Chapter 6
Traffic and Transportation

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6. TRAFFIC AND TRANSPORTATION

6.1 Introduction

This chapter describes the characterisation of the existing road network and assesses the likely potential impact of the proposed 'DART+ West' (hereafter referred to as the 'proposed development'), in accordance with EIA Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU[1] and as required by the Transport (Railway Infrastructure) Act 2001 (as amended) and guidance on preparation and content of EIARs. Both the construction and operational phase are considered.

The assessment was undertaken with reference to relevant legislation, policy and guidance documents outlined in Section 6.2 and Section 6.3 outlines the methodology followed in carrying out the assessment, Section 6.4 describes the receiving environment and summarises the main characteristics of the proposed development which are of relevance to traffic and transportation. The description of potential impacts of the proposed development on traffic and transportation are described in Section 6.5 and Section 6.6 describes the mitigation measures proposed to mitigate these impacts. Residual impacts are described in Section 6.8. References are detailed at the end of the chapter.

In addition, a separate Traffic Impact Assessment (TIA), included in Appendix A6.2 Traffic Impact Assessment in Volume 4 of this EIAR, was undertaken that considers the general potential transport impacts of the proposed development. Where relevant, the TIA report is cross-referenced within this chapter.

6.2 Legislation, Policy and Guidance

6.2.1 Legislation

Córas Iompair Éireann, hereafter referred to as CIÉ or 'the Applicant', is applying to An Bord Pleanála for a Railway Order ("RO") for the DART+ West project ("the proposed project" or "proposed development") under the Transport (Railway Infrastructure) Act 2001 (as amended and substituted) ("the 2001 Act") and as recently further amended by the European Union (Railway Orders) (Environmental Impact Assessment) (Amendment) Regulations 2021 in Statutory Instrument No. 743/2021 ("the 2021 Regulations").

6.2.2 Policy

The proposed development forms a key scheme within local policy. Relevant local policy includes:

- Project Ireland 2040 National Planning Framework, Government of Ireland, February 2018.
- Transport Strategy for the Greater Dublin Area 2016-2036, NTA, April 2016.
- Draft Transport Strategy for the Greater Dublin Area 2022-2042, NTA, November 2021.
- Fingal County Development Plan 2021-2027.
- Draft Fingal Development Plan 2023-2029.
- Dublin City Development Plan 2016-2022.
- Draft Dublin City Council Development Pan 2022-2028.
- Kildare County Development Plan 2017-2023.
- Draft Kildare County Development Plan 2023-2039.
- Meath County Development Plan 2021-2027.
- North Lotts and Grand Canal Dock SDZ Planning Scheme 2014.
- Ashtown-Pelletstown Local Area Plan 2014.
- Kellystown Local Area Plan 2021.

[1] The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) inter alia transposed the Directive.

- Draft Kellystown Local Area Plan 2020-2026.
- Barnhill Local Area Plan 2018.
- Draft Barnhill Local Area Plan 2019-2025.
- Maynooth Local Area Plan 2013-2019.
- Kilcock Local Area Plan 2015-2021.
- Leixlip Local Area Plan 2020-2023.

In addition, key planned infrastructure located within the proposed development's area is included in the future year transport infrastructure, for the modelling process. Main schemes included in the future year include BusConnects, MetroLink and others as detailed in the Transport Strategy for the Greater Dublin Area, with the exception of DART+ Programme, which consists of five separate projects (DART+ West, DART+ South West, DART+ Coastal North, DART+ Coastal South and DART+ Fleet) and is subject to this EIAR.

When determining the mitigation that should be provided, reference is made to those documents set out above, to ensure that they accord with policies outlined in these documents.

6.2.3 Guidance

To inform the impact assessment of the proposed development, reference is made to the guidance documents set out in the following section. There are classified according to documents that guided the Environmental Impact Assessment, Traffic and Transport Assessment and Design of the proposed development.

6.2.3.1 Environmental Impact Assessment

In order to identify the topics of relevance to roads and traffic typically addressed within the EIAR, and to set out the methodology used for this process, the following documents are referred to:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports (May 2022), EPA, May 2022.
- Guidelines for the Environmental Assessment of Road Traffic, Institute of Environmental Assessment (IEMA), 1994.

6.2.3.2 Traffic and Transport Assessment Guidelines

To assist in the preparation of Traffic Impact Assessments (TIA), guidance was issued by Transport Infrastructure Ireland (TII) in May 2014 in the form of the 'Traffic and Transport Assessment Guidelines'. This document outlines the principles and methodologies for assessing the traffic and transport impact of a new development. The guidance forms the basis of the assessment undertaken to determine the impact of the proposed development and the results set out within the EIAR.

6.2.3.3 Design of Proposed Development

The proposed development and the required mitigation identified within the impact assessment was designed in accordance with the following documents:

- Design Manual for Urban Road and Streets (DMURS), Department of Transport, Tourism and Sport and Department of Environment, Community and Local Government, March 2013.
- NTA Permeability Best Practice Guide, 2015.
- NTA National Cycle Manual, 2011.

6.3 Methodology

In line with the guidance documents, this assessment describes the baseline conditions, determines the likely potential impacts associated with the construction and operation of the proposed development, determines appropriate mitigation and monitoring, and defines residual effects.

For the purposes of this traffic and transport assessment, traffic survey information from 2019 and the National Transport Authority's (NTA) Eastern Regional Model (ERM) were used to support the Local Area Models that were developed specifically for the proposed development. The key aspects of the methodology are summarised below.

6.3.1 Study Area

The scoping stage of the assessment determined the appropriate study area, and this is illustrated in Figure 6-1, below.

The direct and indirect impacts of the proposed development were considered with reference to the following study area extents:

- Direct Study Area - immediate vicinity of the alignment of the proposed development.
- Indirect Study Area - due to proposed level crossing closures at Ashtown, Coolmine, Porterstown, Clonsilla and Barberstown, wider study areas around Blanchardstown and Ashtown were included in the assessment.

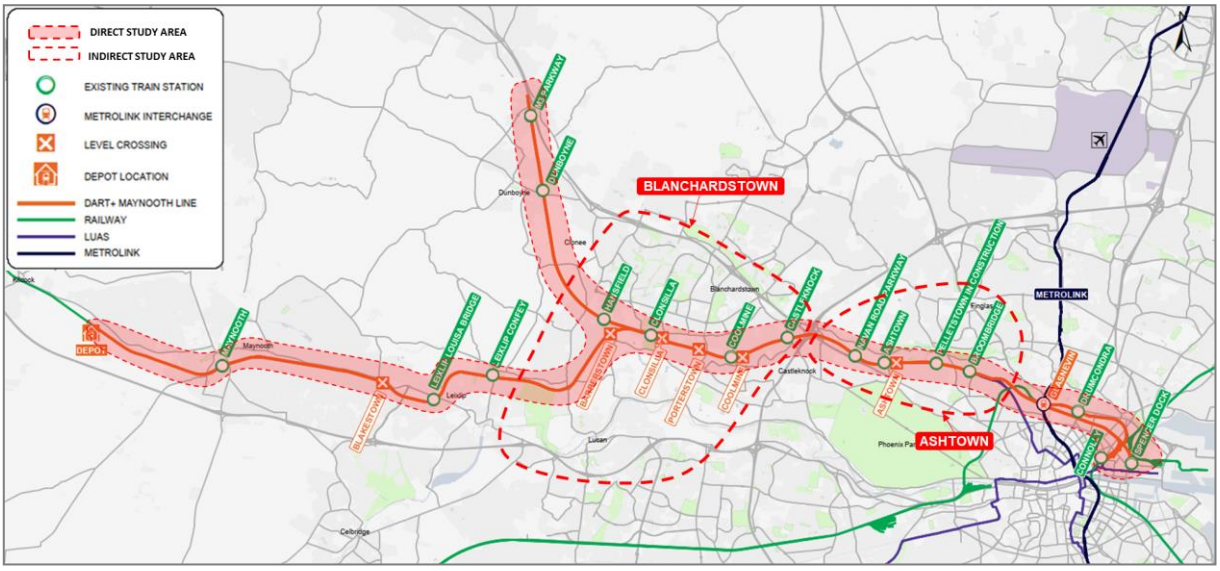


Figure 6-1 Study Area

The two identified indirect study areas have been modelled as two Local Area Models (LAMs).

6.3.2 Data Collection

To inform the assessment, several sources of data are referred to. These are described in the following sections.

6.3.2.1 Road Traffic Surveys

Baseline road traffic surveys undertaken in January 2019 include the following:

- Automatic Traffic Counts (ATC) at 35 locations.
- Pedestrian and cyclist count at two locations.
- Junction Turning Counts (JTC) at 48 locations.
- Supplementary counts by Fingal County Council.
- Journey time information from the NTA database.

