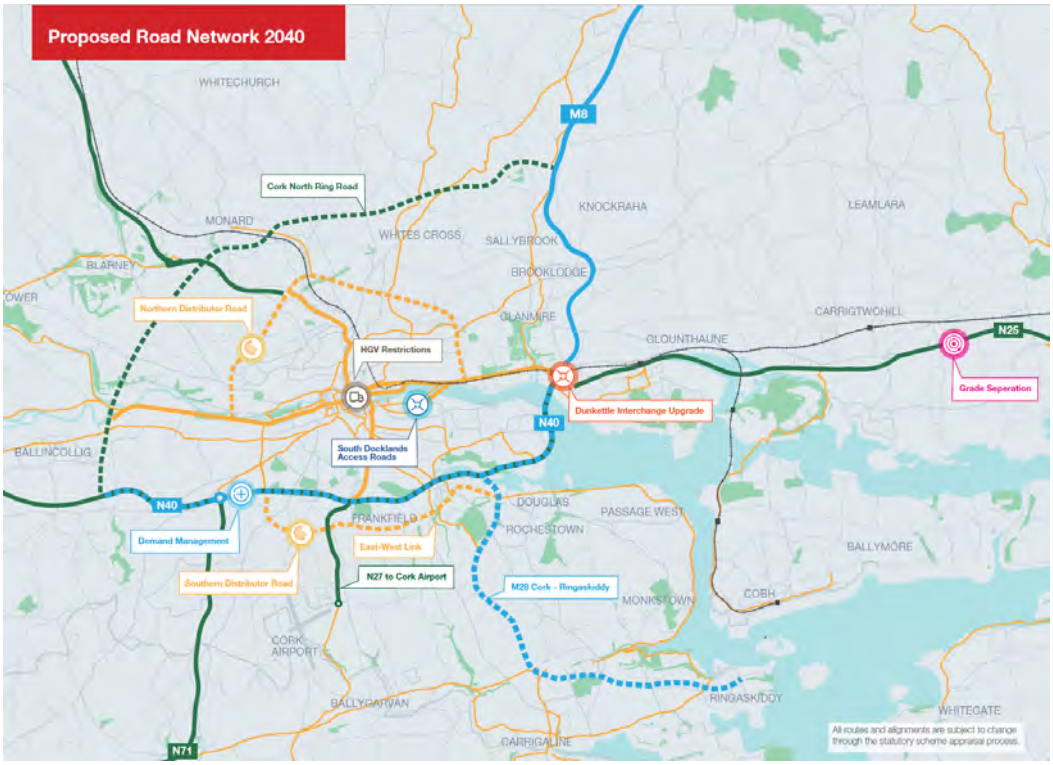


Figure 8: Proposed Road Network 2040

3.2.8 Ballincollig / Carrigaline Local Area Plan, 2017

This Local Area Plan sets out the detailed planning strategy and land use zoning as appropriate for the towns and villages of the Municipal District. This document has set a Vision for the town, considered the town's strategic and local context and made projections on the town's expected population and employment growth. The LAP includes a detailed review of planning considerations and proposals that was presented in 2017. It provides an appreciation of the then existing traffic and transportation environment.

The LAP contains well founded principles and proposals on both land use and transportation that remains still relevant to any future planning for Carrigaline. The LAP proposes a spatial framework for Carrigaline which is shown in **Figure 9**. This plan shows the existing built up area at that point in time, land development objectives including residential development at infill sites located at the edges of the town, a defined town centre and industrial development zone. A review of recent aerial photographs has however shown that the majority of the land earmarked for residential development has already been developed or is currently being constructed. The spatial framework also shows green walking routes which to a large extent overlaps with CMATS proposals, for example the Herons Wood greenway link.

An important infrastructure proposal is the proposed outer relief road to the west of Carrigaline which was proposed to divert through traffic within the town centre. A task of the Carrigaline TPREP is to review the feasibility of this route and its proposed alignment.

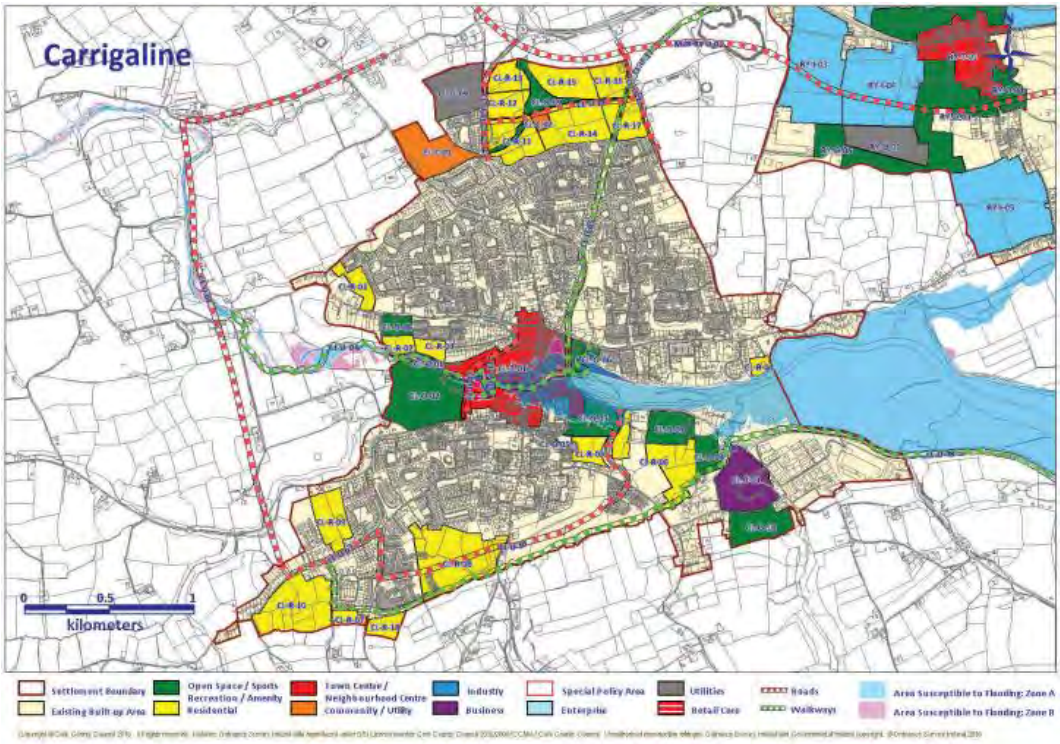


Figure 9: Carrigaline 2017 Spatial Framework

4 Demographic Profile of Carrigaline

4.1 Introduction

This section highlights some demographic information for Carrigaline which was obtained from the CSO Census 2016. In addition, Census 2016 Place of Work, School or College, Census of Anonymised Records (POWSCAR) information was obtained for Carrigaline to develop a better understanding of the travel movements of employees and people travelling to places of education.

4.2 Residential Population

The 2016 Census recorded a population of 15,770 for Carrigaline which is an annual growth rate of 1.6% since 2011, when the recorded population was 14,775. The 2014 County Development Plan set a population target of 17,870 for Carrigaline in 2022, which is an assumed annual growth rate of 2.1%. The Local Area Plan 2017 identified land based on available land and planning permissions at that time, to accommodate the projected population in Carrigaline as shown in **Figure 9** as outlined above. As mentioned, recent aerial photography however has shown that much of the land earmarked for residential in the LAP is under construction or already developed.

As outlined in Section 3 Planning Policy Review, the National Planning Framework envisage significant growth within the Cork Metropolitan area and CMATS have identified strategic land to the north of Carrigaline to accommodate this growth.

The feasibility of developing this land is currently underway and will be one of the objectives of the project.

4.3 Employment Population

According to CSO Census data there were 2,881 jobs within the Carrigaline census boundary.

Figure 10 shows the employment structure within the Carrigaline census settlement boundary. There is a mixture of employees within Carrigaline. The largest category is non manual at 39%, followed by lower professional at 19% and Employers and managers at 15%.

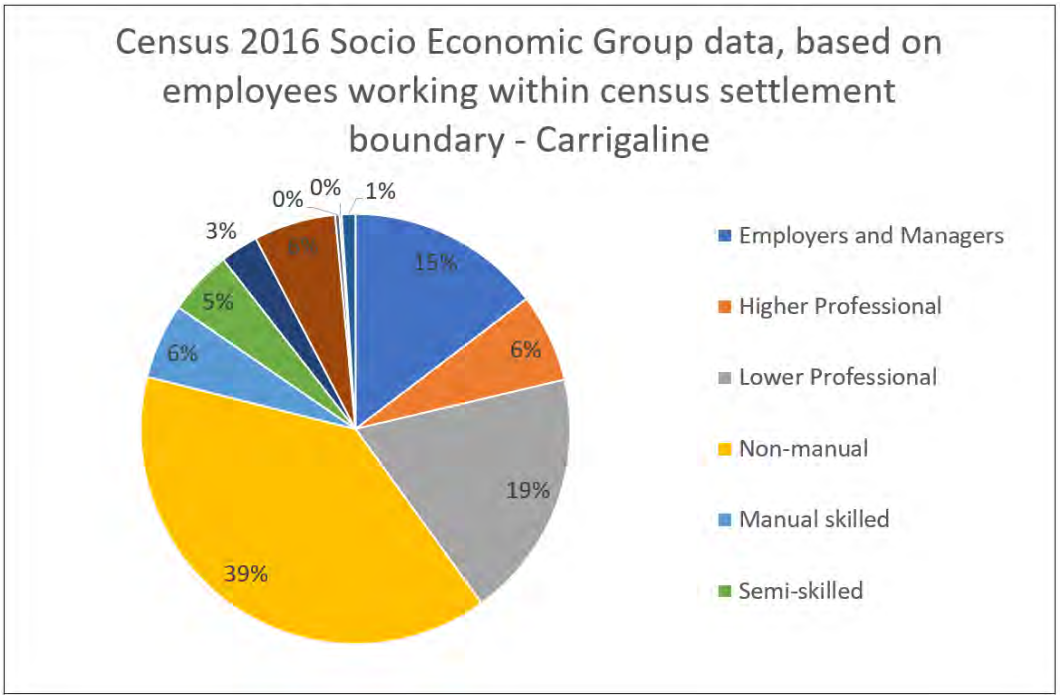


Figure 10: CSO 2016 Employment Structure

Figure 11 shows commuting patterns of people living in Carrigaline travelling to locations within the vicinity to avail of employment opportunities. Around 1,000 people travel from places elsewhere to avail of employment opportunities in Carrigaline. There is however more than 5,000 people that travel to places of employment outside of Carrigaline including Cork City, Little Island and Ringaskiddy. There are about 1,800 people living and working within Carrigaline.

Figure 11: Commuting Patterns

According to 2016 CSO Census data, Carrigaline has a job to resident ratio of 1:5. In other words, there are 1 job available for every 5 residents. In comparison to the Cork City and Suburbs area, which have a similarly calculated ratio of 1:2, Carrigaline has low employment availability which forces residents to travel long distances to destinations elsewhere to avail of employment opportunities.

Figure 12: Job / Resident Ratio

Figure 13 shows the zones within Cork Region to which employees living in Carrigaline travel to for work. Zones that has a high number of destinations are Ringaskiddy, Cork and Little Island. **Figure 14** shows the travel distance of commuters from Carrigaline. 26% of commuting occurs within 3km of Carrigaline town centre and can be considered to be local trips. An additional 30% travel between 3km and 7.5km and these locations include Ringaskiddy, Crosshaven and some of the southern parts of Carrigaline. The remainder of the trips are further than 7.5km away and include Cork, Little Island and other locations beyond. 5% of residents travel even longer distances than 50km.

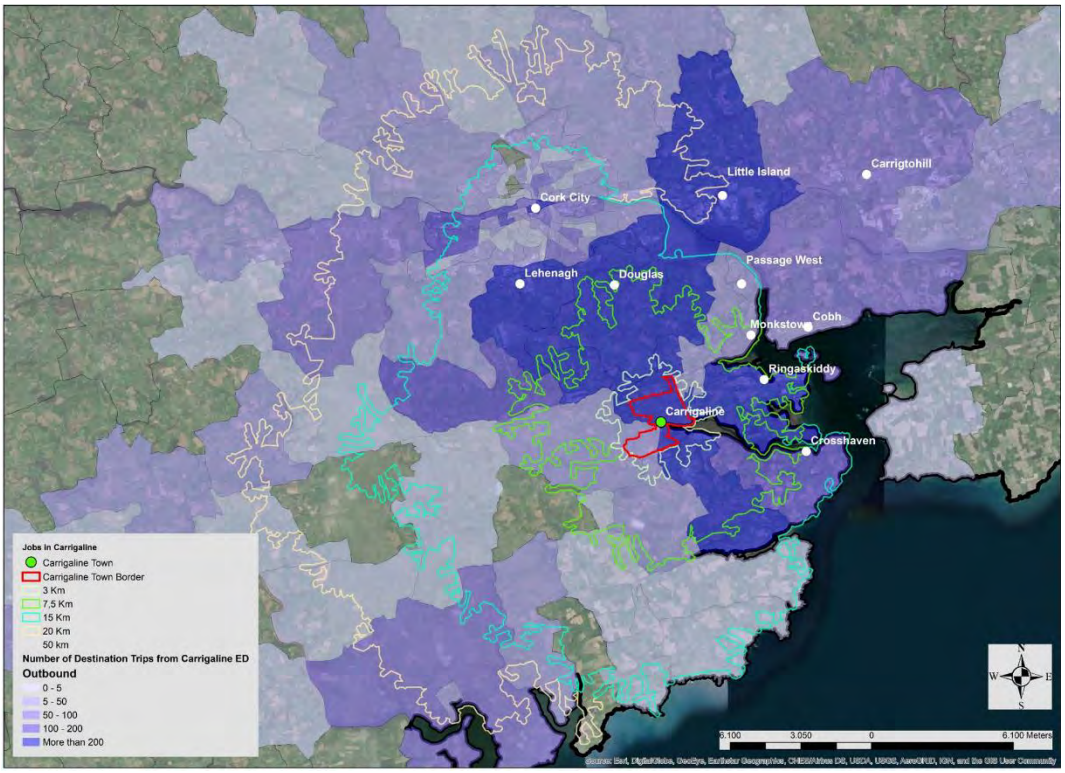


Figure 13: Commuting Patterns

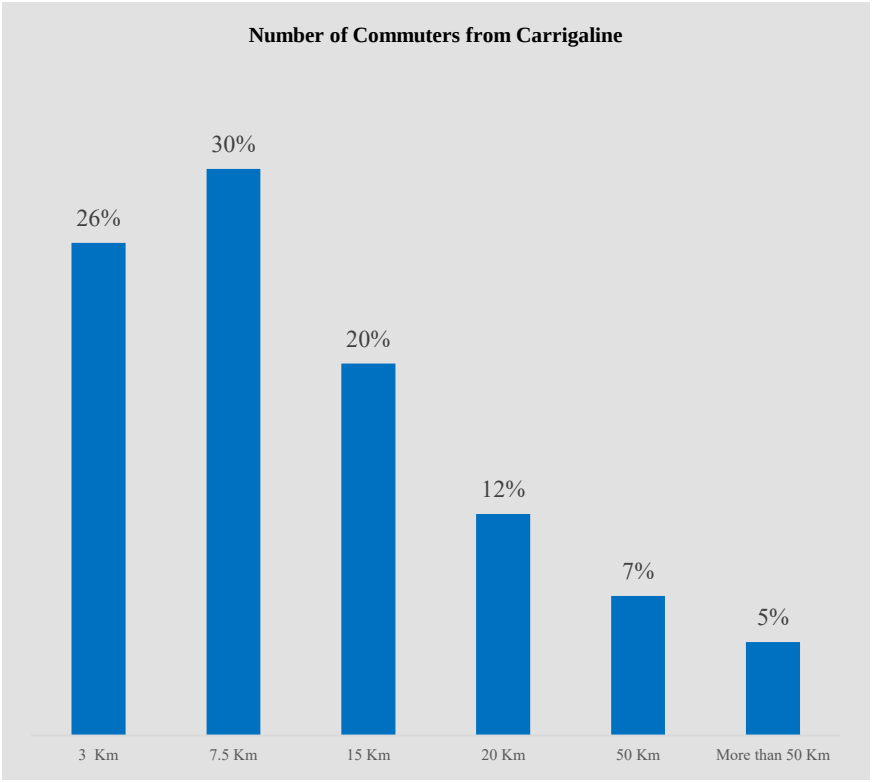


Figure 14: Travel Distance

4.4 Population age

Figure 15 shows that Carrigaline has the largest percentage of young population under the age of 18 compared to the Cork City and other towns within the vicinity. Younger people are generally more open to use other modes of transport such as active modes to travel which presents an opportunity to promote these modes of travel in Carrigaline.