Some supplementing traffic counts were also carried out in November 2021.

Car park utilisation data provided by Iarnród Éireann for Coolmine station which illustrates demand for spaces prior to the Covid-19 pandemic has been utilised in the assessment to support the data obtained in November 2021.

Details relating to the survey count locations and results are supplied in the TIA Report.

Details relating to the baseline findings of these counts are set out in the baseline section (Section 6.4.1).

6.3.2.2 Train Service Data

Further studies were undertaken by the design team in respect to the existing rail services and the proposed DART+ Programme network to develop the following:

- Baseline service frequencies within peak periods.
- Future Year service frequencies within peak periods.

Demand Modelling study was carried out using the National Transport Authority East Regional Model (ERM), for 2028 and 2043 future years. For consistency, the same models have been used in the development of the Business Case for DART+ Programme. The ERM was used as the basis for the development of two Local Area Models (LAMs), which were cordoned from the ERM and updated to reflect the demand data obtained from the 2019 survey. The Baseline ERM and the LAMs as well as surveys and publicly available data were used to inform the baseline assessment and the emerging preferred options in respect of each principal element were used to measure the impact of the proposed development.

6.3.2.3 East Regional Model

The East Regional Model (ERM) was used to supplement the baseline data, where survey information was lacking.

The ERM is one of five transport demand models in the NTA's Regional Modelling System and focuses on the Greater Dublin Area (GDA). The ERM includes all surface access modes for personal travel and goods vehicles, including private vehicles (taxis and cars), public transport (bus, rail, LUAS, BRT, Metro), active modes (walking and cycling) and goods vehicles (light goods vehicles and heavy goods vehicles). The NTA ERM is a multi-modal tour model and consists of four input elements:

- Public Transport (PT) Model (e.g., rail/bus/light rail services and separate P&R module).
- Walking and Cycling Model.
- Highway Model (e.g., road links/junctions and parking model).
- Demand Model - GDA total transport demand is taken from the National Demand Forecasting Model (NDFM) which outputs travel demand to the ERM for iteration through the choice, destination, and assignment modules.

The geographical extent of the ERM extent is shown in Figure 6-2.

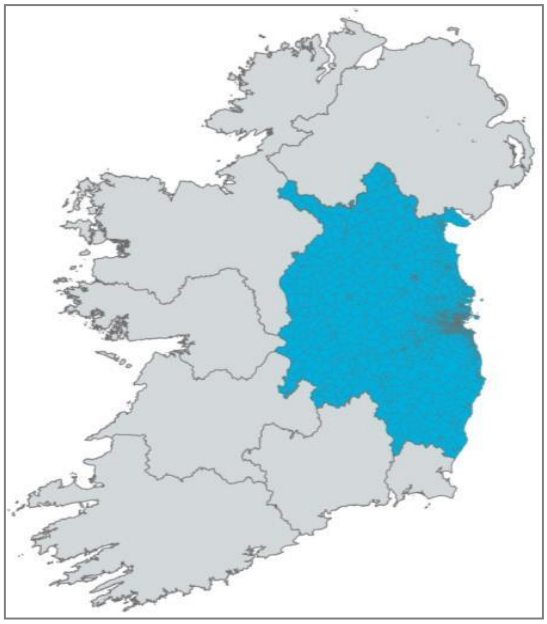


Figure 6-2 Extent of East Regional Model (ERM)

The ERM can be used as a tool to assess the impact of interventions on peoples travel choices in relation to time of travel, mode of travel and route of travel. In the context of the DART+ West, the ERM runs were undertaken as part of the business case for the DART+ Programme, the ERM provided information on the total generalised cost of travel (made up of travel time, waiting times, fares, parking charges, tolls, and fuel) for all trips in the Eastern Region both without and with the DART+ Programme. The model runs were also undertaken with and without individual DART+ corridors on their own, to ensure consistency between individual DART+ projects.

The NTA developed several ERM reference case forecasts (years 2028 and 2043 were used on DART+ West), which are in line with the projections contained in the Project Ireland 2040: National Planning Framework (NPF). These projections take account of employment, population, and education projections at Small Area level. The projections are developed using the National Demand Forecasting Model (NDFM) which outputs travel demand to the ERM for iteration through the choice and assignment modules. The demand in the NDFM is based on Central Statistics Office Place of Work, School or College – Census of Anonymised Records (CSO POWSCAR 2012), NTA Household Travel Surveys, Transport Surveys, and other transport related datasets. During the model run, mode choice is undertaken based on current costs for each mode for each origin and destination pair. The modelling has been undertaken as part of DART+ Programme works and was made available to the DART+ West team.

The Future years 2028 and 2043 include several schemes that are planned as part of the GDA Strategy. It includes Bus Connects and MetroLink which are planned to be developed in advance of DART+ West.

6.3.2.4 Road Traffic Data

To inform the road safety review within the impact assessment and the mitigation identified for the proposed development, reference was made to the Road Safety Authority's (RSA) online database. This identifies the number of accidents which have occurred along a link or at a junction in a particular year.

6.3.3 Impact Assessment Methodology

The methodology used when assessing the potential magnitude of impacts of the proposed development on Vehicle Travellers, Pedestrians, and Cyclists, and Public Transport Users is based on the IEMA guidance in combination with that set out in guidance provided by the EPA.

6.3.3.1 Categorisation of Effects

Potential effects were considered during the construction and operational periods of the proposed development. Effects during the construction period are typically considered as either temporary or short-term, while potential effects during the operational phase are typically considered as either medium-term or long-term.

The impact of the effect, which occurs in the construction and / or operational phase will either be positive or negative. A positive impact will be where an improvement to the existing scenario is identified whereas a negative will be, but not limited to, a reduction in facilities, operation or provision of services.

The significance of the effect is determined by the extent of impact, the magnitude and complexity of the impact, the probability of the impact and its duration, frequency, and reversibility. The rating identified for all road users is broadly categorised into Slight, Moderate or Significant. These are further defined as:

- **Slight** – capable of being 'designed out' during detailed design and construction. Traffic management measures and the provision of temporary infrastructure would remedy any slight impacts associated with construction given their likely short timescales in comparison to operation.
- **Moderate** – limited impact (by extent, duration, or magnitude) should be recorded in an assessment but are not considered significant.
- **Significant** – considerable impact (by extent, duration, or magnitude) of more than local significance, or in breach of recognised acceptability, legislation, policy, or standards.
- **Positive** – provide beneficial improvement on the existing condition
- **Negative** – reduces the quality of existing condition

6.3.3.2 Significance on Pedestrians and Cyclists

In addition to vehicular traffic, there will also be impacts to pedestrians and cyclists using the network and therefore affected by the proposed development during both construction and operation. To determine the significance on the movement of pedestrians and cyclists, reference is made to the following criteria:

- There is a predicted increase in total traffic flows of more than 30% and the increase is more than 40 movements per day.
- The sensitivity of the area is 'high' i.e., there is significant pedestrian flows because of a major community facility.

Severance is defined in the IEMA guidelines as "*perceived division that can occur within a community when it becomes separated by a major traffic artery"*. The Guidelines note that the term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. It can also relate to quite minor traffic flows if they impede pedestrian access to essential facilities. The significance of severance is determined by the number of people impacted by the proposed development and the presence of vulnerable groups such as children, the elderly or the disabled.

The significance categorisation for pedestrians and cyclist is set out in Table 6-1 below.

Table 6-1 Categorisation of Impact Significance for Pedestrians and Cyclists

Extent of Impact	Description
Slight	In general, the current journey pattern is likely to be maintained, but there will be some limiting factors to movement • Pedestrian level crossing of a road with <8,000 Annual Average Daily Traffic (AADT) • A new bridge will need to be provided. • Increases in journey lengths by up to 250m
Moderate	Some residents, especially children and the elderly are discouraged from undertaking journeys • Two of the impacts listed under slight

Extent of Impact	Description
	• Pedestrian level crossing of a road with 8,000 to 16,000 AADT • Increases in journey lengths by between 250m and 500m
Significant	Pedestrians and cyclists are likely to deterred from their journeys by such an extent to change their habit. • Pedestrian level crossing of a road with >16,000 AADT • Increases in journey lengths of over 500m • Three or more of the impacts listed under slight • Two or more of the impacts listed under moderate

6.3.3.3 Impact on Vehicles, Pedestrians, Cyclists and Safety

The proposed development covers a significant study area with many varying types of land uses and environments. This results in varying differences in terms of the term of road, facilities and amenities, movements and modal choice therefore impacting on the number of users per mode.

Safety within the assessment is reviewed in terms of both the construction and operation phase while making use of data including daily traffic flows, available public transport infrastructure and services, pedestrian and cyclist counts and the accident history available for the road network within the study area.

6.3.3.3.1 Construction

The construction period will, in comparison to the operation, be short term and therefore for assessment purposes the peak point of construction has been assessed to identify the greatest impact to road users, pedestrians, and cyclists. For those times outside of the peak, traffic management and other localised mitigation would take place.

It is considered due to the length of programme, the construction works will be staggered, which would mean that not all works are undertaken at once. Although this is likely to be the case, the works have been assessed as occurring at the same time to identify the most robust case i.e., the worst case. The impacts are therefore considered likely to be less than identified in the assessment. Undertaking a robust assessment where construction is concerned ensures that any mitigation requirements are not underestimated. On this basis, worst case construction scenarios have been taken forward within the assessments. This assumes that:

- The phases of construction which have the greatest negative impact on the network are occurring at the same time.
- Changes to the network, including closure of the level crossings, construction compounds, prohibition of movements and other restrictions where they impact flows.
- A maximum duration of construction is incurred.
- The greatest construction vehicle routing and volumes occur.

To determine the impact during the construction phase in regard to safety, the following was reviewed:

- Traffic flows from the modelling for the peak hours, including both background traffic and construction specific traffic.
- Public transport infrastructure and service details.
- Pedestrian and cyclist numbers and infrastructure.
- Access and servicing requirements.

6.3.3.3.2 Operation

The operation assessment will determine the impact in terms of safety for the opening year, 2028 and the design year, 2043. This will be based on:

- Traffic flows from the modelling for the peak hours.
- Changes to the road network.

- Public transport infrastructure and service details.
- Pedestrian and cyclists' numbers and infrastructure including new bridges and parking.
- Access and servicing requirements.

6.3.3.4 Significance on Vehicular Traffic

The guidance set out by the EPA states the significance of vehicular traffic impact is determined by changes in traffic flows. Highway links where traffic flows will increase by more than 30% or the number of heavy goods vehicles increases by more than 30% are considered to be significant along with any other specifically sensitive areas, such as where road safety is a concern, there is a high pedestrian flow, or a hospital is nearby. The criteria for classifying the impact of increases in traffic flows is as follows:

- **<10%** – Traffic flow increases directly attributable to the proposed development of less than 10% are not considered likely to give rise to any potential significant effects.
- **10% to 30%** – Traffic flow increases of 10% to 30% are only considered to give rise to significant effects in specifically sensitive area.
- **>30%** – Traffic increases directly attributable to the proposed development of more than 30% are considered likely to give rise to potentially significant effects.

6.3.3.5 Significance on Driver Delay

In addition to traffic flows, the impacts of traffic are also measured in the terms of the effect on driver delay. These are deemed to exist where:

- There is a predicted decrease in speeds of more than 5kph on a link.
- There is a predicted increase in journey length of greater than 500m.

Further detail on the assessment scenarios and the inputs is set out in the following sections.

6.3.3.6 Assessment Scenarios

In line with the guidance, the assessment will describe the baseline conditions, determine the likely potential impacts associated with the construction and operation of the proposed development, determine appropriate mitigation and monitoring, and define residual effects. The key aspects of the proposed methodology are summarised below.

The process for undertaking the impact assessment of DART+ West is as follows:

- Determination of baseline conditions through the assessment of available traffic survey data supported by the information extracted for various traffic models, where survey information is not available. The year being assessed in terms of traffic is 2019 due to the limitations relating to the Covid 19 pandemic, the information will be supported by NTA's Base Year ERM model (2016) where 2019 data is not available.
- Determination of forecast year traffic conditions, using future year traffic models for:
  - Scenario without DART+ West, this is also referred to as the 'Do Minimum' scenario, and
  - Scenario with DART+ West during operational phase, this is also referred to as the 'Do Something' scenario
- Assessment of the traffic impact for the 'peak' construction year and the mitigation measures required to alleviate and reduce the associated traffic impact.
- Assessment of the traffic impact for operational year of opening which is 2028 and a +15-horizon operational year, which is 2043,
- Understanding the impact of the proposed development on:
  - The users of the DART+ West project,
  - Active transport modes, such as pedestrians and cyclists, using industry standard assessment techniques and survey data, and
  - General traffic, considering management and operational issues at both local and strategic levels.

The assessment of the impacts of the DART+ West project is dependent on a thorough understanding of current conditions for each mode of transport operating in the vicinity of the DART+ West corridor. It is also important to understand the traffic conditions pertaining to the No DART+ West or Do Minimum future year scenarios as these will represent the baselines to which the traffic impact of the With DART+ West or Do Something future year scenarios are measured against.

6.3.3.7 Transport Modelling

To determine the baseline and future scenarios for the proposed development and therefore allowing an assessment of its impact to be undertaken, transport modelling has been carried out. The process undertaken for this element of the development is set out in Figure 6-3.

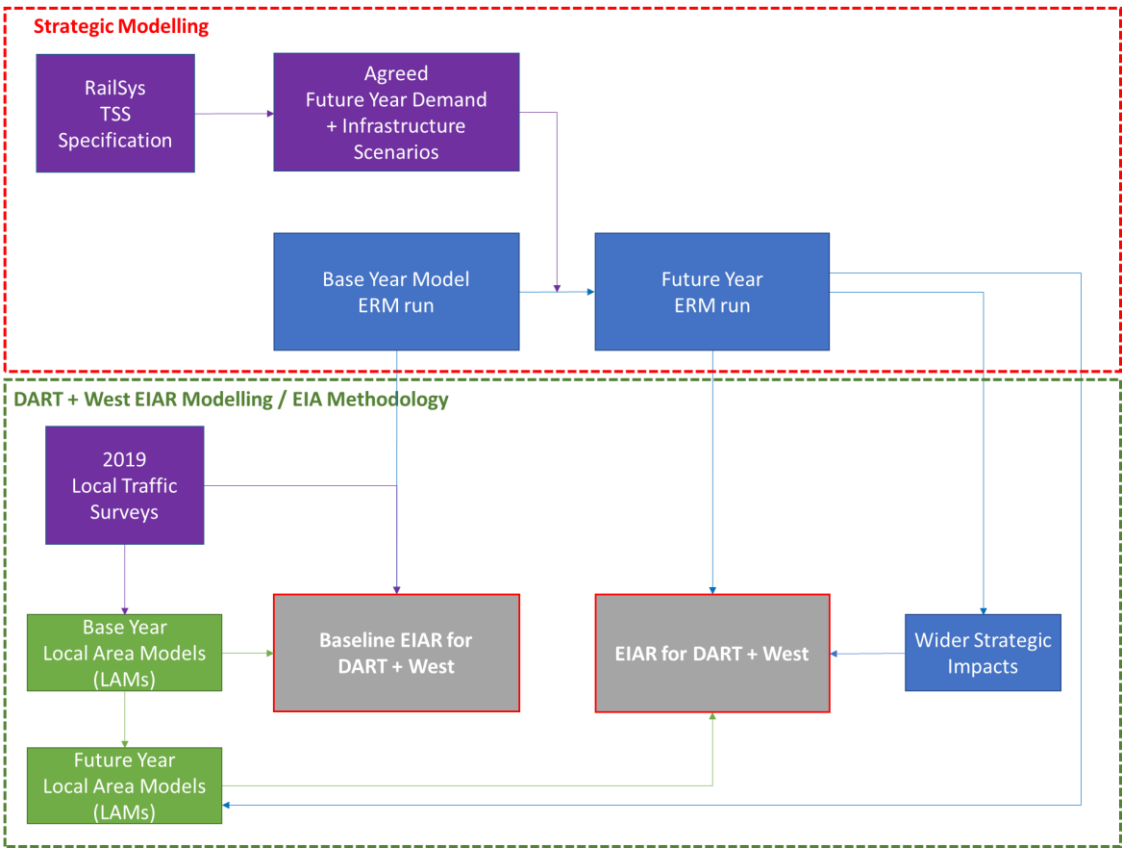


Figure 6-3 Transport Modelling Methodology

The NTA's East Regional Model (ERM) has been used to inform the future year demand of the Local Area Models and to assess wider impacts of the proposed development. Two Local Area Models (LAM) have been developed using a cordon from the NTA's ERM to assess indirect impact of the proposed development. The LAMs have been developed in SATURN, a computer model used for the analysis and evaluation of traffic management schemes and calibrated for 2019 conditions using the traffic survey data collected. LAMs have the advantage of having a greater level of local specificity compared to using the full ERM. Scheme impacts are more likely to show up as significant without the 'background noise' of the full model. Figure 6-4 and Figure 6-5 shows extent of the ERM and LAMs respectively.