On the other hand, the percentage of people over 64 years is by far the smallest percentage and when compared to Cork City is almost half.

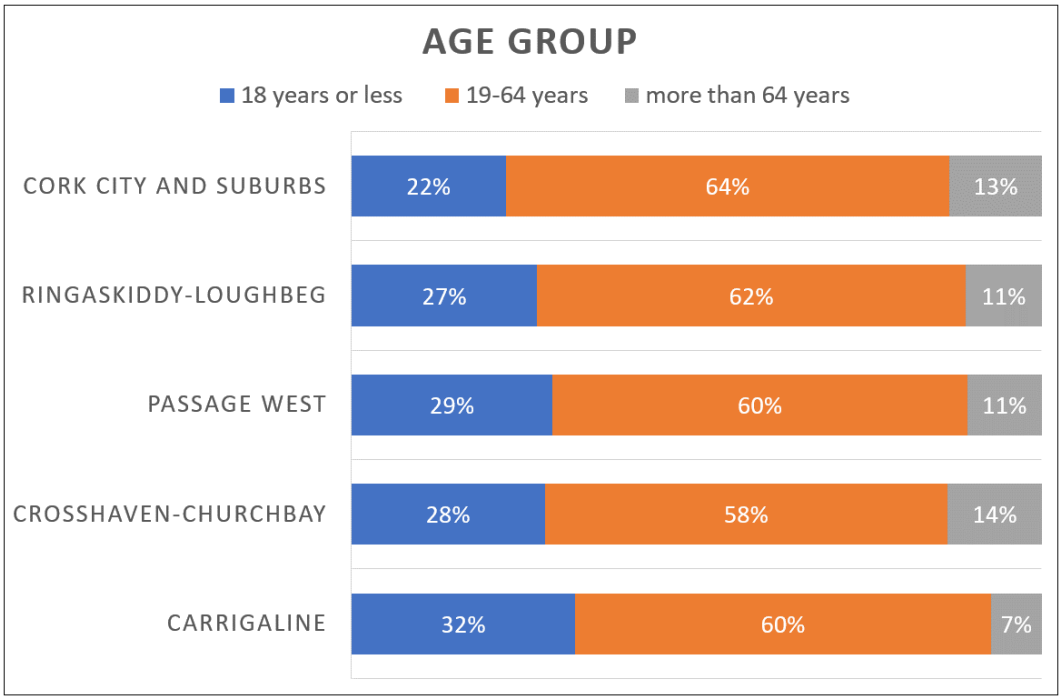


Figure 15: Age Group Population

4.5 Journey Duration

Figure 16 shows the journey time to work, school or college. Compared to Cork City and suburbs, a smaller percentage of the Carrigaline population travel less than 30 minutes to their destinations. It also seems that all other towns within the area have longer travel times compared to Cork City and suburbs. Crosshaven and Churchbay seem to be the worst affected and this is understandable considering the long commute from these locations through Carrigaline and beyond to Cork City.

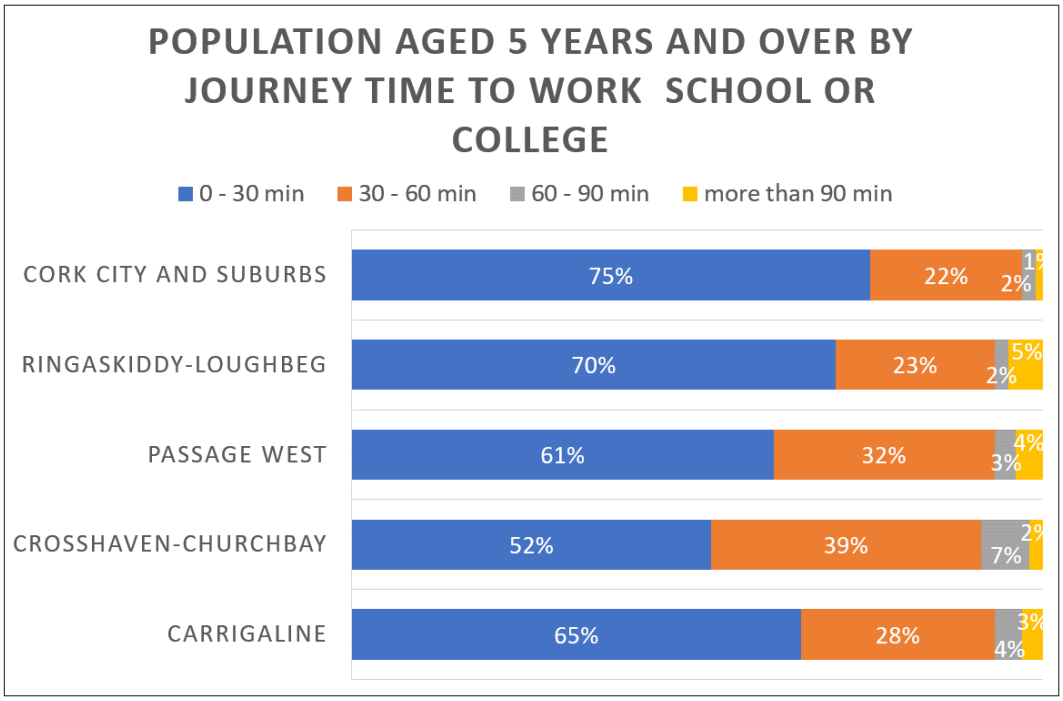


Figure 16: Journey Duration

4.6 Car Ownership

Figure 17 shows that car ownership in Carrigaline is substantially higher than that of Cork City and Suburbs and other local towns within the vicinity. Almost half of the Carrigaline households have two cars and another 10% of the households have more than two cars. Only 5% of households have no car which is a very low number compared to any of the statistics of the other towns but especially Cork and Suburbs.

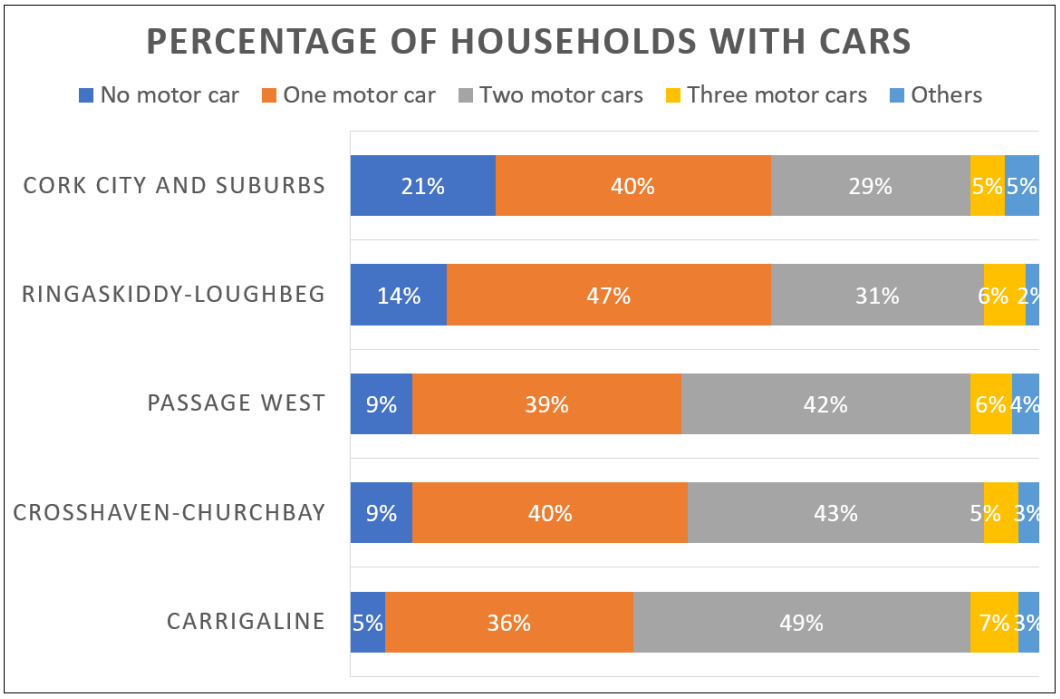


Figure 17: Car Ownership

4.7 Modal Split

Figure 18 shows the modal split of all trips made in Carrigaline. The modal split of Carrigaline is very similar to that of other towns within the vicinity, which all show just over 10% of the population walking, 1% cycle and 4-6% is making use of public transport. All the towns also show that more than 75% of trips are car based.

Cork City and Suburbs differs substantially from the four towns. 20% of the population commutes on foot which is almost 4 times as much and 2% cycles. Almost 10% of the population makes use of public transport, which is almost double that of the four towns. Around 60% of the population indicated that they make use of car-based transport.

The information for Cork City and Suburbs sets a target for achieving a more sustainable modal split in the future. However, it must be realised that Cork has a much more elaborate public transport system and the travel distances to places of work and education is less than Carrigaline. This Transport Strategy needs to identify the means to make this step change in modal split for the wider Cork area surrounding Carrigaline.

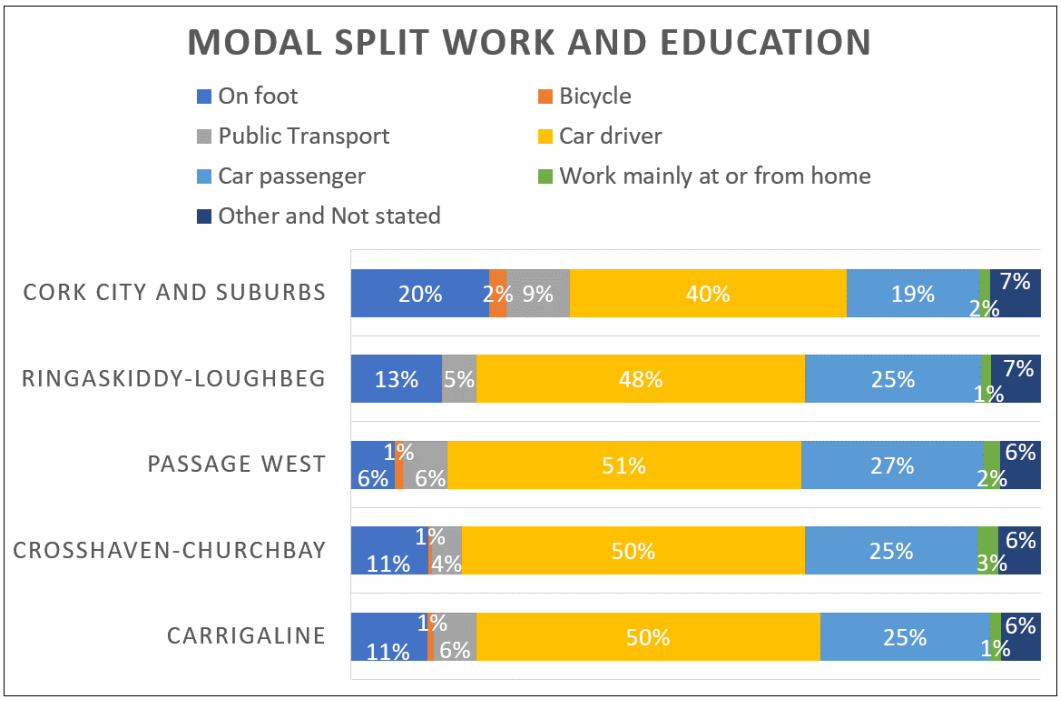


Figure 18: Modal Split of all travel

Figure 19 shows that the modal split for people travelling to work in Carrigaline is even more dependent on car based transport. More than 80% of the working population travel by car compared to less than 65% for Cork and Suburbs.

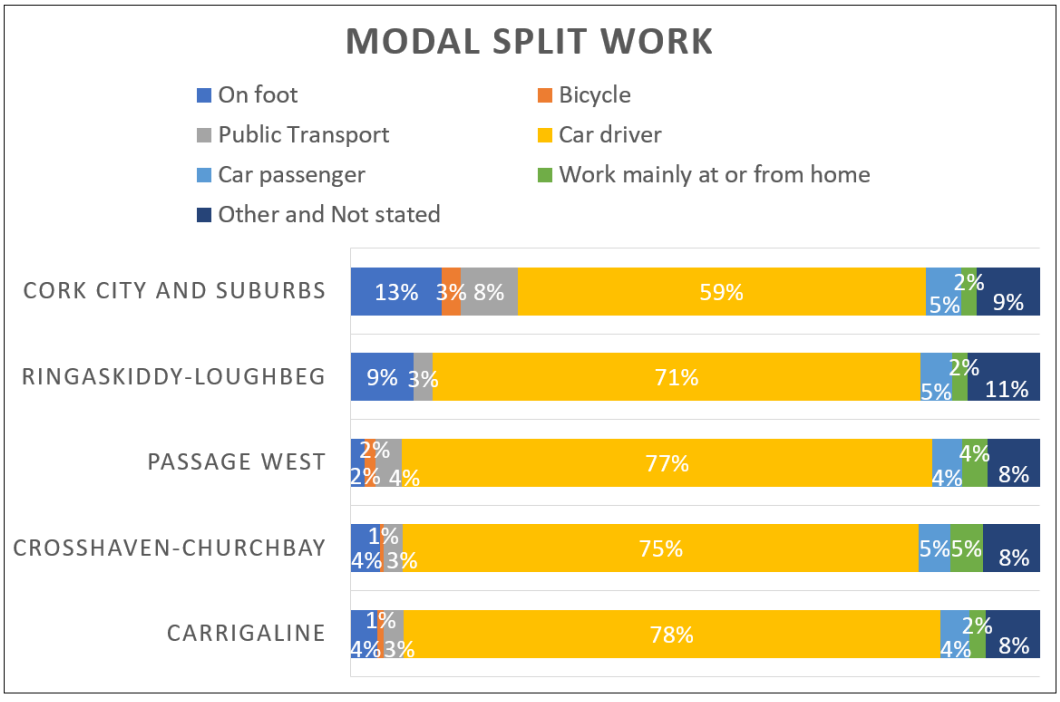


Figure 19: Modal Split of people travelling to Work

Figure 20 shows that between 2011 and 2016 the modal share patterns have stayed very much the same. The percentage car drivers amongst employees has remained the same at around 50% and car passengers at around 25%.

There is some marginal difference for people walking and using public transport, but this variance is not significant enough to show any trend.

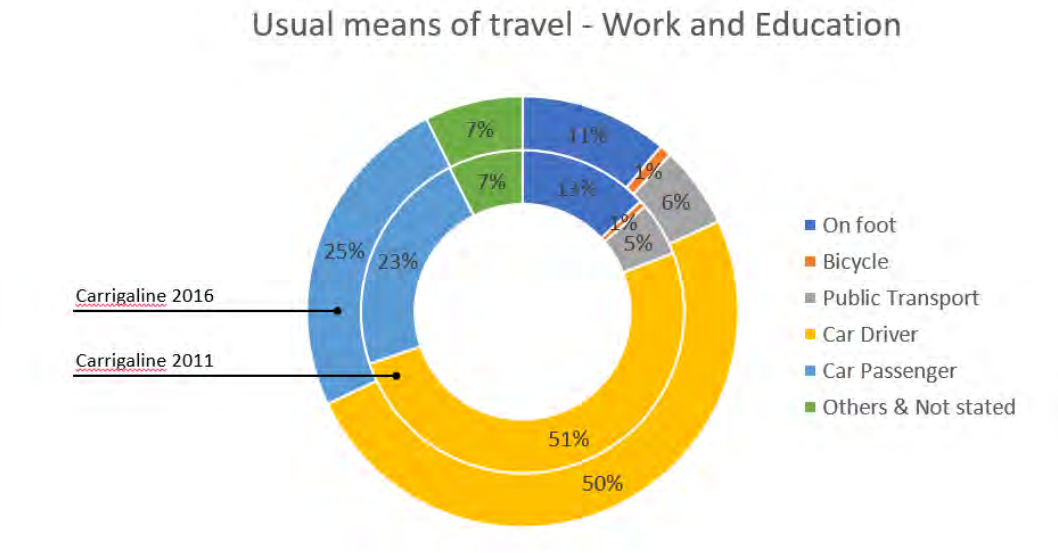


Figure 20: 2011 and 2017 Modal Split Comparison

4.8 Accommodation Type

Figure 21 shows the type of accommodation available within Carrigaline, surrounding towns and Cork City and Suburbs. This graph is an indication of the density of the built-up areas. Carrigaline and Ringaskiddy both has very limited choice in accommodation with more than 95% being houses or bungalows and only a small percentage being a flat or apartment.