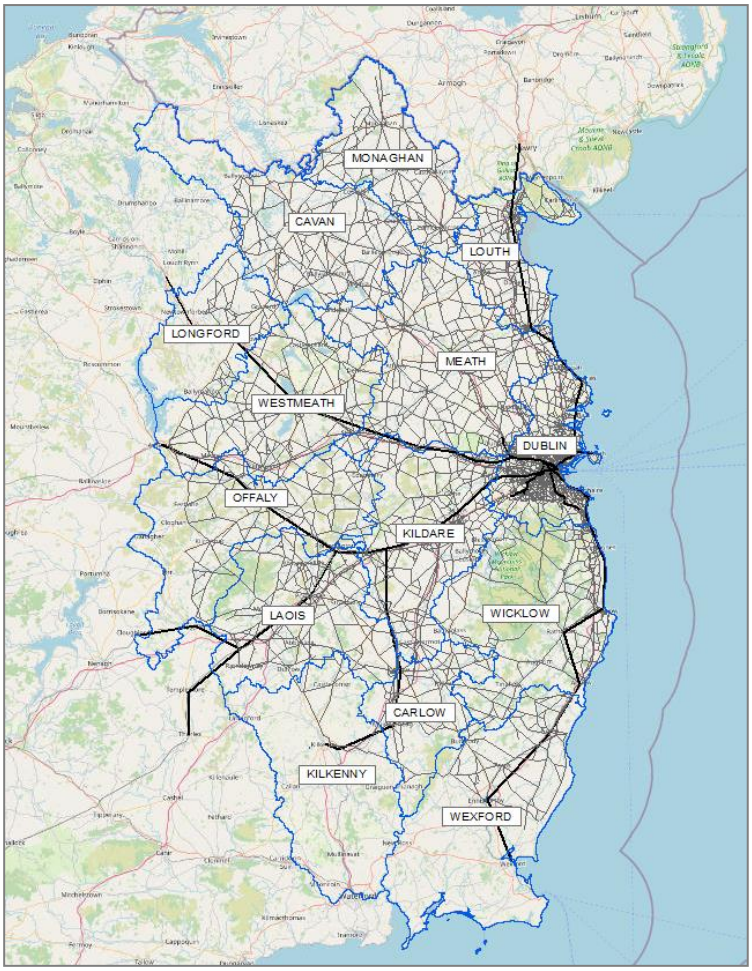


Figure 6-4 Extent of East Regional Model (ERM) with details

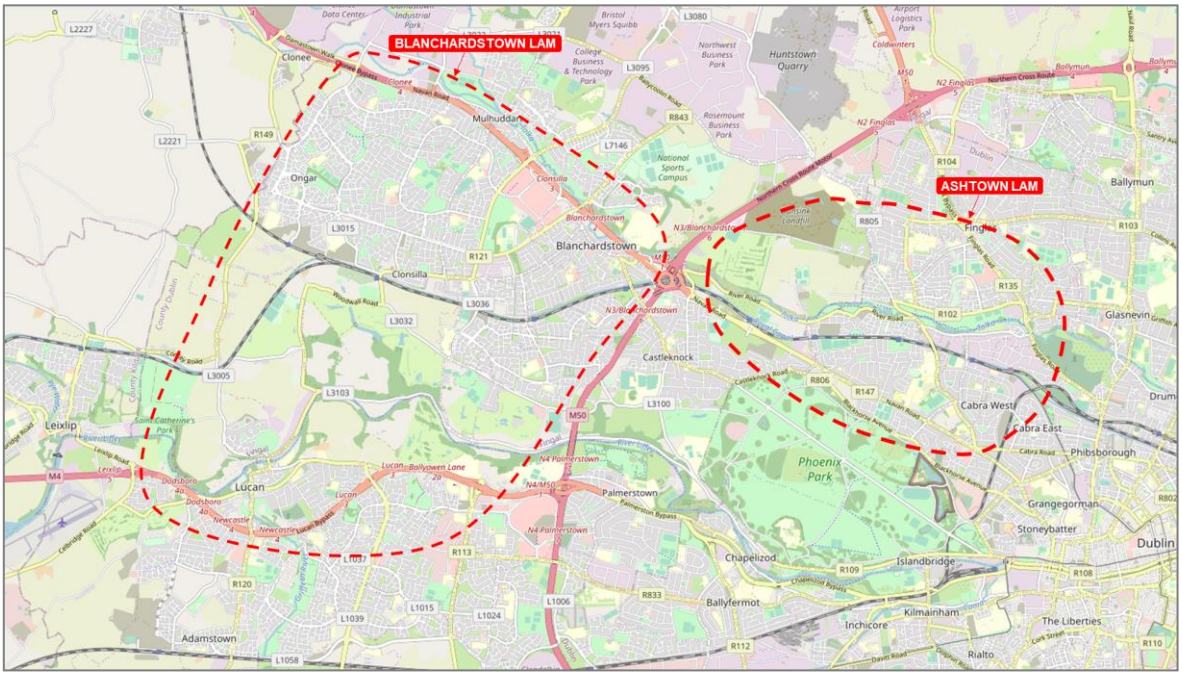


Figure 6-5 Local Area Models Extent for the DART+ West Project

The ERM Base model as calibrated and validated by the NTA is a model representing the year of 2016. Two future years were prepared under separate commission and the results were utilised to assess the impact of

the proposed development. Two future years 2028 and 2043 demands were assigned to 'Do Minimum' and 'Do Something' networks to provide the outputs for this assessment.

In addition to ERM, two Local Area Models were developed to assess the indirect, localised impact of the proposals and to develop local mitigation measures associated with the proposals. For details in relation to the development of the Local Area Models please refer to LAM Development Reports, which are attached to the TIA Report in Appendix A6.2 in Volume 4 of this EIAR.

The Local Area Model of Blanchardstown, which will be referred to as 'BLAM', is bounded by the M3 (as far as Junction 4a Clonee East) to the north and the M4 (as far as Junction 7 Maynooth) to the south. The western extent is bounded by Clonee, Ongar and boundary between County Dublin and County Kildare while the eastern extent is just west to the M50.

The Local Area Model of Ashtown, which will be referred to as ALAM is bounded by Castleknock Road and Phoenix Park to the south, just east of the M50 to the west, Finglas west to the north and Cabra and Kildare Rail line to the east.

To be able to measure the impact of the proposed development, a 'Do Minimum' scenario is required with which to compare the 'Do Something' scenario, i.e., it is necessary to identify the changes to the baseline scenario that will occur regardless of the proposals for DART+ West.

Outputs from the NTA's ERM Base and amended future year (2028 and 2043) models (change in demand, traffic flows and changes in mode share etc.) have then been used, along with existing mode share data, to calculate the applicable growth rates to apply to the calibrated 2019 LAM, to determine the appropriate demand for the Do Minimum scenario for the LAM models.

In both the ERM and LAMs the Do Minimum road network contains all planned road improvements that will be in place by 2028 and 2043 as detailed in the Draft Transport Strategy for the Greater Dublin Area 2022-2042. The main schemes coded in Do Minimum networks include: MetroLink and BusConnects and exclude DART+. The Do Minimum model has then been amended appropriately to reflect the proposed Do Something scenario. The road network has been updated to reflect the proposed amendments as part of the DART+ West project arising from the proposed closing of the level crossings and other proposals such as the depot to the west of Maynooth. The demand in LAMs has been updated to reflect changes in mode share brought about by the proposed development, taken from ERM outputs.

For construction impacts 2028 Do Minimum ERM and LAM models were used to establish traffic levels on the road network.

An 'Opening Year +15' LAM assessment has also been undertaken by increasing the background demand by an appropriate factor derived from NTA ERM outputs, in keeping with agreed national/regional future growth rates.

6.3.4 Covid Impact

During 2020 and 2021 travel demand was impacted by the Covid-19 pandemic. In the future, there may be some changes in travel behaviour driven by COVID-19, for example an increase in working from home. This could reduce overall travel demand and potentially shift the trends of peak demand. Longer term and permanent impacts of Covid-19 are difficult to determine, as any such changes could be offset by an increase in travel for other purposes. For the purposes of this assessment which focusses on the potential impacts of the proposed development, it is assumed that in general travel demand is likely to return to pre-2020 levels.

According to Traffic Count data available on TII website[2] (also shown in Figure 6-6) traffic levels in 2022 following periods of restrictions associated with Covid-19 pandemic are only catching up to 2019 traffic levels from before the pandemic.