Cork and Suburbs show that at least 15% of the accommodation stock is a flat or apartment, providing more density in the City.

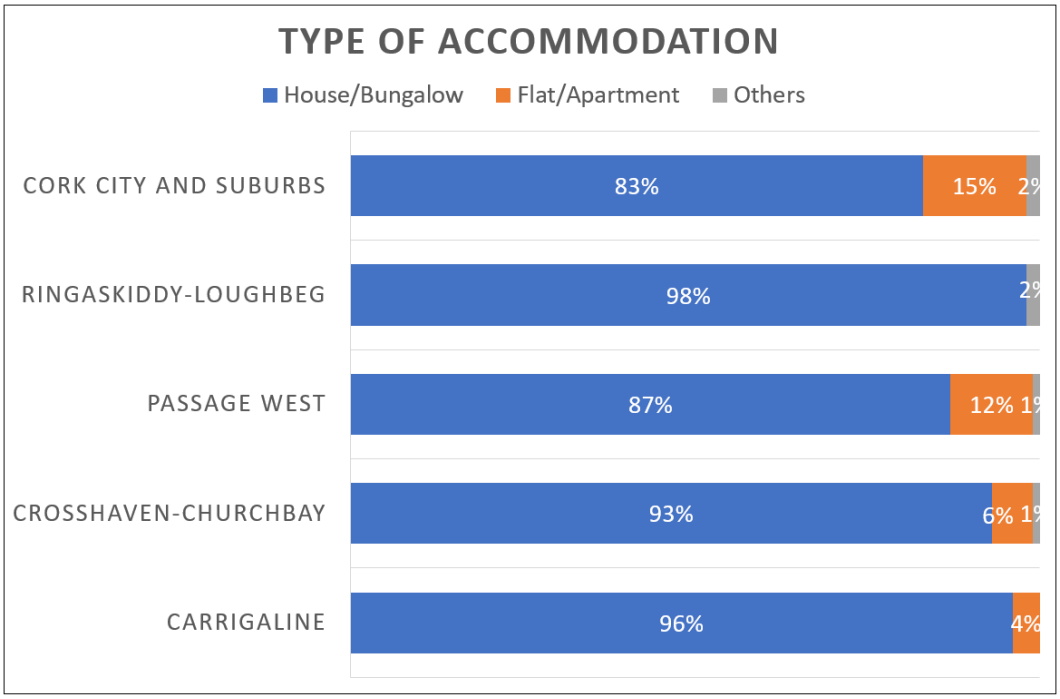


Figure 21: Housing Type

5 Land Use

5.1 Regional

Figure 22 shows the land use within the vicinity of Carrigaline on a regional perspective. The image shows that Carrigaline is surrounded by agricultural land from other built up areas of which by far the largest is Cork City. Cork City has a mix of residential uses which is supported by industrial and commercial uses. Passage West and Crosshaven are the nearest residential areas to Carrigaline. The image shows the significant industrial uses at Ringaskiddy and around Cork Airport to the north west of Carrigaline.

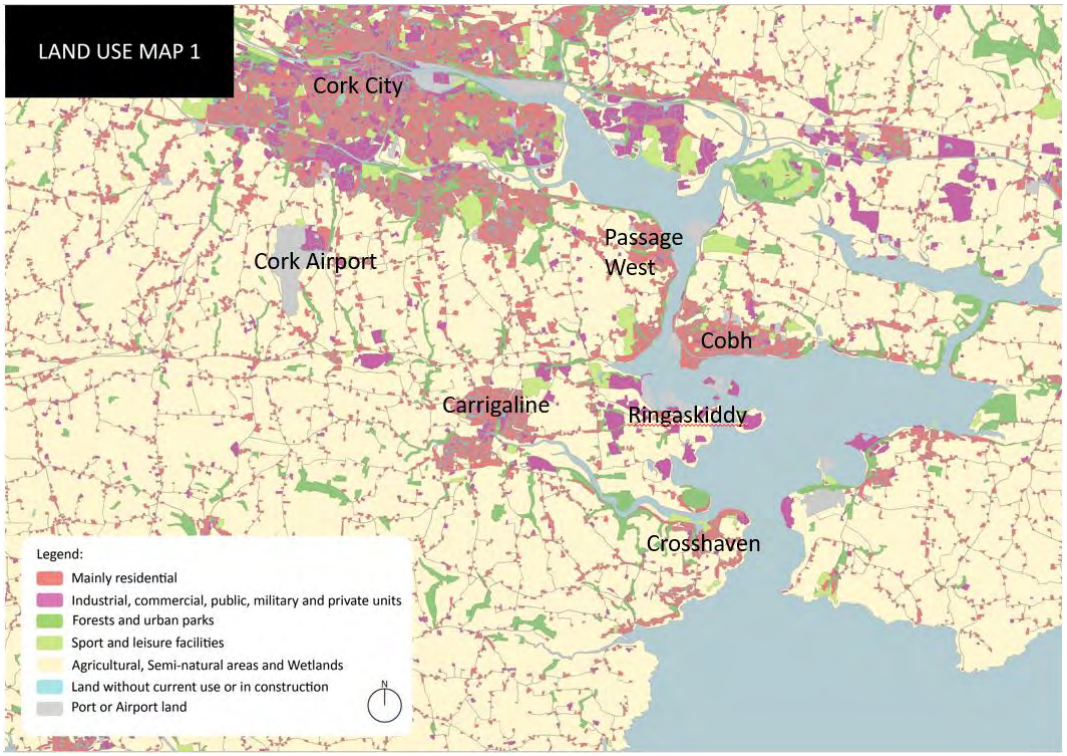


Figure 22: Regional Land Use

5.2 Local Land Use

Figure 23 shows the current land use of Carrigaline. The majority of the built up area comprise residential use in the form of estates. The majority of the residential stock comprise of detached or semi-detached houses each with space for at least one or two cars to park.

The town centre is located where the Owenabue River crosses the R610 Main Road. The town centre is approximately 600m in length from north to south and 500m from east to west, which makes it walkable from one end to the other. The main road through the town centre is clustered with small shops and offices fronting onto the road. These include take away's, bars and public houses, pharmacies, banks, barbers, dry cleaners, bookies and auctioneers.

There are three shopping centres in the town including Supervalu and Dunne Stores along the main street (R611) and Lidl and Dunnes Stores along the R612 Crosshaven Road.

The Carrigaline Industrial Park is located in the south eastern corner of the town. This area includes a number of large stand alone developments including warehousing, packing and manufacturing.

There are a number of educational facilities within the town. The majority are located in the north central part of the town, close to Bothar Guidel although two schools are located in the south eastern part of the town.

From the image it can be seen that there are many open spaces within the boundary of the town which includes sportsfields, parks or undeveloped tracts of land. Of note is the large triangular portion of land directly to the west of the town centre, which is also within the flood plain of the Owenabue River.

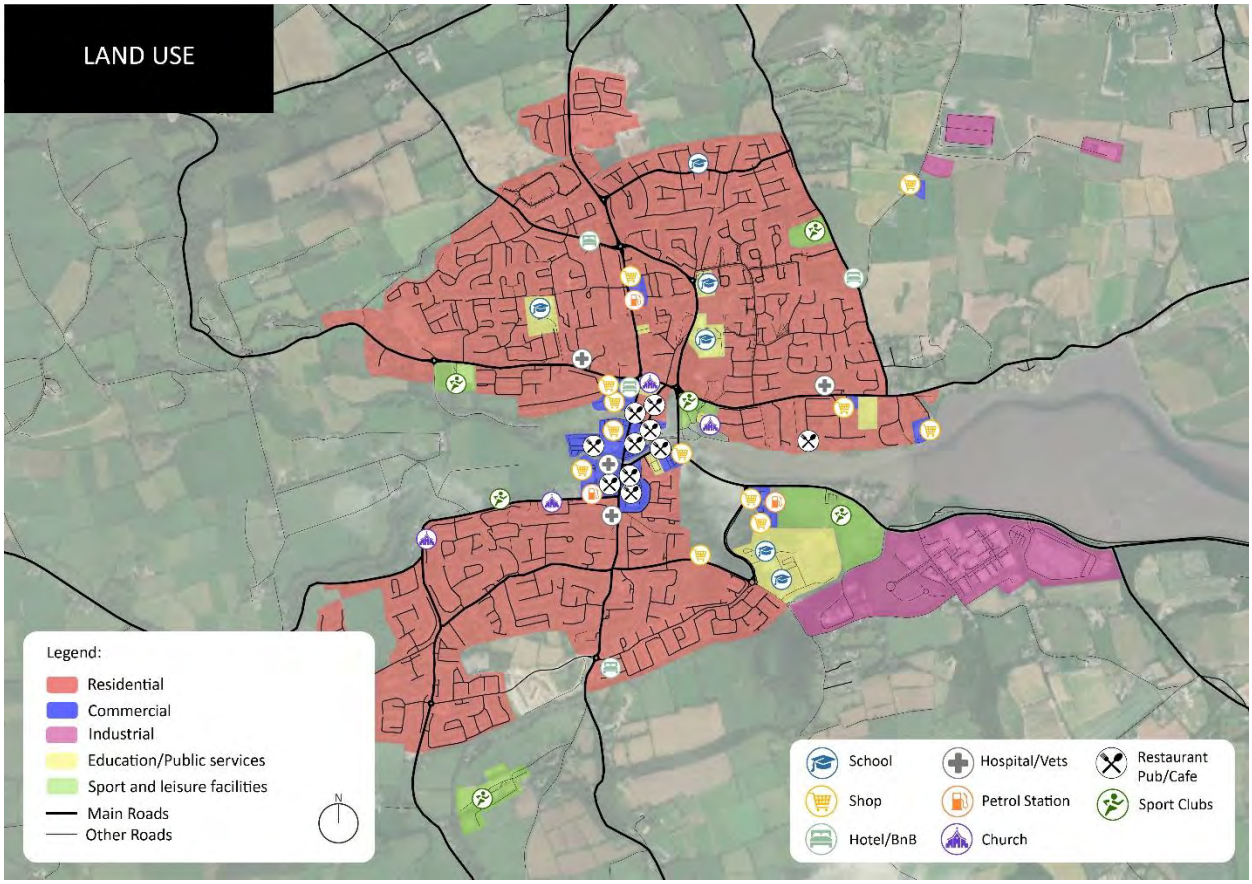


Figure 23: Local Land Use

5.3 Topography

Figure 24 shows the topography within the vicinity of Carrigaline. The image shows that Carrigaline lies within a valley formed by the Owenabue flood plain running in an east west direction. The majority of the town lies within 0-25m of sea level. Since the town lies within a valley, the topography especially to the north and south rises steeply as well as towards the north west.

This limits development potential in these directions. The most natural direction for development is therefore to the northeast which includes the Strategic Land Reserve.

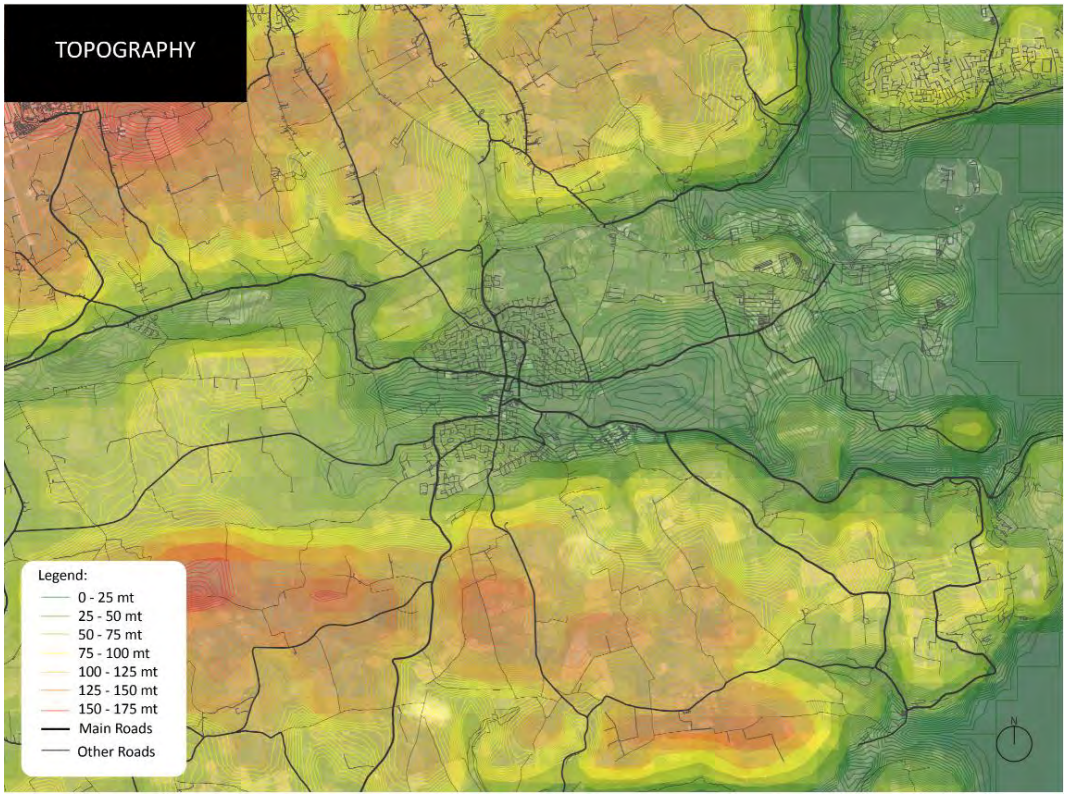


Figure 24: Topography

5.4 Physical Opportunities and Constraints

Figure 25 shows some of the opportunities and constraints of Carrigaline. As discussed in the previous section, further development within Carrigaline is challenged by the surrounding topography. Steep slopes limits town expansion to the north, west and south, but leaves the east and north-eastern area available for potential development.

Carrigaline developed around the River Owenabue which forms an estuary to the east of the town. The open land directly to the west of the town centre lies within the floodplain of the River and is therefore unsuitable for further expansion of the town.

North-south connection across the River is limited to the R611 Main Street and Bothar Guidel links. These are the only two crossings connecting the southern part of the town to the employment centres of Cork City and Ringaskiddy.

The greater majority of the business within Carrigaline is located adjacent to the Main Road. This provides limited exposure to sites located further away from the Main Street, limiting the potential growth of the town centre.

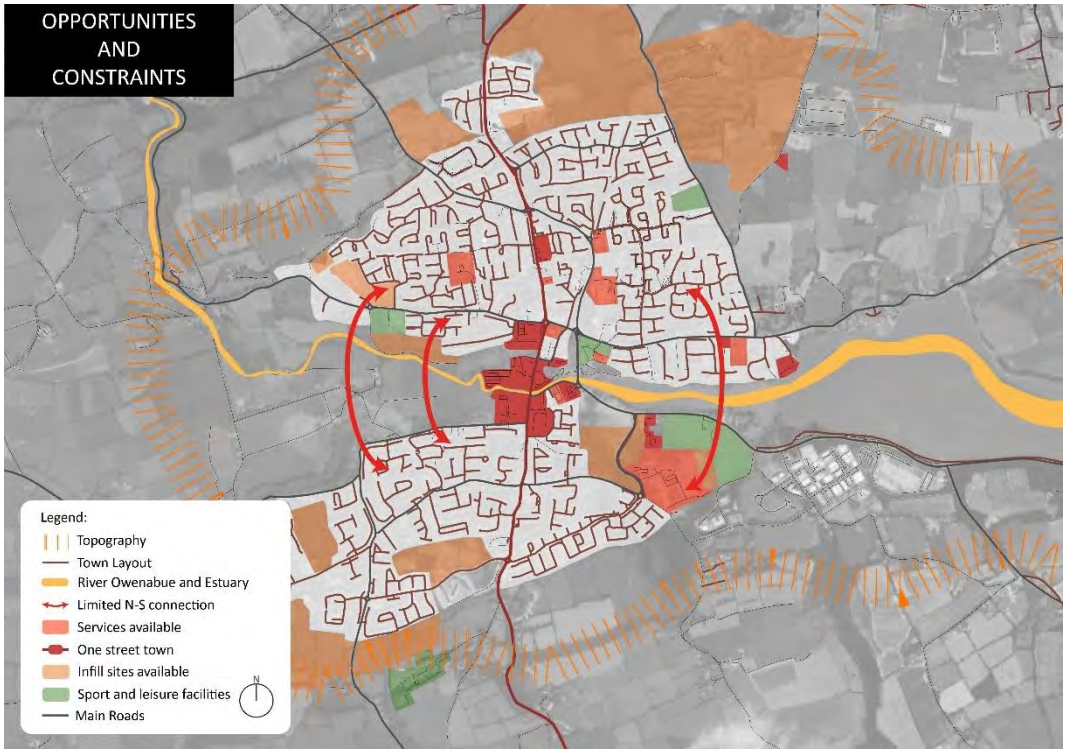


Figure 25: Opportunities and Constraints

6 Transport Network Review

6.1 Connectivity and Permeability

Figure 26 shows the road layout of Carrigaline. The roads are classified into three categories including regional routes, local connectors and local access roads. This presentation of the road network was carried out to demonstrate the current connectivity within the town. The regional routes generally provide access to the town as well as access through it. The local connector roads links into the regional roads and the majority of these roads only connect once into a regional route. This type of road network provides limited permeability and offers little route choice to road users. All the local roads links into the local connectors and do not interlink with one another.

Due to the limited number of connections to the regional road network, long queues and delay typically occurs on the approaches of local connector routes where they enter regional routes. Regional routes also have too many functions and are likely to be overburdened:

- It carries through traffic through the town;
- It collects all local traffic and distributes it over the network;
- It serves an access function by serving many local land uses directly off it;
- It caters for parking and deliveries;
- It accommodates public transport services.

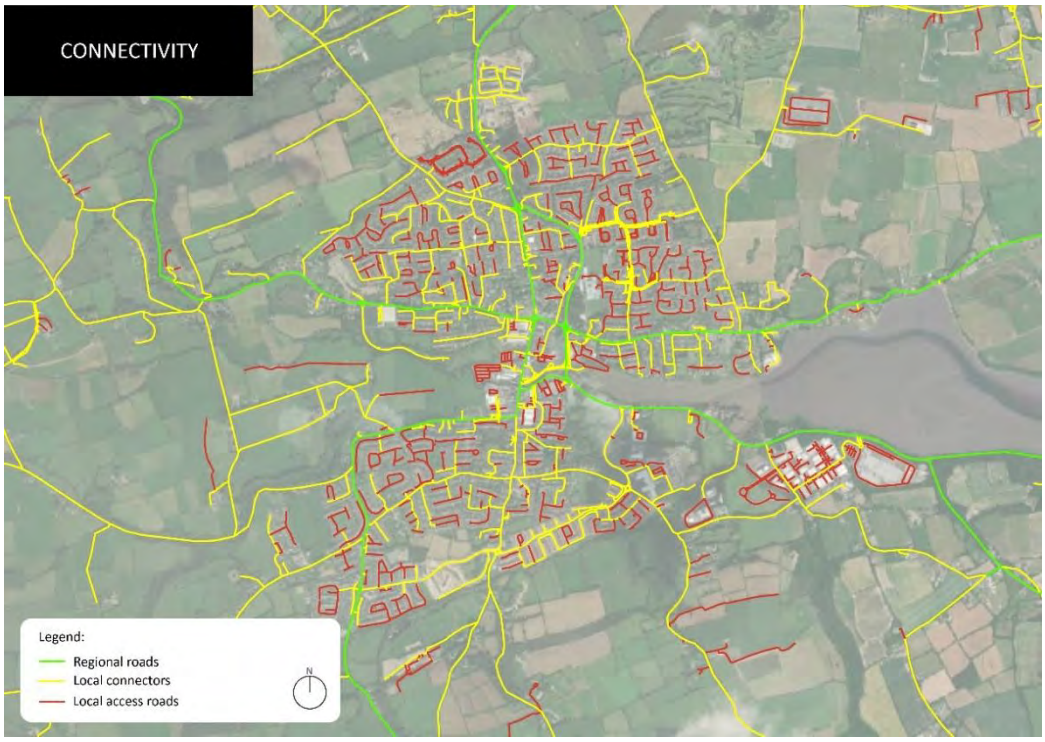


Figure 26: Connectivity

Figure 27 shows the segregation between individual neighbourhood developments. The image shows that some neighbourhoods are not well connected with one another and that to gain access to an adjacent estate, the regional road must be used, which can compound traffic issues and these important through routes can deter active travel choices.

In addition, public transport is confined to only through routes with a limited catchment area along it and which is also compounded by congestion.

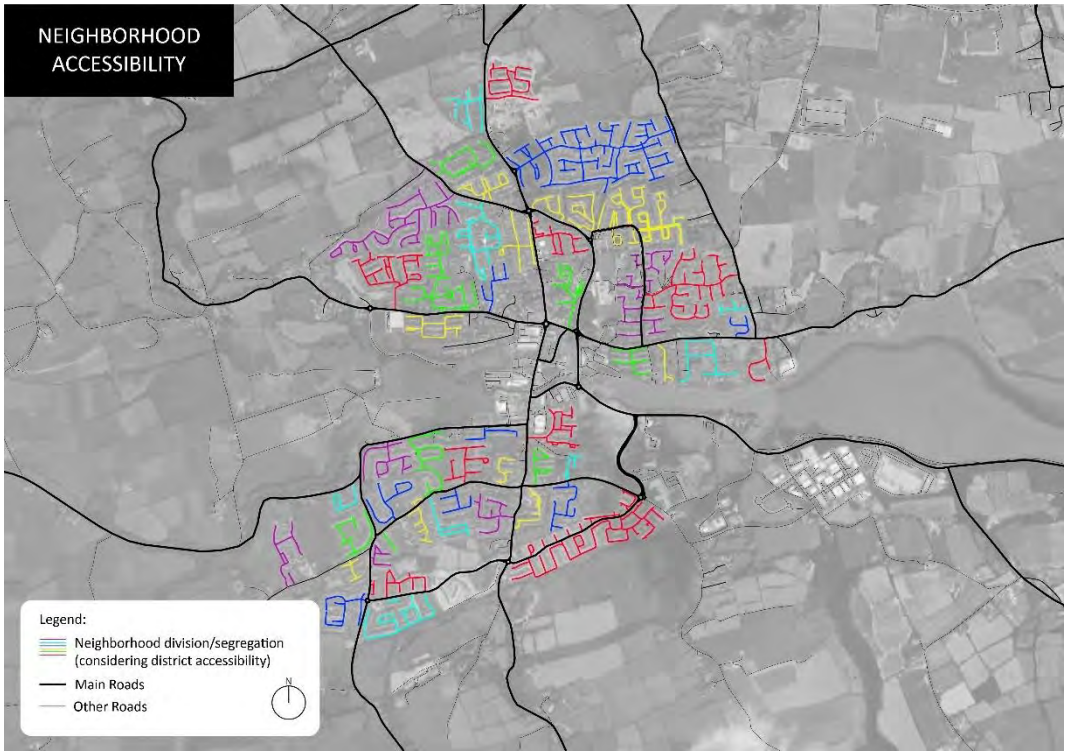


Figure 27: Neighbourhood Access

Figure 28 demonstrates two examples of current permeability issues prevailing in Carrigaline. The first shows to move from point A1 (Herons Wood) to point B1 (Gaelic Scoil) the route by road is 1,400m. The top right picture however shows a road closure between the two residential estates at point A1. If there were a link between the two estates, the walking distance could have been reduced to 300m, a much shorter walk with potential less traffic on the regional road network and less traffic congestion.

The second example shows that traveling on the road between A2 to B2 is a journey of 890m. The bottom right picture in **Figure 28** shows that residents do not follow the routes designed for within the estate but rather cuts across open land forming informal footpaths to shorten the walking distance between the two locations to 550m.

In the first example by providing the link to allow a more direct route from A1, a pedestrian can save more than 15 minutes walking time, while in the second example a pedestrian can save almost 5 minutes. These are significant time savings in a person's day and would play a large role in deciding whether to do a trip on foot or by car.

The two examples above shows that that there are opportunities to improve permeability within the town which will have the following advantages:

- Desire lines for pedestrians and cyclists are provided for;
- Shorter walking distances are provided;
- Opportunity for public realm development is created;
- Pedestrians and cyclists can follow routes which are less noisy, away from traffic and less stressful to use;
- All of the above is expected to encourage more walking and cycling and only requires a small investment to achieve.

Figure 28: Examples of Non-permeability

6.2 Pedestrian Network

6.2.1 Existing pedestrian network

Th existing pedestrian network is shown in **Figure 29**. The image shows that Carrigaline has an elaborate footpath network, especially within the residential estates which would typically have well maintained footpaths on both sides of the road.

On the main routes through the town, the quality of the footpath routes is not consistent as that provided into housing estates which are generally excellent. On the R611 Cork Road, some sections have footpaths only on one side of the route while other sections have it on both sides. This situation is similar to the R613 to Ringaskiddy Road and the R612 Crosshaven Road.

The town centre consists of one north south spine (R611) and has footpaths on both sides and numerous pedestrian crossings. However, there are opportunities to improve the quality of this road as a pedestrian link by removing narrow footpaths, broken surfacing, street clutter on footways and a car dominated environment along the street.

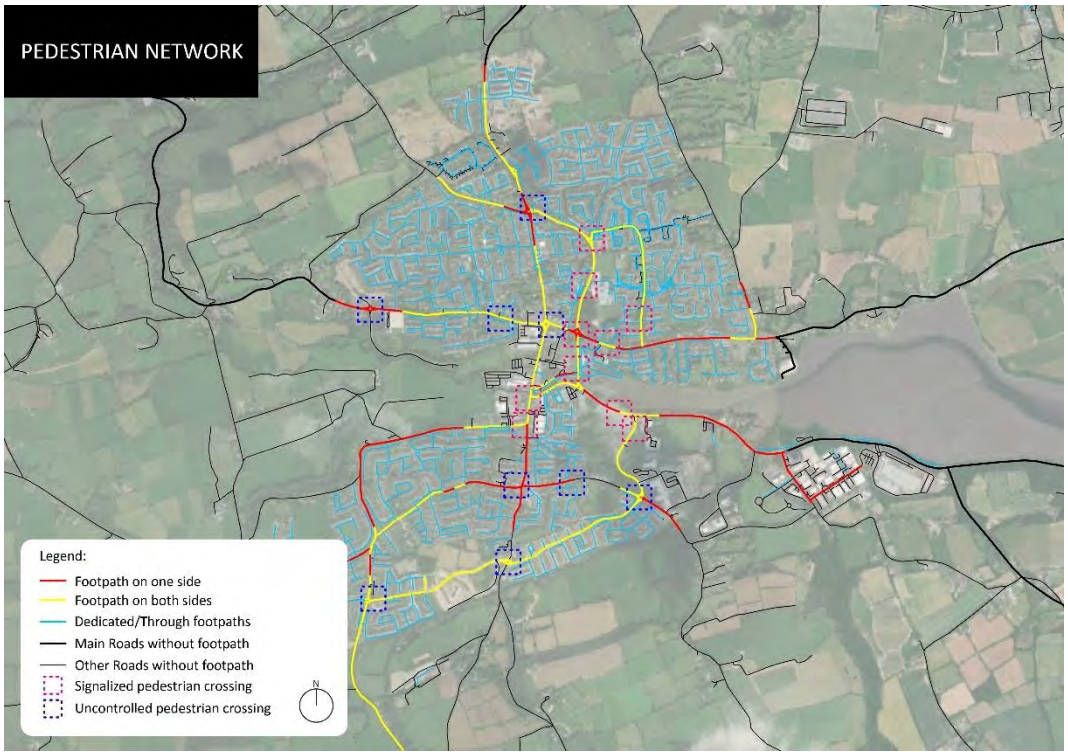


Figure 29: Existing Pedestrian Network

6.2.2 Walking Catchment area

Figure 30 shows the walking catchment of various land uses including primary schools, secondary schools, medical services and retail.

The majority of the primary schools are located to the north of the River, providing a good catchment to neighbouring residential areas. However, some residential areas on the fringes of the town fall outside of the 15 minute walking catchment to these schools. There is only one primary school to the south of the River and this school provides coverage of the south-eastern part of the town, however the southwestern part of the town falls outside the 15 minute catchment area.

There are three secondary schools in Carrigaline currently including two to the north of the River and one to the south.

The image shows that half of the town falls within the 15 minute catchment of the secondary schools which makes walking to these schools very accessible. Similar to the primary schools, the southwestern quadrant of the town also falls outside of the catchment area.

There are four medical facilities within the town and all of them are located to the north of the River. This leaves most of the town to the south of the River outside of the 15-walking catchment.

The shopping centres are all located within the town centre close to the River which allows good access by active and sustainable travel modes. The catchment of the shopping centres, being so close together is smaller as the individual catchment areas overlap. This leaves large parts of the towns outside of the 15-minute walking catchment which could be improved with better permeability.

The walking catchment area of the various land uses can be improved if permeability within the town is improved by linking estates with one another as illustrated by the permeability scenarios discussed above. More children would be willing to walk to school and parents will be less anxious knowing that the children walk along quieter routes away from traffic. With the correct public realm investment, it is also possible to ensure that pedestrians feel safe and encouraged to walk along these routes.

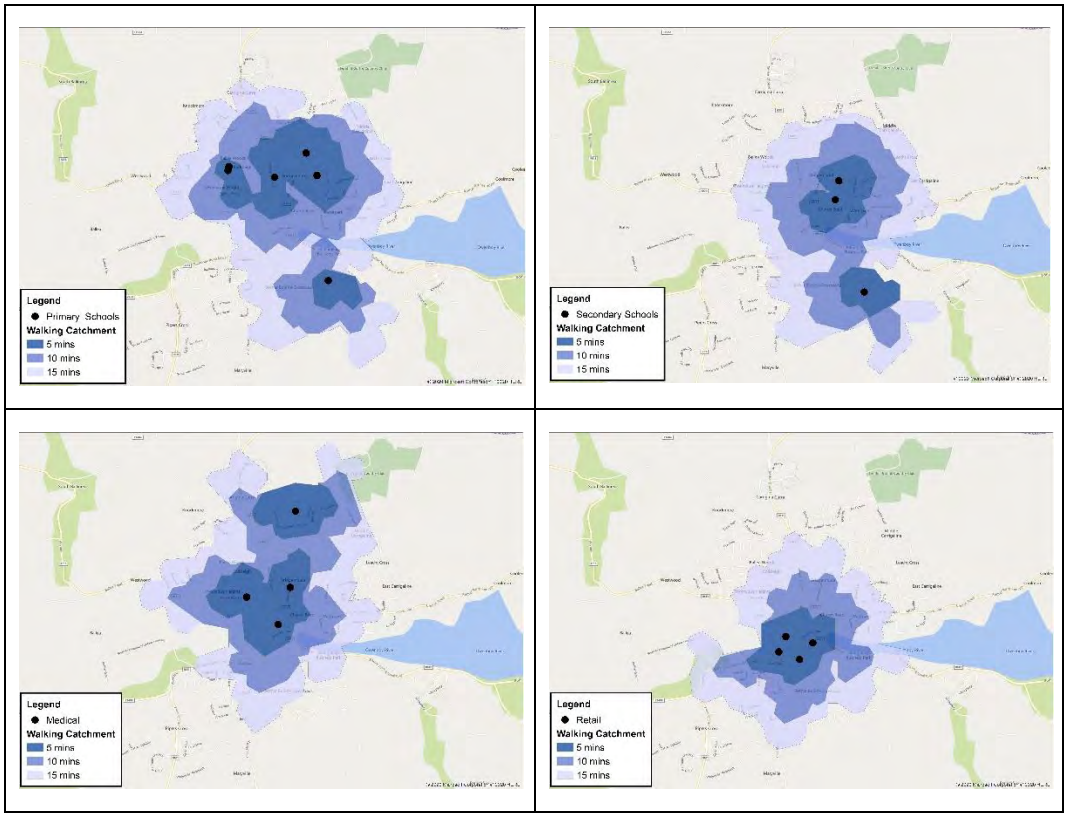


Figure 30: Walking Catchment of various land uses

Parents would also be more willing to walk to the town centre and to community services as more direct routes are available rather than add to the current congestion on the few regional roads serving the town.