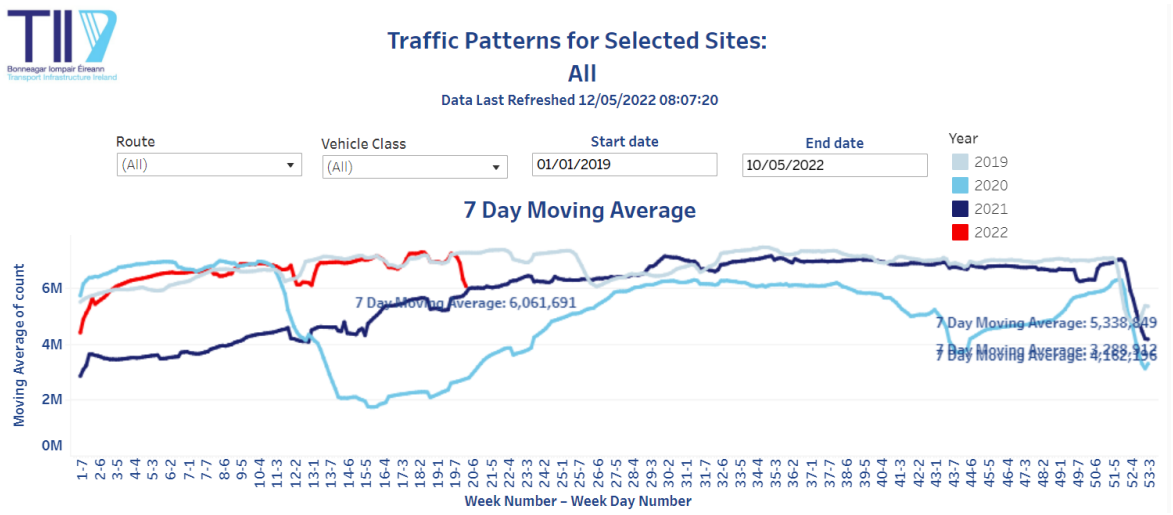


Figure 6-6 Traffic Patterns across all TII Permanent Traffic Counters

Year 2019 in above chart is shown in grey and 2022 in red. As such it is considered appropriate that traffic and transport data from 2019 is used for baseline assessments.

6.3.5 Consultation

In the context of understanding the views of the local authorities within the functional areas where the proposed development is located, namely Dublin City Council, Fingal County Council, Meath County Council and Kildare County Council, consultation in the form of both a submission of an EIA Scoping Report and consultation through updates of the proposed development was carried out.

An EIA Scoping Report was submitted in March 2021, with a Scoping Opinion received in May 2021.

Specific reference to the Traffic and Transport chapter was made by Meath County Council in its response to the Scoping Report. Their response is set out below and has been considered when preparing the TIA and Traffic and Transport chapter.

> *"With regard to traffic impacts and subject to meeting the appropriate thresholds, it is asked that a Traffic and Transport Assessment will be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. This Assessment should include any cumulative traffic impacts that might arise from other construction activity expected to be undertaken during a similar timeframe and in proximity to the site location.*
>
> *For information purposes, developers have engaged with Meath County Council on a number of large scale residential and employment schemes in the vicinity of both the M3 Parkway Train Station and the Dunboyne Train Station. In preparing the EIAR, the developer should conduct a thorough planning search of recently granted planning permissions within proximity of the site to ensure cumulative impacts on the road network arising from other proximate developments are adequately assessed during the construction stage of the project.*

[2] https://www.tii.ie/roads-tolling/operations-and-maintenance/traffic-count-data/covid-traffic-patterns/

The positive traffic and air quality impacts arising from the development of high density residential and employment lands in close proximity to both train stations should also be considered in the environmental assessment.

On the 25th March 2021, Meath County Council attended a meeting with Iarnród Éireann, Roughan O'Donovan and IDOM outlining the latest design developments for the DART+ West Project. This included the proposed locations of temporary compounds during the construction of the project. Noting the proposal to place a temporary Construction Compound at M3 Parkway Car Park and Dunboyne Train Station Car Park, it is requested that any future EIAR assess the potential traffic and parking impacts that might occur on users of the carpark, and to also consider potential impacts on the M3 motorway and L2228 that might arise during the construction period of the project."

In addition to the EIA Scoping response, each of the local authorities provided feedback on the proposed development. A summary of the response provided in relation to traffic and transport by each of the authorities is set out below.

- Dublin City Council
  - Cumulative impact with other major schemes to be assessed.
  - Connectivity with high density private development in terms of construction traffic to be considered.
  - Enhancement of pedestrian and cyclist facilities where possible to be provided.
- Fingal County Council
  - Consider pedestrian improvements along with replacement crossing at Coolmine station.
  - Consider the impact on the bus services from the closure of crossings.
  - Provide improved pedestrian and cyclist facilities at crossings and where improvements to the bridges are to be made.
  - Provision of good quality cycle parking at the stations as well as improvements to the cycle and pedestrian facilities where possible along the proposed development.
  - Consider the impact of the compound locations.
- Kildare County Council
  - Provision of enhanced pedestrian and cyclists' facilities where possible.
  - Consider the impact of the compound locations.
  - Blakestown crossing to be considered as a temporary closure due to future land development nearby.
  - Multi-modal accessibility study should be included in the overall project for Confey Station.
  - A new train station and Park and Ride facilities to be considered to the west of Maynooth.
  - Test the capacity of new junctions at the Depot.
- Meath County Council
  - Ensure that cumulative impacts in the vicinity of the M3 Parkway and Dunboyne train station are considered.
  - Traffic and rail station parking impacts in relation to compound locations are considered.
  - Consider the future interactions between the rail line at Pace (north of Dunboyne) and the future extensions of this line to Navan.

This feedback provided as part of consultation process was considered in the assessment of the proposed development in terms of traffic and transport.

6.3.6 Difficulties encountered/ Limitations

The following assumptions and limitations are reflected in this assessment:

- During most of the time the analysis supporting this EIAR was undertaken, there were national and local lockdowns imposed by the Government due to the ongoing Covid-19 pandemic, and as a result, significant reduction in trips made by all modes has occurred during this time. This has meant that it has not been possible to obtain new traffic data for use in the assessment. Following the easing of restrictions in September / October 2021 road traffic level checks on the permanent traffic

counters indicated that traffic levels were reaching the levels from 2019, therefore the use of historic data is justified. The 2019 traffic surveys have been utilised as a representative year for the baseline.

- The 2019 traffic surveys were available in Ashtown and Blanchardstown location due to an earlier transport analysis undertaken in this area. Historical traffic data was obtained from NTA and other private sources along the entire route, supplemented with local traffic data obtained in November 2021.
- For areas of traffic impact where up to date local area models are not available, NTA's ERM was used to establish the Baseline and future year conditions.

6.4 Receiving environment

In this section, descriptions of both infrastructural provision and usage of that infrastructure by each mode for the baseline scenarios is presented in detail along the corridor of the proposed DART+ West project. This chapter therefore includes reference to the following modes:

- General Traffic (cars, taxis, LGVs, HGVs).
- Buses.
- Light Rail.
- Heavy Rail.
- Emergency Vehicles.
- Pedestrians and cyclists.
- Mobility impaired and disabled.

6.4.1 Existing Baseline

6.4.1.1 General Traffic

6.4.1.1.1 Network Description

The rail line subject to electrification as part of the DART+ West project is approximately 40 kilometres in length from its start at Dublin City Centre to the M3 Parkway in Co. Meath and to the proposed depot to the west of Maynooth in Co. Kildare. The highway network follows the rail line in various forms from minor local roads to national strategic roads such as the M3 and M4. The roads which, for the main part, are in the immediate vicinity of the proposed development are single carriageway roads providing facilities for pedestrians, cyclists, and buses. More detail relating to the highway network is provided within the TIA (see Appendix A6.2 in Volume 4 of this EIAR).

There are a number of vehicular crossings along the length of the railway line which are generally provided in the form of bridges, apart from six level crossings at Ashtown, Coolmine, Porterstown, Clonsilla, Barberstown, and Blakestown which are to be closed as part of the proposed development. Figure 6-7 shows the extent of the proposed development, existing stops, the proposed Spencer Dock Station and future proposed interchange with MetroLink.