6.3 Cycling Network

6.3.1 Existing Cycle Network

The existing cycle network of Carrigaline is shown in **Figure 31**. The network is currently limited but does focus on the high demand areas in and around the schools. The network includes two-way cycle lanes adjacent to the R612 to Crosshaven. This route is a green-way and very popular amongst pedestrians and cyclists. The two-way cyclist route however only starts at the Carrigaline / Kilnagleary industrial estate which is some distance from the town itself. Cycle lanes are also available along Bothar Guidel, but these routes are inconsistent, and require greater integration.

Two directional cycle lanes are however provided on Waterpark Close / Mount Rivers Close in the northern part of the town and within the new development to the south of the town, these are of relative good standard.

The town centre is not connected to any cycle routes nor is the R611 Main Road and cyclists have to share the road with general traffic which is difficult due to high volumes of traffic and on street car parking leaving little room for cyclists to ride.

There are also few cycle lanes within the residential estates of Carrigaline. However, as traffic within these areas is limited and speeds are low it is possible to share the road among all road users. The attractiveness of cycling can however be improved by increasing the permeability between the residential estates to reduce the cycling distance between estates and destinations in town.

Except for the Green way to Crosshaven, which is a major success given the popularity of the route, there are no cycle routes to Carrigaline, making cycling difficult as a mode of transport to consider for commuting to work or any other outside of town destinations during peak periods.

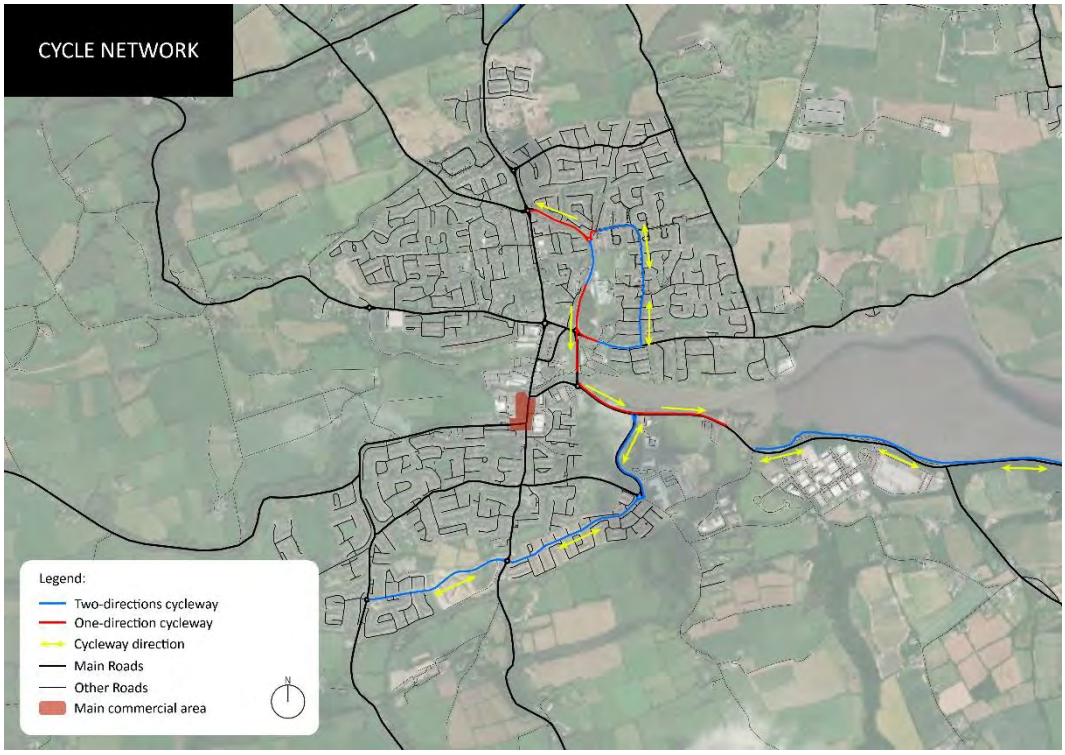


Figure 31: Existing Cycle Network

6.3.2 Cycling Catchment

Figure 32 shows the cycling catchment for various land uses in Carrigaline including primary schools, secondary schools, medical services and retail. The analysis shows that the entire town (and areas beyond) is included in the 10-minute catchment of all the land uses considered. The catchment analysis clearly demonstrates the potential of cycling as an important mode of transport in the town.

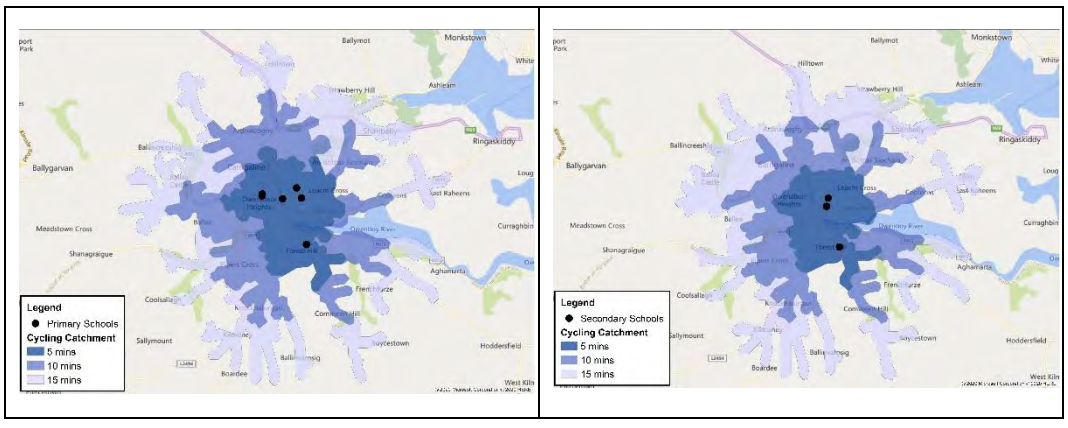


Figure 32: Cycle Catchment

6.4 Public Transport

6.4.1 Current Public Transport Network and Services

Figure 33 shows the available bus services in Carrigaline, where stops are available and the frequency of the bus services. Carrigaline is served by three bus routes including the 225 between Ringaskiddy and Cork Airport, the 220 from Crosshaven to Cork and the 220x from Crosshaven to Ovens (to the west of Cork). The 220 is the most frequent bus running on a 15 minute frequency, followed by the 220x, which runs on a 25 minute frequency and the 225 running on a 30 minute interval.

The buses therefore run quite frequently between Carrigaline and the locations it is connected to, however traffic congestion and causes delays to services during peak periods leaving periods where there is no buses. This unreliability can result in residents turning to their car as the most reliable mode of transport for longer trips.

There is no bus priority systemin the town and therefore buses have to negotiate general traffic which affects bus operations. All of the bus routes run partially on the R611 main route through the town crossing the Owenabue River. There are bus stops located within the town and on the R611. They are around 500m apart to the east of the town while within the centre of town the spacing is just over 200m apart. The bus stop spacing are considered to be reasonable in terms of optimising the bus route catchment.

The bus network generally connects a number of towns and city centres on a regional scale to one another. Therefore, public transport is generally not used to gain access to the town centre from the estates located on its edges, except arguably along the route 220 serving the south of the town. Large parts of the town fall outside of the catchment of the public transport routes.

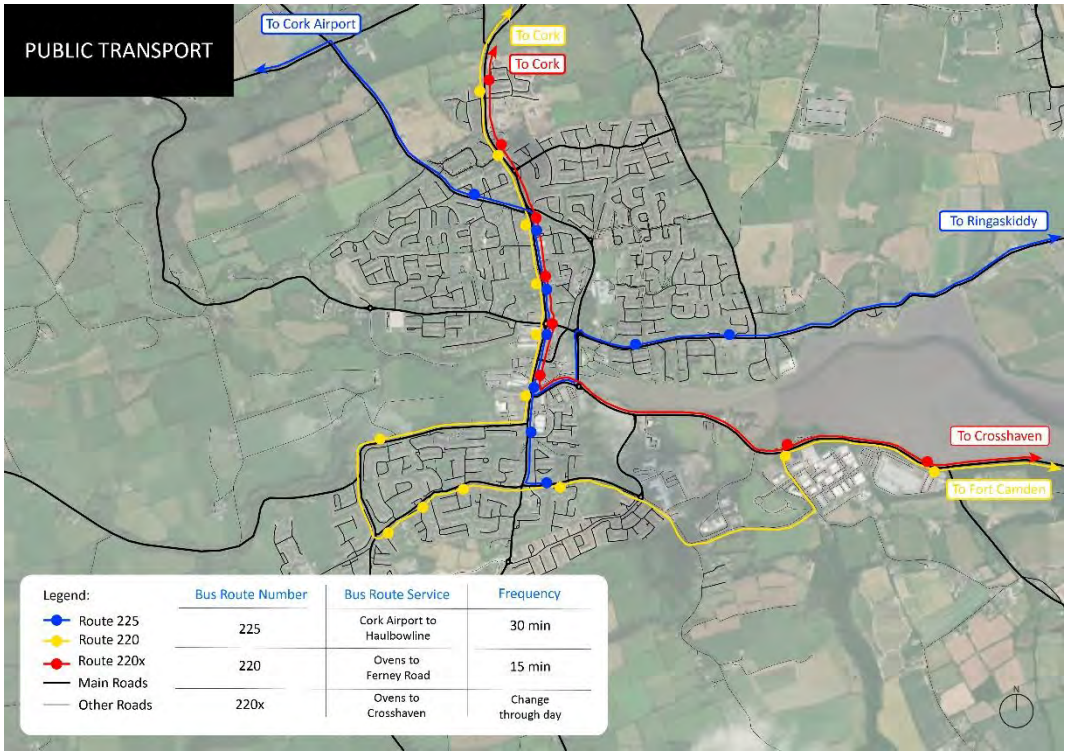


Figure 33: Current Public Transport Network

6.4.2 Public Transport Volumes

Figure 34 shows the recorded public transport movements during the AM peak period. The traffic counts show that most of the public transport movements are on the R611 Main Road. The highest volume was recorded between Junction 2 and 3 where 10 public transport vehicles were counted. Public transport movements in the town centre was recorded as 6 vehicles per hour northbound and 4 southbound. Bus movements of 1 or 2 buses per hour were recorded on all routes leading into the town.

Figure 35 shows the recorded public transport movements during the PM peak period. Compared to the AM peak period the volumes are somewhat less during the PM peak.

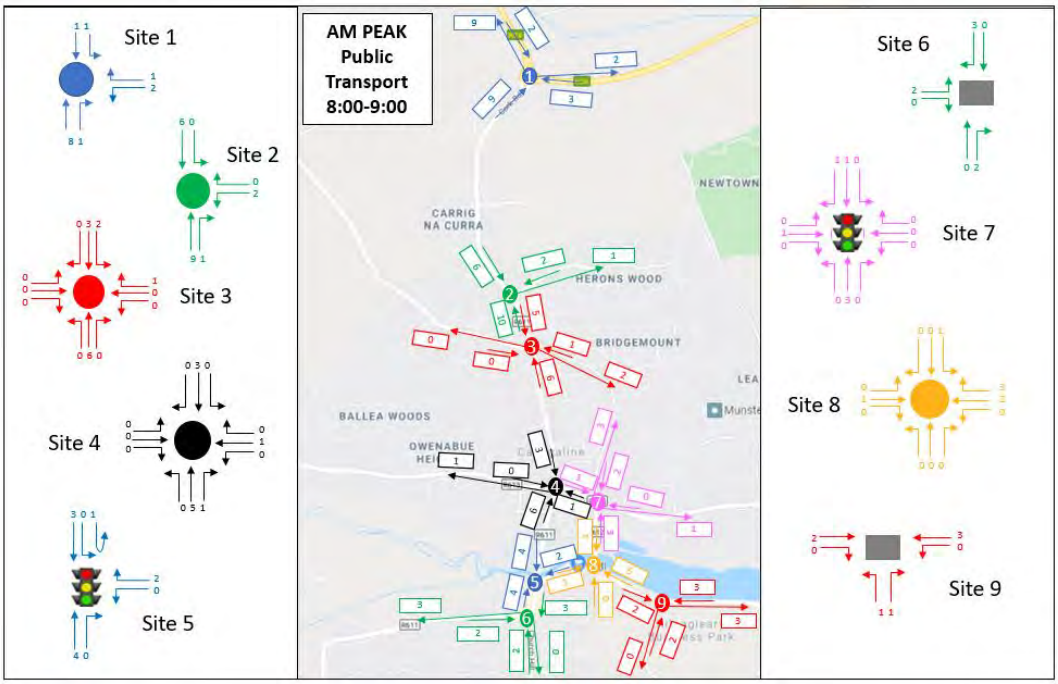


Figure 34: Public Transport Traffic Volumes during AM Peak

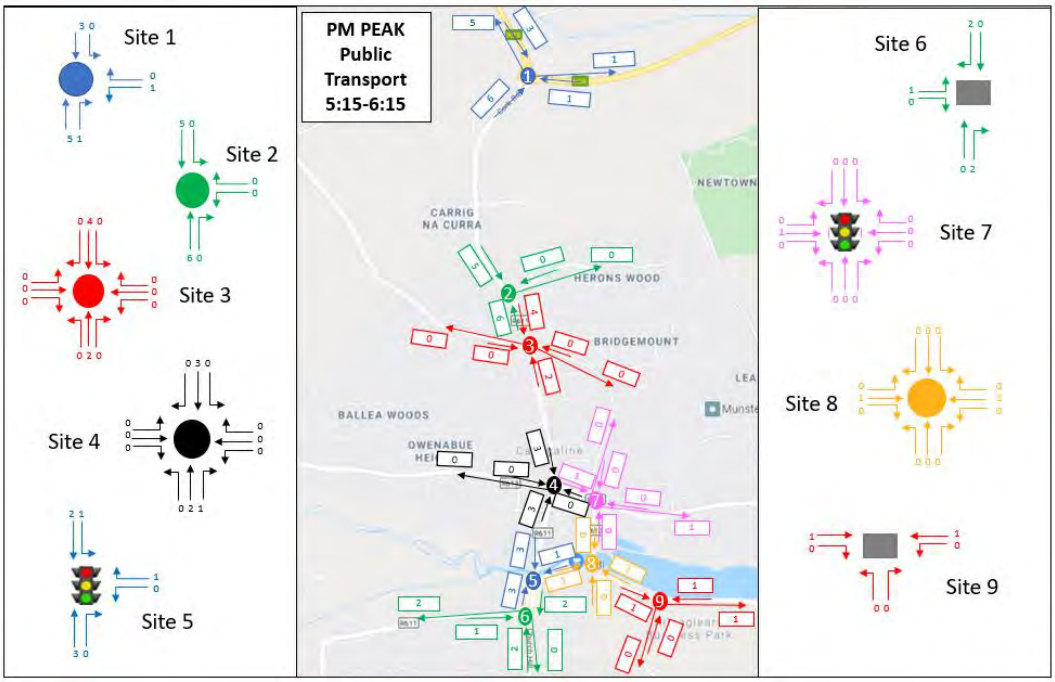


Figure 35: Public Transport Traffic Volumes during PM Peak

6.5 Public Realm

6.5.1 Town Centre Analysis

A town centre quality criteria analysis was carried out from a public realm point of view which is illustrated in the **Figure 36** below:

Figure 36: Public Realm Quality Criteria Analysis

The criteria analysis includes the following:

- Invitation for Walking: The space itself is dominated by parked cars and bound by a congested and contested Main Street space, offering little invitation for walking;
- Invitations for Standing + Staying: The landscape of the River and the River banks are very attractive, and so a pleasure to look at for a while. Being the heart of the town centre there is also invitation to stay for a while;
- Invitations for Sitting: There is very little invitation or opportunity to sit within the space. South East of the bridge there are some sittable stone objects and there are a couple of benches with backs and arms northeast of the bridge and nothing adjacent to active frontage;
- Invitations for Seeing: Being in the heart of the town centre there is lots going on and life surrounds the place, however the invitation to stop and take it in is very limited;
- Invitations for Hearing and Talking: The environment next to the River is quiet however the adjacent traffic volumes and parking make for a space that isn't suited ideally for conversation;
- Invitations for Play and Recreation: Very little consideration of informal play in the space and the dominance of vehicles makes the environment unlikely to engage children. The sittable elements southeast of the bridge provide some invitation but with the adjacent busy carriageway this is lessened;
- Dimensioned at a Human Scale: The scale of the town centre and the enclosure of the space by adjacent built form has good potential to create an attractive and active space;

- Positive Aspects of Climate: The space offers little protections from the elements however benches are protected with adjacent tree planting;
- Aesthetic Quality: Overall the aesthetic quality of the space is lacking, primarily due to the dominance of vehicles detracting from the potentially very strong landscape quality of the River;
- Protection against Vehicular Traffic: There is very little protection from vehicles, with vehicles dominating the space and people put at the edges;
- Protection against Crime and Violence: The space and town feel safe and large lights illuminate the space in the hours of darkness;
- Protection against Unpleasant Sensory Experiences: The adjacent parking and street creates poor air quality that detracts from the space.