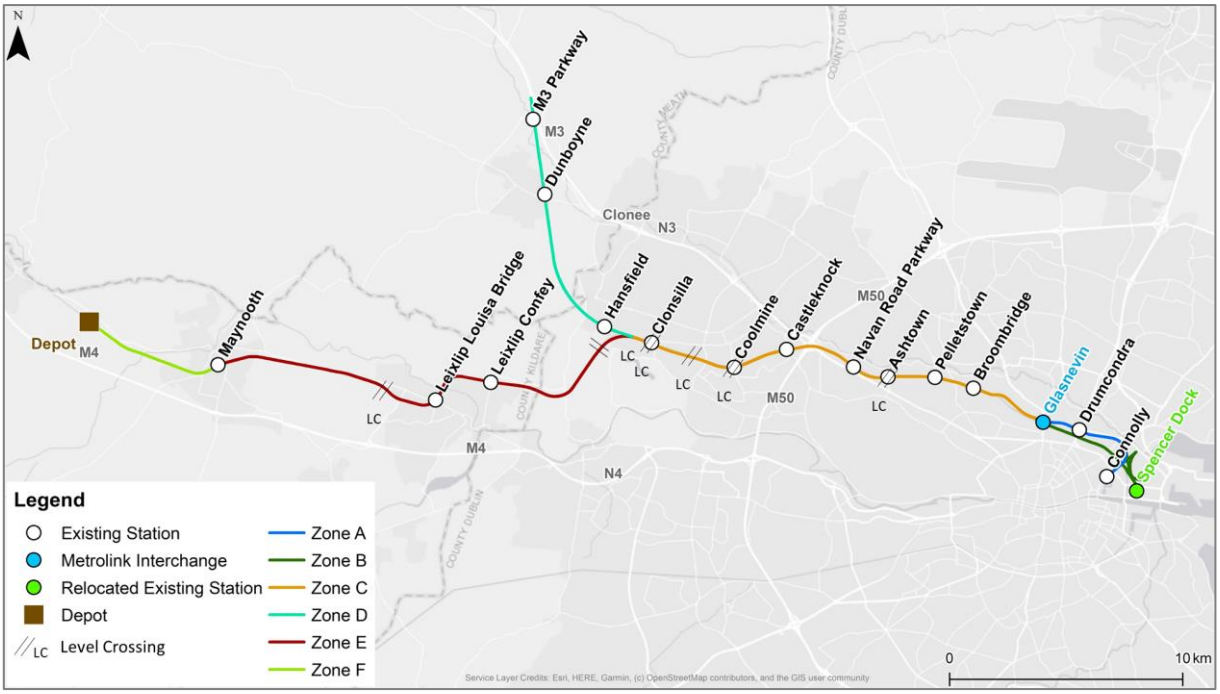


Figure 6-7 Extent of Development

Given the length of the proposed development, it has been divided into six zones to aid in setting out the works taking place, the time periods when the works will take place and thus aid in identifying the location of impacts. The six zones are set out below and are considered in detail in the following section.

- Zone A - Connolly Station to Glasnevin (Glasnevin Junction) on Great Southern and Western Railway (GSWR) Line – Phoenix Park Tunnel and Cabra Compound.
- Zone B - Spencer Dock Station to Phibsborough/ Glasnevin (Glasnevin Junction) on Midland Great Western Railway (MGWR) Line.
- Zone C - Phibsborough/ Glasnevin (Glasnevin Junction) to Clonsilla Station (Clonsilla Junction).
- Zone D - Clonsilla Station (Clonsilla Junction) to M3 Parkway Station (M3 Parkway Terminus).
- Zone E - Clonsilla Station (Clonsilla Junction) to Maynooth Station.
- Zone F - Maynooth Station to Maynooth Depot.

A detailed figure of the geographical zones of the project can be found in Chapter 4 of this EIAR.

Zone A – Connolly Station to Glasnevin (Glasnevin Junction) on GSWR Line – Phoenix Park Tunnel and Cabra Compound

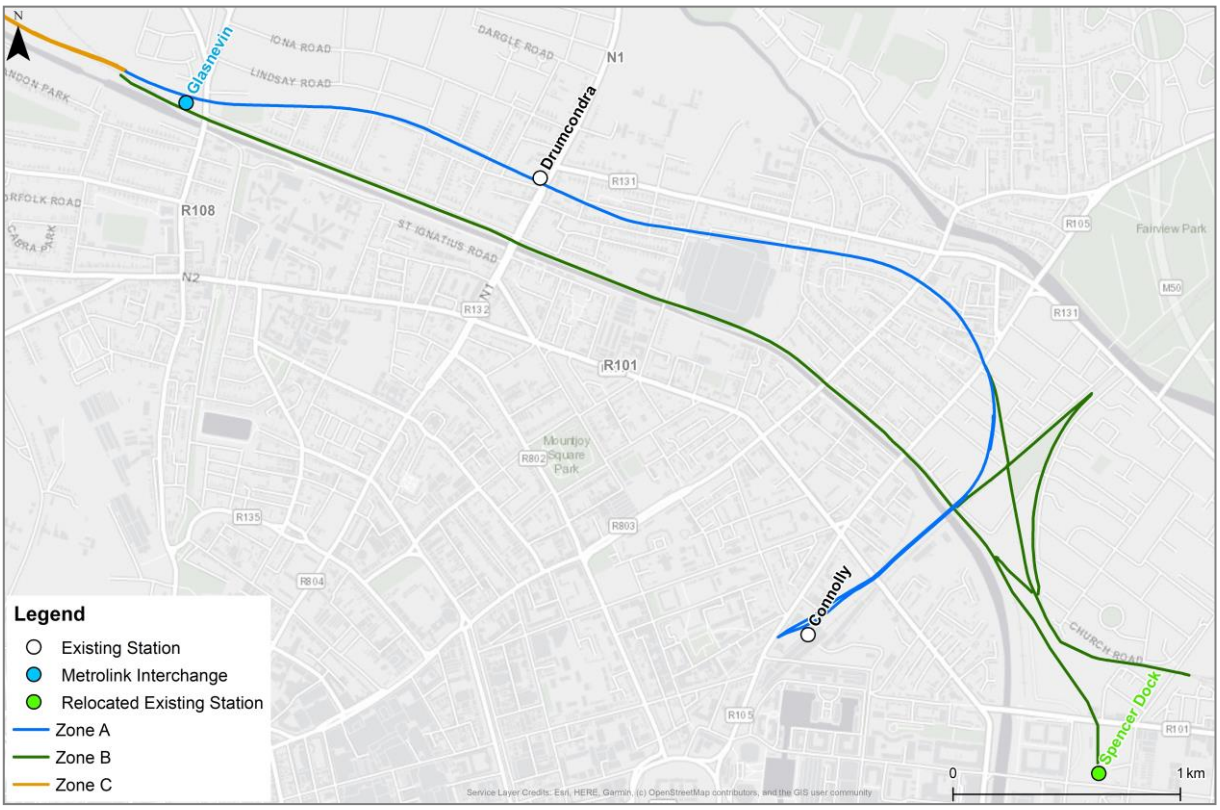


Figure 6-8 Zones A and B of the Development

Figure 6-8 shows the extents of Zones A and B of the proposed development. The existing line links Maynooth and M3 Parkway with Connolly and Docklands stations in Dublin City Centre. The rail services are currently split between the two stations, where trains originating on the M3 Parkway branch line terminate at Docklands station and trains originating along the Maynooth rail line terminate at Dublin Connolly or Bray. The proposed Spencer Dock LUAS Station is located within short walking distance of the existing Docklands Station.

Due to the positioning of Connolly Station, the surrounding area is urban in nature with wide, well-lit footways provided along with signalised crossings at intermittent locations. Amiens Street (R105) runs in a broad north to south direction along the western boundary of the station and provides access to several other roads within the city centre. Access to the M50 motorway (Dublin Tunnel (Toll)) is provided some 1.75 kilometres north-east of the station and is accessible from East Wall Road (R131). This provides a vehicular route out of the city centre to the northern edge of Dublin avoiding congested areas. Several bus stops are provided along Amiens Street as well as bus lane to encourage trips by more sustainable modes and connecting with the rail services available at the station. Several local roads are located around the station however to the north Seville Place (R101) connects with Amiens Street at a signalised crossroads, The Five Lamps junction. Seville Place is part of the North Circular orbital route around Dublin City centre and provides a vehicular connection with the Docklands railway station.

Seville Place between the stations is more residential in nature than Amiens Street, while being a key route for vehicular traffic within the city. Well-lit footways are provided along with cycle lanes and on-street parking laybys. Several pedestrian signal crossing facilities are provided along the street.

There are several other local streets (Sherriff Street and Mayor Street) that are closed to through traffic but are available as cycling and walking routes.

In Zone A the rail line between Connolly and Drumcondra is elevated above street level, and the crossings with local streets are provided in the form of rail bridges. Zone A also contains Drumcondra train station. This station provides access to bus services which connects with the north of Dublin, including Dublin Airport and with the city centre and the south of Dublin. The station offers opportunities for interchange with other public transport services, if required. As the route of the line continues west towards Glasnevin Junction the elevation changes to 'at grade', and then below street level as it passes under the Glasnevin Junction, with only limited street crossings, including a footbridge at Claude Road 400m to the west of Drumcondra Station.

Zone B – Spencer Dock Station to Phibsborough/ Glasnevin (Glasnevin Junction) on MGWR Line

The proposed Spencer Dock station is located 250 metres south east of Docklands Station. The area around the proposed station is currently in the process of being developed and therefore is already busy with pedestrians and cyclists. The proposed station, as well as the existing Connolly Station, will provide access to an area of Dublin which is being regenerated to accommodate significant areas of residential, office and retail spaces.