6.6 Car Parking

6.6.1 Available Car Parking

Figure 37 shows the location of existing car parking in Carrigaline. The parking shown excludes any spaces at schools or churches. The parking shown includes both on street and off street parking.

On street parking is mainly provided along the R611 Cork / Main Road in the town centre and also along Bóthar Guidel. On street car parking availability is shown in **Table 1** below:

Table 1: On Street Car parking

Location	Parking Type	No of Spaces
Town Centre		
	Standard Car Parking Spaces	88
	Disabled Spaces	4
	Loading	4
Bóthar Guidel		
	Standard Car Parking Spaces	33

There are 88 car parking bays located within the town centre, four disabled bays and four loading bays and on Bóthar Guidel there are an additional 33 car parking bays. These spaces are pay and display parking bays and the tariff is low. From observation during site visits, these spaces are heavily utilised during weekdays.

The off street car parking space availability is shown in **Table 2**. There are 826 standard car parking spaces located within the town centre area. The majority of these spaces are associated with retail development such as Supervalu, Dunnes Stores and Lidl. No fee is asked for the use of any of these spaces. From observations during site visits, it seems that generally between half and a third of these car parks are not utilised during weekdays.

There are 120 car parking spaces available for the hotel. These bays are heavily utilised when functions are held at the hotel.

There are 700 bays available within the Carrigaline industrial area. From observations, it seems that the majority are not utilised during the weekdays. These bays are however not open to public and closely associated with specific businesses and organisations.

Table 2: Off Street Car Parking Spaces

Location	Parking type	No of Spaces
Town Centre		
	Standard Car Parking Spaces	826
	Disabled Spaces	27
Hotel		
	Standard Car Parking Spaces	120
	Disabled	
Industrial		
	Standard Car Parking Spaces	700
	Disabled	13

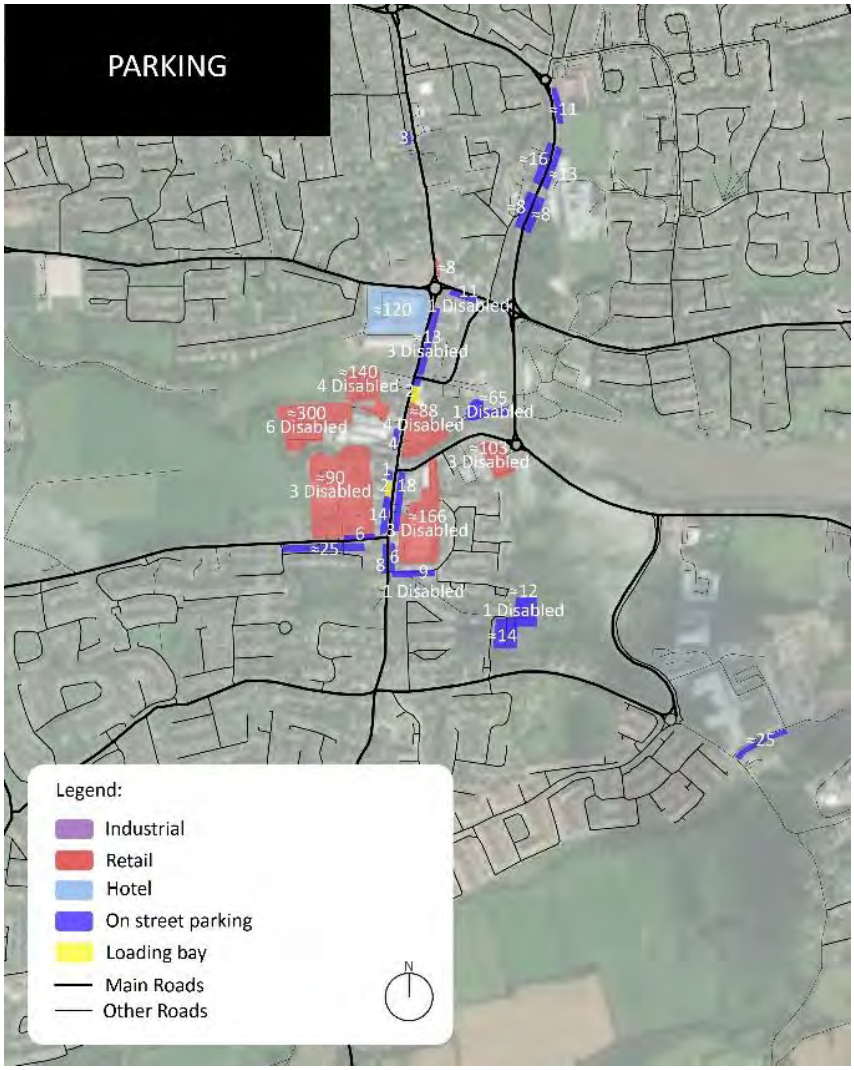


Figure 37: Existing Car Parking

6.7 Road Network

6.7.1 Existing Road Network

Figure 38 shows the internal and surrounding road network of Carrigaline. The N28 is the only national road within close vicinity of Carrigaline. This road provides direct linkage between Cork and Ringaskiddy, providing access to the Port facilities and industries. At the Shannonpark Roundabout the N28 intersects with a secondary road, the R611 which continues in a southbound direction, traversing through the town and forming the main street. This road continues up to a point to the south of the Owenabue River where it turns towards the west and south to continue on to small villages such as Boardee, Ballyfeard and Nohoval.

The R613 traverses the town in an east west alignment to the north of the Owenabue Estuary and River providing a direct link from Ringaskiddy to Carrigaline which continues further west to Ballygarvan.

The R612 runs to the south of the Owenabue Estuary and River adjacent to the River bank and provides a link to Carrigaline from Crosshaven.

There are very limited tertiary roads within Carrigaline to collect traffic from residential roads. The majority of the internal roads of Carrigaline are residential or local roads. Many of these roads connect directly into the secondary roads which results in numerous junctions affecting continuous traffic flow on these routes.

The typical street patterns of the residential roads are suburban with loops, cul de sacs and dead ends, making these areas relatively inaccessible, non permeable and offering little route choice.

Bóthar Guidel was constructed as a relief road to the R611 Main Road and provides a second access across the River Owenabue. It provides an alternative route that avoids the high level of friction caused by parking, loading and pedestrian activity on Main Street.

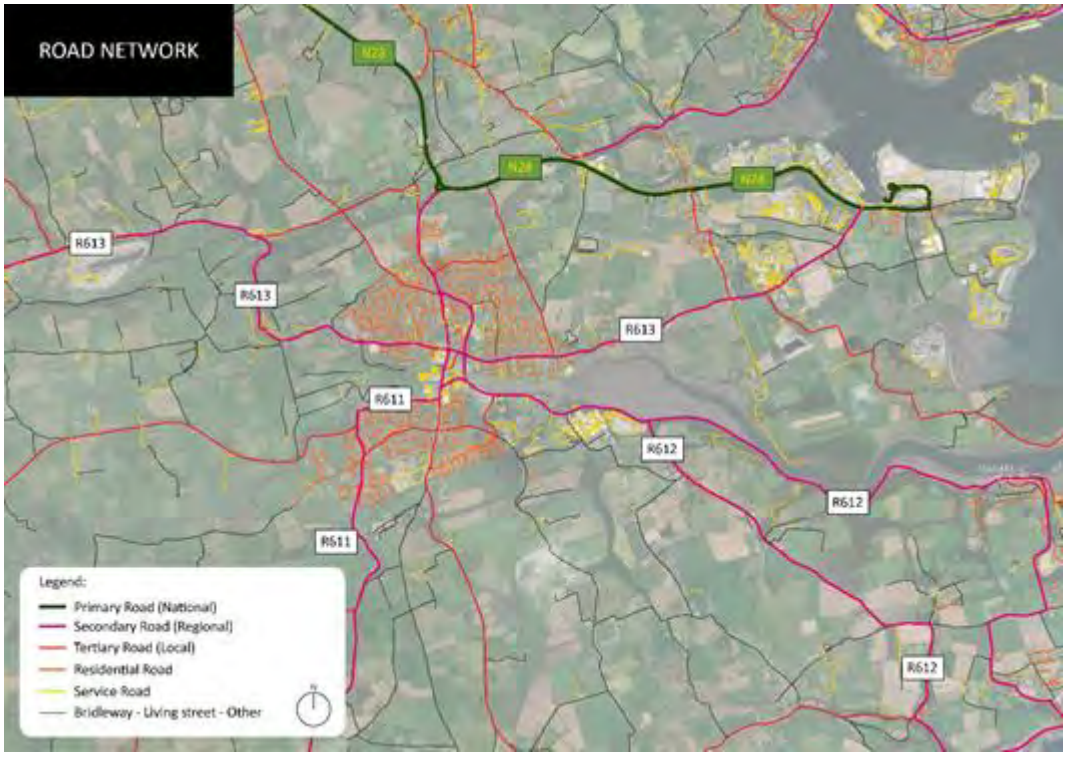


Figure 38: Surrounding Road Network Hierarchy

6.7.2 Road Administration

Figure 39 shows the road ownership and administration of Carrigaline. The majority of the roads are in ownership of Cork County Council. There are however instances where roads are in private ownership. These include individual residential streets and large estates such as Heron's Wood. These estates are typically newly built and in time the road ownership may be transferred from the developer to Cork County Council via the 'taking in charge' procedure.

The road ownership within the Carrigaline and Kilnagleary Industrial Estates are also currently privately owned.

All roads within the town centre are public roads in the ownership of Cork County Council.

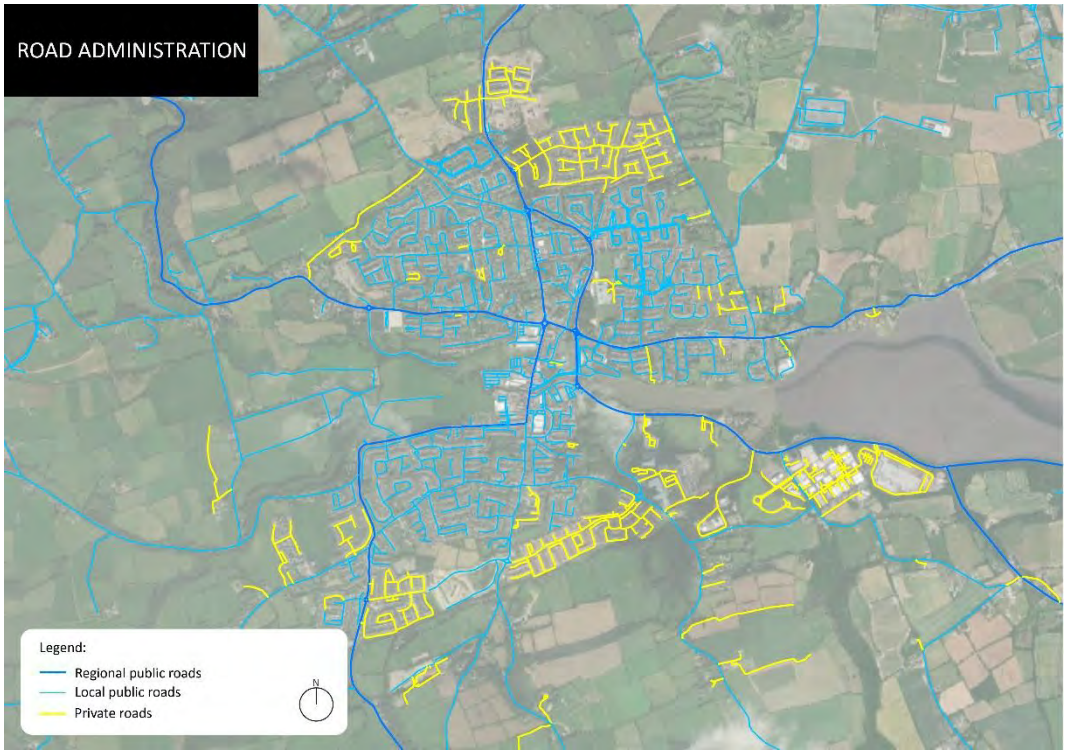


Figure 39: Roads Administration

6.7.3 Planned Road Infrastructure

Figure 40 shows proposed road infrastructure within the vicinity of Carrigaline. The proposed M28 to the north of Carrigaline will link Cork to Ringaskiddy and to accommodate port expansion.

To the west of the town centre the Inner Relief Road is proposed and currently a Contractor is imminently due to be appointed to commence the works, with construction expected to take two years to complete. This road will provide alternative access into the town centre and reduce traffic on Main Street providing opportunities to properties.

The alignment of the Outer Relief Road is also shown. The alignment for this road is only indicative and will be further investigated in this study.

Figure 40: Proposed Road Infrastructure

6.7.4 Traffic Flow

6.7.4.1 Introduction

The recording of new traffic counts was not possible due to the Covid 19 restrictions that subdued traffic volumes. The traffic volumes shown below are based on historic counts that were carried out for various projects between 2014 and 2018. Some of the count locations were overlapping and therefore the compatibility of the traffic counts could be reviewed. It was found that the traffic counts that overlapped differs from one another less than 10% in volume and therefore the counts can be seen as compatible.

6.7.4.2 AM peak hour

Figure 41 shows the AM peak hour traffic flows within Carrigaline which was identified between 08:00 and 09:00.

Junction 1 (Shannonpark Roundabout) is the main entry point into Carrigaline during the AM peak period. This junction is the busiest junction on the road network carrying more than 3,000 vehicles an hour. This is a very strategic junction as it is the main access to Carrigaline from the Cork area and also provides access to Ringaskiddy where Cork Port is located as well as large scale industry. More than half of the southbound traffic on the M28 heads toward Ringaskiddy, while the remainder enters Carrigaline. Of the vehicles leaving Carrigaline the greater majority heads to Cork via the M28 as this is the shortest route and a high capacity road.