The existing rail line which serves Docklands Station travels north and to the east of Connolly Station and follows the Royal Canal up to Glasnevin Junction, passing south of Croke Park stadium. Similarly, to Zone A, through this area the line generally travels between residential areas but in cutting, under the roads, therefore does not impact on pedestrians, cyclists, and vehicles. There are 5 existing bridges across the rail line in this zone to provide community connectivity.

The Royal Canal Way is a pedestrian route that follows the towpath of the Royal Canal parallel to the railway line throughout Zone B. This route is being upgraded and widened for shared use with cyclists, with the aim of linking from Spencer Dock in the Dublin Docklands to Maynooth where it will join the existing shared greenway that extends westwards across the country towards Mullingar and Athlone. In Zone B the Royal Canal Way is on the southern bank of the Royal Canal from Sherriff Street westwards to Binn's Bridge on Drumcondra Road. It the switches to the north bank from there to Glasnevin Junction.

Zone C – Phibsborough/ Glasnevin (Glasnevin Junction) to Clonsilla Station (Clonsilla Junction)

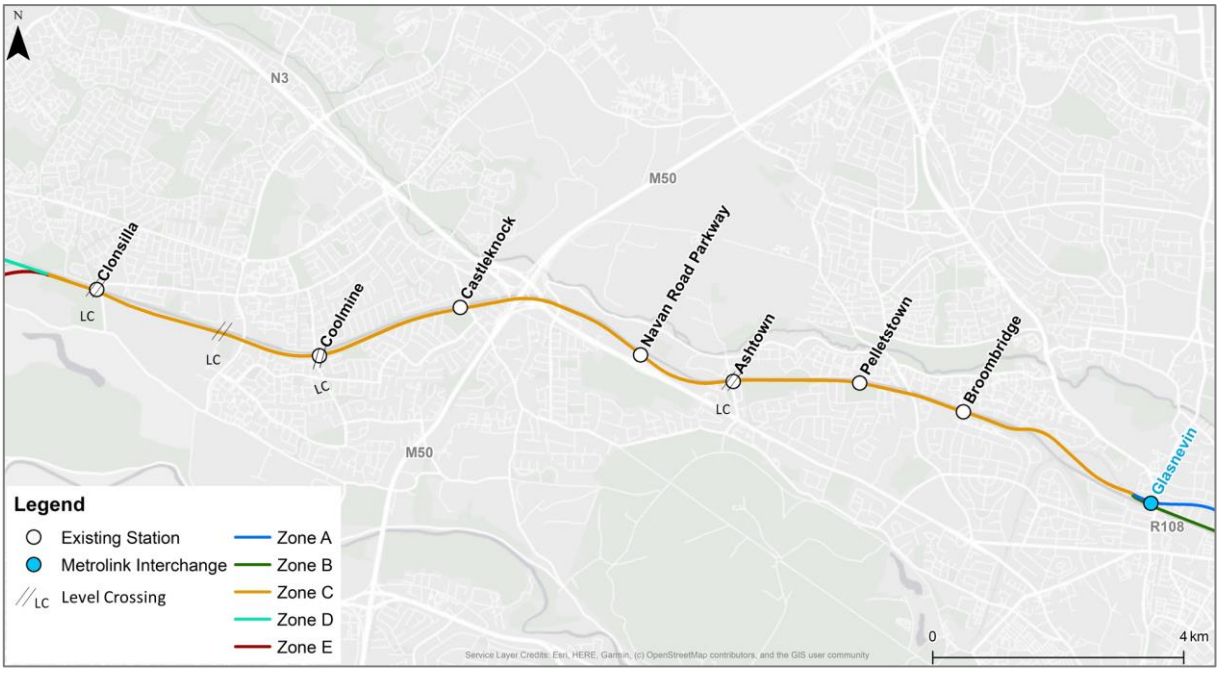


Figure 6-9 Location of Zone C

In Zone C, shown in Figure 6-9, there are four existing level crossings located at Ashtown, Coolmine, Porterstown and Clonsilla.

Figure 6-10 provides an overview of their existing conditions.

Figure 6-10 Existing conditions of Level Crossings in Zone C

At Glasnevin Junction the two railway lines in GSWR and MGWR join together, and then the rail continues westwards to the south of Glasnevin cemetery, where it then crosses over the Phoenix Park Tunnel spur rail line and over the Royal Canal to the southern side. From here westwards the railway line remains on the southern side of the Royal Canal. It reaches the first station in Zone C, at Broombridge which is followed by the new Pelletstown Station (opened in 2021). There is little impact on the existing road or rail network in the vicinity of these stations as the roads pass over the railway on bridges.

The Royal Canal Way continues on the northern bank of the canal westwards from Glasnevin Junction to Castleknock Road Bridge where it switches to the southern side as far as Porterstown Road. The route then recrosses to the northern side of the canal and continues to Clonsilla. Along this section there are connections to the existing roads at each of the bridges and level crossings.

Broombridge Station offers interchange with the LUAS Green Line Connecting Broombridge with Bride's Glen on the south side of Dublin via Dublin City Centre at O'Connell Street / Parnell Street, St. Stephen's Green, Dundrum, Sandyford, Carrickmines and Cherrywood, where it terminates at Bride's Glen Stop.

Continuing west, the rail line reaches Ashtown Station, where there is the first level crossing on Ashtown Road level crossing. Ashtown Road is a single carriageway which runs in a north to south direction, connecting with River Road (R102) to the north and Navan Road (R147) to the south. The posted speed limit is 50kph and footways, which are lit, are provided along the eastern side of the carriageway to the south of the crossing whilst footways are provided on both sides to the north. Access is provided to a number of residential areas as well as to Ashtown Stables and Ashtown station. The closure of the existing barriers at this crossing requires all modes of transport to wait for the train to pass and for the barriers to be lifted. The footbridge provided as part of the station to cross the rail line is only for rail passengers as it requires a valid pass to enter the station.

The rail line continues west and follows the Royal Canal and the alignment of the Navan Road parallel to the south. It crosses under Dunsink Lane, under the N3/M50 Junction 6, over the M50 mainline carriageway and under the Old Navan Road, and Castleknock Road.

The road network which follows and crosses the line at Navan Road and Castleknock stations is unimpeded by the rail line due to the provision of bridges.

The next interaction with the road network is at the next level crossing at Coolmine, which links Coolmine Road to the north with Carpenterstown Road to the south. The crossing itself is very narrow, with very limited space for pedestrians and cyclists to cross the rail line on either side of the road. There is no footpath immediately north of the crossing on the west side of the road, where Coolmine Road crosses over the Royal Canal. There is a pedestrian bridge provided to cross the Royal Canal on the east side of Coolmine Road, which is a single carriageway with footpaths provided on both sides. Standard street lighting is provided, and the speed limit is posted as 50 kph. On the northern side of the canal a shared footway / cycleway is provided westwards from Coolmine Road over a short distance to link into nearby residential areas. Coolmine Road provides access to residential areas before connecting with Clonsilla Road approximately 630 metres north of the crossing.

Coolmine Road runs south from the crossing connecting with Diswellstown Road at a three-arm roundabout 0.9km from the crossing. Two other roundabouts located between these points provide access to the residential areas. Lit footways are provided along the carriageway with uncontrolled crossing points provided in the form of dropped kerbs with tactile paving and central refuges at crossing locations on roundabouts. The posted speed limit is 50 kph.

The rail line continues west from Coolmine and crosses under the Diswellstown Road, which is the main distributor road in the area and provides segregated cycle tracks and footpaths on both sides of the road. The road is lit and has a speed limit of 50 kph. The rail line continues 0.2 km westwards where the next level crossing is provided at Porterstown Road.

Unlike the other level crossings which are predominately located within residential / more urban areas, the crossing on Porterstown Road is located on the urban fringes and therefore is not subject to the high traffic flows of the other crossings. Although it's not subject to high traffic flows Porterstown Road does provide a short walking and cycling route for those living in Clonsilla to access the Scoil Choilm Community National School and St Mochta's Football Club therefore reducing the need to travel along the wider network.

Porterstown Road is a narrow single carriageway with a footway provided along the western side of the carriageway. The footway is however only lit in the vicinity of the crossing and is, due to land constraints, not provided in accordance with standards in terms of width. Where Porterstown Road crosses the Royal Canal immediately north of the level crossing, no footway is provided and therefore at this point pedestrians are required to use the carriageway. To the north of the crossing, footway provision is provided largely in accordance with standards, however there are occasions where narrowing occurs, to less than a metre in width. To the north 0.4km from the crossing, Porterstown Road links with Clonsilla Road (R121) which provides connections to the wider road network and is more urban in nature.