Junction 2 (Cork Road / Herons Wood) carries around 2,000 vehicles per hour during the AM peak period. The majority of the traffic continues either northbound or southbound along the R611 as there is no alternative route to enter Carrigaline. Typically, during the AM peak, a substantial number of vehicles leave the Herons Wood residential area of which approximately half turn to the north and half to the south highlighting the high level of internal trips carried out by a car in Carrigaline.

Junction 3 (Cork Road / Bóthar Guidel) is busy considering that it is an urban intersection carrying more than 2,600 vehicles per hour. The southbound volume splits into 315 vehicles continuing on the R611 Main Street and the almost 400 vehicles turning left onto Bóthar Guidel (Cork Road). Motorists use Bothar Guidel to avoid the high level of activity on Main Street, which slows traffic down. Large volumes of traffic approach this junction from the south and the east of which the majority continues northbound towards Junction 2.

There are almost 2,000 vehicles per hour using Junction 4 (Heron's Roundabout). This is a very busy junction as major traffic flows merge at this location. Church Road is a direct link from Ringaskiddy attracting high traffic volumes and similar to Junction 2 the majority of the traffic is northbound and southbound on the R611 regional Road. There is quite a significant volume of traffic (616 vehicles) on the R613 (Church Road) east outbound route towards Ringaskiddy.

At Junction 5 (Main Street / Crosshaven Road) the major movements remain on the north south Main Road corridor with the majority of the traffic in the northbound direction. Although the R612 provides access to the Carrigaline and Kilnagleary Business Park, there are generally less traffic generated by Crosshaven compared to Ringaskiddy and therefore east west traffic volumes are lower. Overall the traffic volume accommodated during the morning peak is around 1,200 vehicles.

At Junction 6 (Kilmoney Lower / Church Hill) serves low density residential development to the south of the river and through traffic from rural towns such as Kinsale. The total traffic volume accommodated is almost 1,500 vehicles. There are over 500 vehicles turning left from the R611 to Main Road and more than 400 southbound vehicles turning right.

Junction 7 (Bóthar Guidel / Church Road) carries almost 1,800 vehicles and traffic volumes on the approaches are quite equal with no dominant movement.

Junction 8 (Bóthar Guidel / R612) accommodates the morning peak traffic from Crosshaven travelling north. Of the total traffic of around 1,700 vehicles, more than 500 vehicles turn right from the R612 onto Bóthar Guidel and a reverse movement of around 600 vehicles from Bóthar Guidel to the R612 Bóthar Guidel also takes place.

Junction 9 (R612 / Fuchsia Avenue) provides access onto an alternative north south link. The junction accommodates less than 1,300 vehicles per hour and the major movements are on the eastern and western approach.

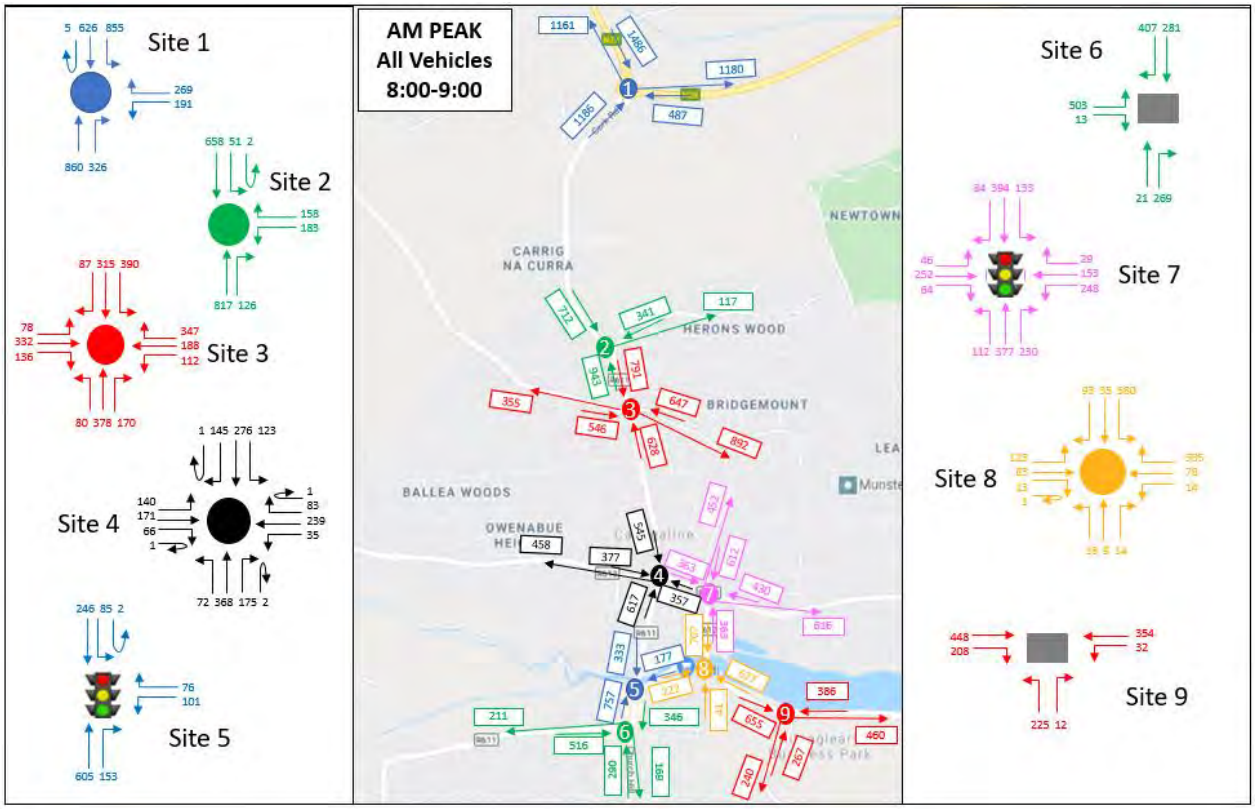


Figure 41: AM Peak Traffic Flows for All Vehicles

6.7.4.3 PM Peak hour

The PM peak period was identified between 17:15 to 18:15 and is shown in **Figure 42**.

Similarly, to the AM peak period, Junction 1 (Shannonpark Roundabout) is the busiest junction on the network during the PM peak period. Again, Cork Road is the main route to return from Cork City and other major employment areas to Carrigaline, which makes it a busy road. The major movements include a large left turning movement of around 850 vehicles on the M28 to Ringaskiddy as well as a southbound movement of over 600 vehicles to Carrigaline. There are however also a significant northbound movement to Cork during this peak period.

At Junction 2 (Cork Road / Herons Wood) which carries around 2,000 vehicles, the north and southbound movements are the most significant as there is no alternative for motorists to take. Total volumes at Junction 3 (Cork Road / Bóthar Guidel) is over 2,600 vehicles and the volumes are fairly evenly distributed on the approaches to the intersection. Motorists use Bóthar Guidel as an alternative to avoid slow traffic on Main Street.

Around 1,900 vehicles travel through Junction 4 (Main Street / Church Road) and the major movements during the PM peak period is northbound and southbound. However, there is a high volume of westbound traffic arriving at this junction as Carrigaline residents employed in Ringaskiddy use this route to travel home.

Junction 5 (Main Street / R612) carries almost 1,300 vehicles and the most dominant movement is the 760 northbound vehicles as this is one of two access points across the river and this is also the shortest route for residents travelling from Crosshaven to avail of business and retail in Carrigaline.

Junction 6 (Church Hill / Kilmoney Lower) carries around 1,150 vehicles and it again serves residential areas to the south of the River and traffic from rural locations such as Kinsale. The most dominant movement is the left turn from the R611 west into Main Street to head in a northern direction.

The most dominant movement at Junction 7 (Bóthar Guidel / Church Road) is the 612 southbound vehicles while the movements at the other approaches are similar. This junction serves Carrigaline residents travelling home from Ringaskiddy which is a major employment centre. This junction carries almost 1,800 vehicles.

At Junction 8 (R612 / Fuchsia the left turn towards Crosshaven and the reverse movement is the most dominant. The east and west movements at Junction 9 is the most dominant.

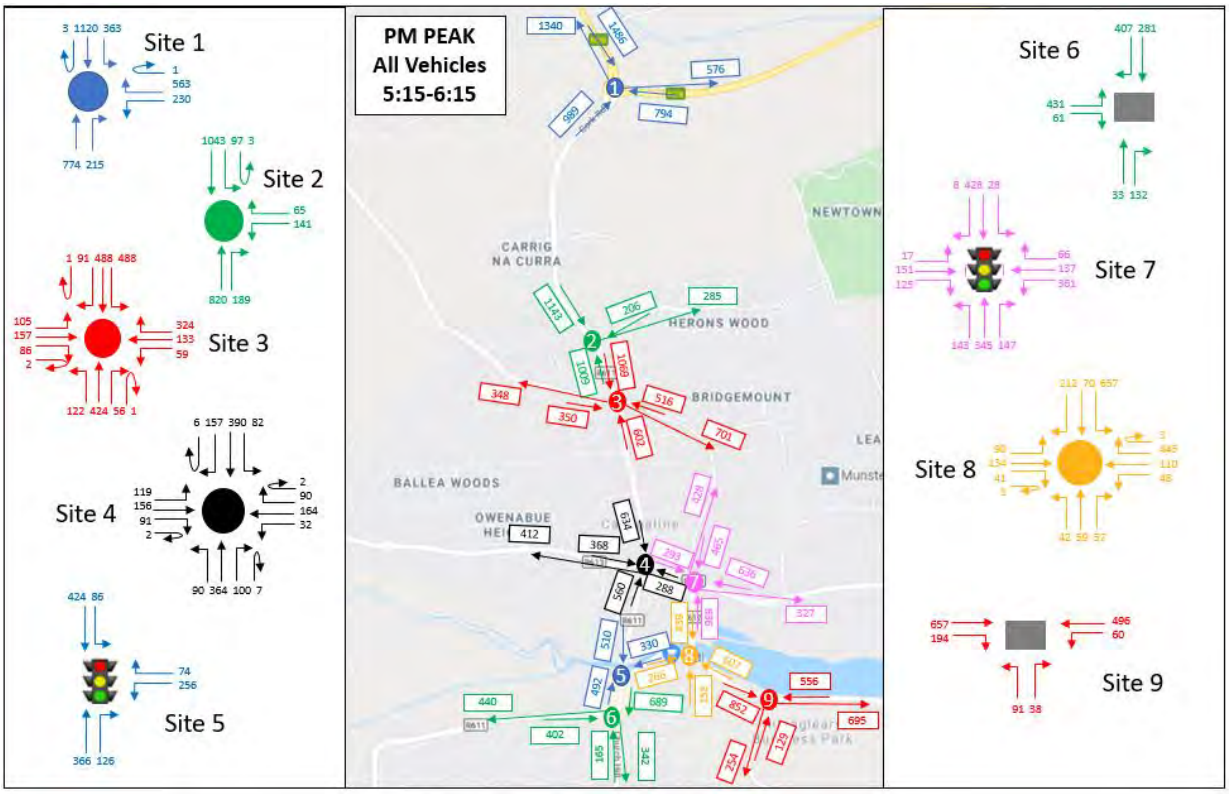


Figure 42: PM Peak Traffic Flows for All Vehicles

6.7.4.4 Traffic flow summary

Figure 43 shows a summary of the AM and PM peak traffic flow within Carrigaline. During both peak hours there are a substantial volume of traffic to and from Ringaskiddy via the M28 as this road provides access to the Port and industrial employment and activity. The Shannonpark Roundabout is by far the busiest junction within the vicinity.

Traffic flow through Carrigaline remains on the R611 Main Road as the only alternative until it splits at the junction with Bóthar Guidel into more or less equal volumes where Bóthar Guidel provides an alternative route to avoid congestion and delay on Main Street. Traffic running through the town is from the R613 Ringaskiddy Road, the R612 Crosshaven and the R611 as this is the spine road through the town connecting all these routes to one another putting pressure on the infrastructure.

Within the town the busiest junctions include the Main Road / Bóthar Guidel junction and the Bóthar Guidel / R613 Ringaskiddy Road junction as these junctions are locations where traffic from different directions merges.

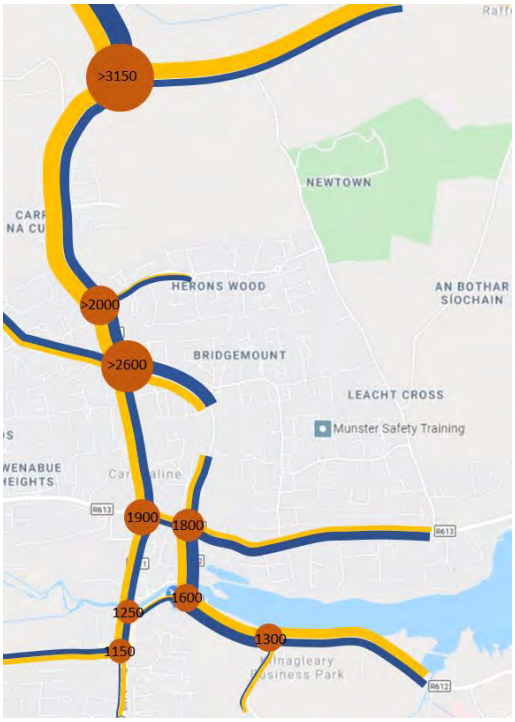
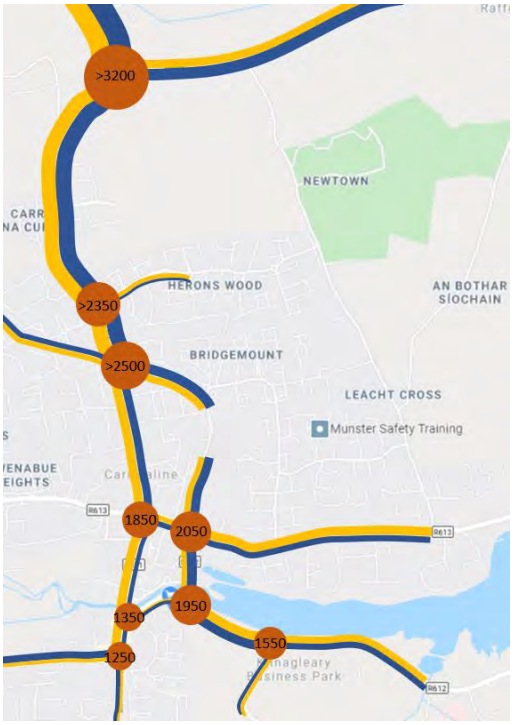
AM Peak Traffic Flow	PM Peak Traffic Flow
	

Figure 43: Summary of All Traffic Flows

6.8 Freight and Delivery

The traffic counts carried out were classified counts identifying between vehicle classes. The traffic movements of various vehicle classes were reviewed, and the following comments are made:

- As can be expected, the greater majority of freight movement occurs on the N28 between Cork and Ringaskiddy. The traffic counts have shown that small numbers of freight vehicles travel through Carrigaline during peak hour periods;
- Freight movements are much more pronounced in the AM peak compared to the PM peak period;

- Similar to freight, there the highest number of delivery vehicle movements are on the N28 between Cork and Ringaskiddy. This high number can probably be ascribed to warehouses repacking freight containers into smaller delivery vehicles;
- While freight vehicles predominantly follow the N28 to gain access to Ireland's national road network, a substantial number of delivery and light goods vehicles access into Carrigaline. Traffic counts have shown that between 50 and 70 delivery vehicles in each direction travels during the AM peak on Main Street and some sections almost 100 vehicles per direction.
- Delivery and light goods vehicles are part of the lifeblood of Carrigaline, bringing products to the town and performing everyday services such as house delivery, construction and maintenance.

7 Opportunities and Challenges

7.1 National Planning Policy

7.1.1 Introduction

The National Planning Policy provides a positive context for Carrigaline to develop further into an area of high quality living. Carrigaline is situated in an attractive area of natural beauty providing residents with the opportunity to live close to major employment areas. However, the transportation infrastructure currently available struggles to meet demand and the National Planning Framework recognises that significant growth needs to be accommodated in the Southern Region which includes towns such as Carrigaline. Although this is exciting, it also is a challenge and improvement in infrastructure and population behaviour needs to be made. The following key challenges and opportunities are identified:

7.1.2 Challenges

- The current transportation infrastructure of Carrigaline already operates at or close to capacity and will struggle to accommodate more demand;
- Linkage to Cork is restricted and dominated by car-based transport;
- High car dependency for local trips;
- Main Street has the potential to serve a growing population as it is well located within the town's built structure;
- The current town structure is spread out with some permeability issues and densities are low;
- The town is well served with educational, community and retail provision and due to its compact nature has the potential to encourage access by active modes.

7.1.3 Opportunities

- There is the opportunity for Carrigaline to grow, bringing a larger population to the town;
- Carrigaline can grow into a better-balanced town where local employment opportunities are created and local services are provided;
- Local employment opportunities can be provided and linkages between Cork City and places of work can be enhanced;
- A more efficient town can be created where more services are available and travel choice is increased.

7.2 Regional Planning Policy

7.2.1 Introduction

CMATS sets out a plan for the delivery of the transportation infrastructure to accommodate the envisaged growth in population and employment by the national policy documentation. CMATS recognises that there are many challenges to deal with the existing transport situation, but provides a high level vision, principles and strategy to address these challenges.

7.2.2 Opportunities

The vision set by CMATS for the Metropolitan area provides a positive approach to deal with the above challenges and future transport demand. The vision is underpinned by underlying principles focussed on sustainable transport, improved connectivity, an enhanced public realm and increase in capacity of the transport network.

CMATS is the mechanism to achieve positive change based on these principles and is backed by financial commitment from Government to bring recommendations to implementation. Opportunities afforded by CMATS include the following:

- Strategic land has been identified to accommodate future growth at Carrigaline. The land use strategy is also underpinned by focussing town expansion within the existing boundaries of the town by infill and brownfield development;
- Utilising the public transport network as the framework for developing supportive infrastructure such as walking and cycling networks. The radial network to Ringaskiddy forms a backbone and development corridor for development to the south of Cork. There is an opportunity to link Carrigaline into this corridor to achieve enhanced long distance public transport services;
- The proposed BusConnect services will have a significant impact on Carrigaline by providing bus priority and operating at a high frequency;
- The proposed Carr's Hill Park & Ride can provide the opportunity to provide shorter car based trips to Cork City and Ringaskiddy. The use of cars can also be further reduced by incorporating mobility hubs in town, connected to the Park & Ride facility;
- CMATS provide the motivation to introduce parking management measures for more effective use of available parking and to reduce on street parking over time. This provides the opportunity to use some of the most valuable and sought-after space in town to be utilised for more intensive use;
- CMATS provides opportunity to develop a walking network that connects neighbourhoods, improve permeability, create attractive environments and prompts more people to walk;

- An elaborate cycle network with different route types are proposed to connect the town with the future BusConnect network. These include for example greenways such as the proposed Carrigaline to Passage West and Monkstown and a primary route to Car's Hill Park & Ride. These are excellent opportunities to create an alternative network for travel to local, short and medium distance locations;
- The M28 is proposed to serve as a strategic freight route between Cork and Ringaskiddy Port activities which will assist in keeping heavy vehicle traffic off local roads.

7.2.3 Challenges

CMATS have identified a long list of challenges of which many are relevant to Carrigaline. Following is a summary of the challenges:

- The demand on travel is on the increase and there is an over reliance on car based transport and parking. This includes school trips and the public health of the town is at risk as well as the town's viability;
- There is limited road space and the competition by various modes of transport puts this space in high demand. This also includes freight traffic travelling through the town;
- Current urban form, based on dispersed travel patterns and a low resident to jobs ratio is low, forcing a significant portion of residents outside of Carrigaline to places of employment;
- Public transport is caught up in congestion and reduces its attractiveness as an alternative mode of transport;
- The growth of towns including Carrigaline is affected by waterways and geographical features such as steep topography.

7.3 Local Planning Policy

7.3.1 Introduction

The Ballincollig / Carrigaline Local Area Plan 2017 sets out a detailed planning strategy for Carrigaline. However, the LAP was developed before CMATS and therefore is to some extent out of date. The plan was however based on well founded principles and presents the following opportunities:

7.3.2 Opportunities

- Land within the boundary of the town was identified for infill development and employment zones and the town centre was clearly defined;
- The Outer Relief Road was identified as a potential option to deal with through traffic, which can be explored;
- Local green walking routes have been identified within the town which could be considered in the development of walking and cycling transport networks.

7.3.3 Challenges

- The premise of the proposals made in the LAP will need to be confirmed due to the timeframe that has passed since the plan was developed;
- The need and feasibility of the proposed Outer Relief Road needs to be investigated.

7.4 Demographic Profile of Carrigaline

7.4.1 Introduction

The 2016 CSO Census data was used to develop an understanding of the residents living within Carrigaline by comparing data for Carrigaline with towns nearby and also to Cork City and Suburbs, which can be used as a benchmark for future change to occur. The following opportunities and challenges were identified:

7.4.2 Opportunities

- Continuous population growth in Carrigaline demonstrating the town is a sought after location within Cork County;
- Census data shows that Carrigaline has a significantly younger population compared to other towns within the vicinity and Cork City & Suburbs. Therefore, there will be increased benefit to Carrigaline from investment in active forms of travel, as young people are more likely to utilise these facilities;
- Pedestrian commuting has increased from 8% to 11% from 2011 to 2016 while bicycle use increased by one percent.

7.4.3 Challenges

- Limited employment opportunities, only 2,881 employment opportunities recorded in the 2016 census. Considering a population of 15,881 people, this translates to an employment/resident ratio of 1:8, compared to Cork City and Suburbs ratio of 1:1.2 illustrating that local population travels outside of Carrigaline to places of work.
- The average travel time for residents to education or place of work is higher than that of surrounding towns and Cork City & Suburbs.
- Carrigaline is highly car dependent and car ownership in Carrigaline is significantly higher compared to nearby locations.

7.5 Land Use and Physical Constraints

7.5.1 Opportunities

- Sought after living location offering beautiful natural scenery and quiet lifestyle which is an attractive alternative to Cork City and Suburbs;

- The town centre is centrally located and optimises access to it, although the urban structure does not necessarily allow easy access to it;
- Local services such as schools, medical facilities and retail are provided locally which reduces long distance trips;
- Land, including undeveloped and brownfield sites within the boundaries of the town is available for infill development and reducing the need for urban sprawl;
- In terms of topography, gentle slopes towards the northeast of Carrigaline can accommodate future development.

7.5.2 Challenges

- There are limited local employment opportunities. Therefore, the majority of the working population in Carrigaline has to travel to places of work outside of Carrigaline;
- Most of the services are located within the northern part of town, leaving the southern partly dormant of services and not within easy walking distances;
- There is limited connection across the River Owenabue, limiting the development potential of the southern part of Carrigaline, without providing additional linkages;
- Steep slopes limits development to the north, west and south of the town.

7.6 Transport Network Review

7.6.1 Opportunities

- Carrigaline has an elaborate pedestrian network and there is potential to link the network together to create more efficient and direct walking routes;
- The existing green route linking Carrigaline to Crosshaven is very popular and successful and can be used as a building block to create an elaborate network serving the town;
- With the exception of the southern parts of Carrigaline, the topography of the existing town is relatively gentle, allowing for comfortable cycling slopes that can be achieved;
- The entire Carrigaline falls within the 15 minute cycle catchment area from the town centre, making cycling a versatile mode of transport;
- Bus services are scheduled to serve the town frequently, and the current investment programme has seen positive changes recently;
- Improved permeability and options to expand, reroute and provide new public transport services can be accommodated by providing strategic changes to the existing network;
- The majority of roads are in the ownership of Cork County Council providing the opportunity to plan and improve the network;

- There is new road infrastructure due to be constructed imminently (e.g. the inner relief road). This provides opportunities to divert traffic, provide alternative routes and provide more frontage for business development.

7.6.2 Challenges

- Main Street in the town centre is currently experiencing difficulties in carrying through traffic, provide access to local traffic, accommodating public transport, providing opportunity for loading and delivery and accommodating on street parking. This is also the busiest part of town in terms of pedestrians walking adjacent to or crossing roads;
- Road networks of residential estates are not linked together causing segregation, long walking and cycling distances and limited opportunity for public transport provision. However, there are opportunities to improve the permeability of the town by Linking estates together;
- The quality of footpaths, surfacing street clutter and width are not constant. Our pedestrian audit has shown that pedestrian crossings at junctions are not all universally accessible;
- Large parts of Carrigaline on the outskirts and especially the southwest are falling outside of the 15 minute walking catchment area due to limited connectivity / permeability, as well as topography constraints;
- Carrigaline has a very limited cycle network which does not encourage cycling as a mode of transport. The town centre is not linked to any cycle routes and cyclists have to share space with car traffic;
- CMATS identified opportunities for prioritising the cycle network and to invest in this mode of transport. Particularly linkage to Ringaskiddy via a secondary route and a green route to Passage West was identified as potential routes;
- Buses get caught up in everyday traffic congestion making this mode of transport unreliable and difficult to compete with car transport;
- Current public transport available is designed to link urban destinations. Bus services are not designed for internal movement for instance from estates to the town centre;
- The structure of the town would benefit from improved permeability as it only allows public transport to follow a singular route through the main town.

7.7 Public Realm

7.7.1 Opportunities

- The River and embankment form a strong landscape that can be enhanced. The extension of the Greenway adjacent to the River is a possibility;
- There are areas of positive green space and parks that can be linked with one another;

- There are town centre spaces to create a new town centre heart and other attractive spaces;
- There are long viewpoints over the town that can be enhanced.

7.7.2 Constraints

- Cars, vehicle accesses and parking dominate the area and the footpaths provided are narrow in many locations;
- Parks and green spaces are not interconnected with one another;
- Parking dominates the Main Street creating barriers and limited crossing and connections points.

7.8 Car Parking

7.8.1 Opportunities

- On street car parking can serve as placeholders for alternative modes of transport;
- The space occupied by car parks can be reconsidered for alternative uses such as a bus transit area;
- Parking demand can be controlled by applying the correct pricing structure to users.

7.9 Challenges

- On street car parking encourage car use due to the convenience it provides;
- Free parking or low parking fees creates a demand that cannot be satisfied;

8 Transport Development Principles

The review of the baseline data and information provided a good understanding of the existing planning context of Carrigaline, the available infrastructure currently and current transport operation.

The baseline data and information were distilled into a list of opportunities and challenges to be considered in the development of a transport strategy. A vision was developed in line with the national and regional planning policy but scaled to Carrigaline as a town centre. Carrigaline will be a place of growth within the next decade. To accommodate this growth, the current travel patterns must be altered to be less car dependent through both land use and transportation initiatives.

Below is an initial vision for Carrigaline which aims to set a goal for which the town can strive towards. From this vision, planning principles were identified which are a more practical description of ways in which to attain a desired future.

8.1 Proposed Vision

This Plan will provide the framework for an integrated transport network for Carrigaline with the purpose of rejuvenating the town centre, enhancing cycle and pedestrian amenities for residents and promoting connectivity with surrounding destinations by sustainable travel modes.

8.2 Development Principles

The following development principles have been identified to support this vision:

- Providing an efficient and safe public transport network;
- Rebalancing streets through transport led planning and providing priority to sustainable modes of transport;
- Creating a public transport spine as focus of the transport network;
- Improve quality of living through placemaking and enhancing public realm;
- Increase the development density to support sustainable modes of transport;
- Integration of all modes of transport to reduce any delay when switching from one mode to another; and
- Manage car parking to reduce demand and need and to provide more space for sustainable transport.

9 Conclusion

Carrigaline has been identified as one of the towns in Ireland with the highest car dependency. The 2016 CSO has shown that more that 75% of Carrigaline residents travelling to work and school is car dependant. If only travel to work trips are considered, this number exceeds 80%. Congestion and delays are frequently experienced within the town.

Substantial population growth is expected for Carrigaline. The National Planning Framework (NPF) expects the population of Ireland to reach 6 million in 2040. However, it is a national objective to accommodate a large portion of this growth in the Southern Region where Carrigaline is situated. The approach to accommodate new development is to provide more compact cities and towns built around transport corridors and in existing nodes such as town centres to increase its vitality.

Although the envisaged growth is expected to increase demand, it is an opportunity to reshape the transportation network and travel behaviour towards sustainable transport and also to improve the quality of life for residents by enhancing the public realm of Carrigaline.

CMATS provides a vision and guiding principles to what the future transportation network of the Cork Metropolitan area should be. The vision recognises that employment and population growth is expected within the next two decades and that transportation authorities should prepare for this. The approach to this challenge is to develop a strategy on the one hand that is reliant on public transport connectivity, efficiency and increased capacity and on the other hand enhancing the public realm to attract high volumes of footfall.

Although Carrigaline has some employment districts such as the Carrigaline Industrial Estate, Kilnagleary Business Park, and the town centre, the town is very much a commuting town where residents drive long distances to work. The CSO Census data have recorded a population of 15,770 people and 2,881 jobs. Compared to Cork and Suburbs, which had a recorded population of 208,669 and total number of jobs of 102,139, Carrigaline has a very low jobs to population ratio, leaving its residents with limited choice but to travel outside of Carrigaline for employment.

The CSO 2016 also shows that of the 6,901 workers in Carrigaline, 5,052 work outside of Carrigaline and only 1,849 work within the town. Comparing this to the number of jobs within Carrigaline, it can also be concluded that around a thousand employees travel to Carrigaline for work.

The current transport network is car dominated and parking is readily available to accommodate car based trips. The public transport network is designed to accommodate inter-urban trips to places of employment elsewhere. Although this structure of the public transport network is necessary to match trip patterns, public transport seems to fail as the take up is very low and the public transport network does not cater for residents wanting to make local trips.

CMATS recognises the importance of public transport within the Cork Metropolitan area and that it forms the spine of the public transport network around which all other modes of transport should be planned.

Carrigaline's current public transport network has a very limited catchment area. Living along the edges of the town places residents outside of effective walking distance of public transport. The Carrigaline Transportation Strategy therefore must ensure that a public transport network is created that has improved capacity, has an increased catchment for the town and is reliable and effective.

Although Carrigaline has an elaborate pedestrian route network, walking distances are not necessarily as short as they can be. This is because of the 'Garden City' development style where residential estates are developed in isolation of one another with many loop and cul de sac streets. This type of urban structure limits route choice in the first place and secondly lacks permeability and connection resulting in long walking distances. Only 11% of trips are made on foot, which is much lower than that of Cork City and Suburbs at 20%. Compared to Cork City and Suburbs and other towns within the area, Carrigaline has a younger population which would potentially be more attracted to active modes of transport.

There is opportunity to invest in the pedestrian network for it to enhance links to public transport, the town centre and schools. The permeability of the town needs to be improved to provide more route options and shorter routes to destinations.

Only 2% of trips are made on a bicycle. The existing cycle infrastructure is limited, and the town centre is not connected. Although the Carrigaline to Crosshaven greenway is primarily recreational, this infrastructure demonstrates that quality cycle routes encourage cycling significantly and that there is merit in their investment.

From a public realm point of view, there are opportunities to connect green areas and parks with one another and back to the River which is a strong landscape element that should be taken advantage of. Currently, the town centre prioritises car transport, and this needs to be reconfigured to provide places to walk comfortably, to stand, stay or sit. It should provide places that welcome the pedestrians and other active travel forms. Visitors should feel comfortable, relaxed and safe. Areas should be created where people are outside but protected from the climate and children and carers must have opportunity to play within the streets without stress. Residents should feel safe, have aesthetically pleasing elements to look at and indulge in active space on a human scale.

The transport plan should accommodate car based transport as it remains undeniably a major transport mode within the operation of the town. However, its dominance in key locations needs to be reduced by prioritising sustainable transport modes and to divert traffic to less prominent roads and to reduce car parking and use the space for other uses. The approach is to first develop the public transport network and then to fit the needs for car based transport around it. Loading and deliveries are taking place daily in the roads of Carrigaline and it cannot be argued that this function is not needed. Opportunities should however be sought to provide these facilities further way from the busiest parts of the town.

The next step in this study is to develop strategy options for the transport plan. The strategy options will be based on land use development scenarios as well as various transportation network options considered.