From Porterstown the rail line continues 1.2 km westwards where it crosses Clonsilla Road at Clonsilla Station. Clonsilla Road is a single carriageway road with a posted speed limit of 50kph. A bridge over the Royal Canal, although just wide enough for two vehicles to pass, is located immediately to the north of the crossing. Due to the kinked alignment large vehicles utilise the full carriageway width. There is a footbridge over the canal on the western side of the road bridge. Footways are provided along the western side of the carriageway on the northern and southern side of the crossing which are lit. There are however locations were utility infrastructure and signs are placed in the centre of the footway making it difficult for those with pushchairs or in wheelchairs. Dropped kerbs and tactile paving is provided where pedestrians are required to cross.

Open green space is located to the south of the Clonsilla level crossing with the area to the north predominately residential.

Zone D – Clonsilla Station (Clonsilla Junction) to M3 Parkway Station (M3 Parkway Terminus)

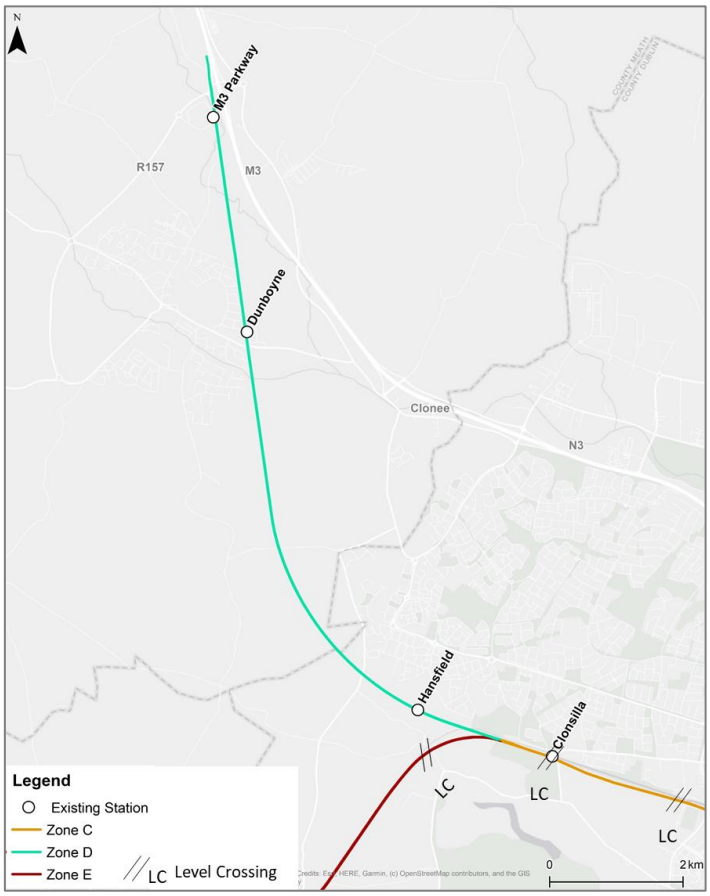


Figure 6-11 Zone D of Development

Zone D is shown in Figure 6-11. To the west of Clonsilla Station, the rail line splits at Navan Junction with the southern divide continuing southwest towards Maynooth, and the northern divide heading north-west towards the M3 Parkway in Co. Meath.

The northern spur provides a station at Hansfield and continues northwest where to the west of Ongar it moves from County Dublin to County Meath. West of Hansfield Station the area is largely rural. Where the rail line intercepts with the road network there are bridges are provided. The rail line serves the town of Dunboyne and M3 Parkway station. This is the terminus point on the rail line and for the proposed DART+ West project. The M3 Parkway station acts as a Park and Ride station and is situated adjacent to the M3 / R157 grade separated junction. The site acts to intercept road traffic travelling from the northwest into Dublin. It assists in reducing vehicular trips into the city centre, by encouraging the use of the train line.

Zone E – Clonsilla Station (Clonsilla Junction) to Maynooth Station

Figure 6-12 Zone E of the Development

Figure 6-13 Existing conditions of Level Crossings in Zone E

Zone E is shown in Figure 6-12. The rail line that continues to Maynooth travels through a more rural area, crossing from County Dublin into County Kildare. A level crossing is provided at Barberstown Lane which is located some 225 metres north of the junction with the R121, which provides a link to the Clonsilla Road. Barberstown Lane is a narrow single carriageway such that it would be difficult for two large vehicles to pass without utilising the verge. The posted speed limit is 50 kph. No footways are provided nor lighting. To the north, Barberstown Lane connects with the R149 which connects to the wider road network including the M3 and N4/M4.

As the line continues southwest from Barberstown and through to the stations at Leixlip Confey and Leixlip Louisa Bridge, there are several road crossings of the line with bridges and are generally of sufficient width to cater for all traffic types and other road users. However Cope Bridge at Leixlip Confey Station is only wide enough for a single traffic lane and is controlled by traffic signals on either sides of the bridge for shuttle operation in alternate directions . The existing level crossing at Barberstown will be closed to ensure efficient operation of the rail line. A second level crossing in Zone E is provided on a rural lane, south of the Deey Bridge in Blakestown, some 100 metres south-east of the R148 / L1014 priority junction, midway between Leixlip Louisa Station and Maynooth Station. The lane which crosses the rai l line is single track, unlit and has no pedestrian facilities. The lane provides access to a small number of properties. Both level crossings in Zone E are shown in Figure 6-13.

As the rail line reaches Maynooth, the area surrounding the surrounding area becomes more urban and the rail line passes under a number of bridges within the town.

Zone F – Maynooth Station to Maynooth Depot

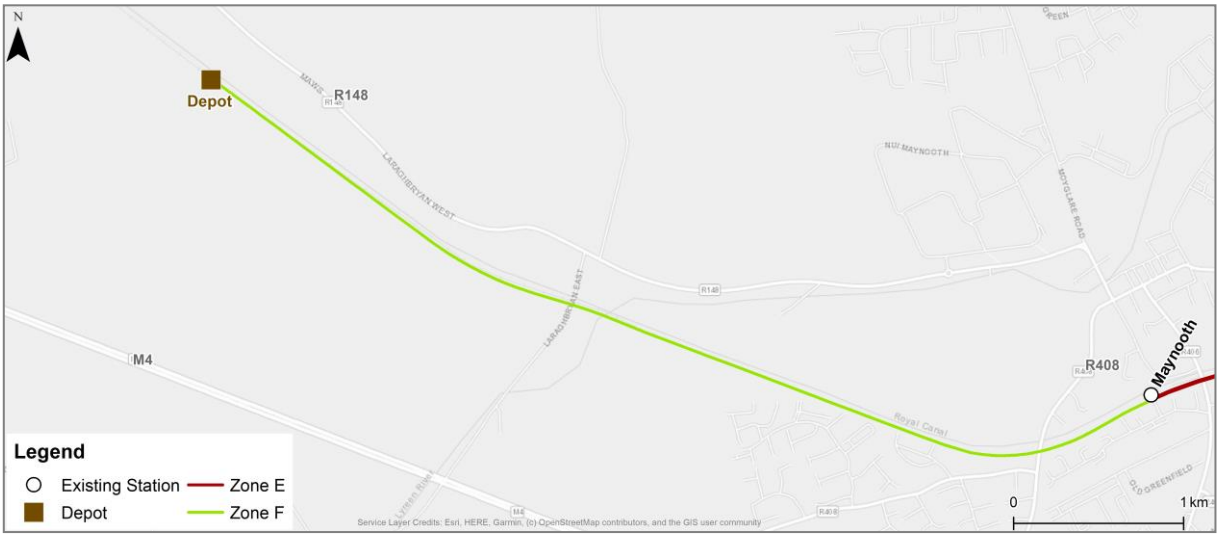


Figure 6-14 Zone F of the Development

Zone F is shown in Figure 6-14. The proposed new depot will be located to the west of Maynooth on undeveloped land located to the south of the Royal Canal and the R148 which connects Maynooth with Kilcock. The proposed development ends at the depot west of Maynooth.

The road network linking Maynooth with the new depot located on land to the west of the town is primarily of a rural nature. The rail track is along the southern side of the Royal Canal, while the Royal Canal Greenway runs along the northern side of the Royal Canal. Access to the Royal Canal Greenway is provided off local roads at three locations. Access to Maynooth Station is provided from the Straffan Road (R406). This is provided in the form of two priority junctions with ghost right turn lanes, yellow boxes, and stop lines to aid vehicles entering and exiting the car park and the station. The Straffan Road is lit with footways and cycle lanes provided on both sides of the carriageway. To the south, the Straffan Road connects with the M4 Motorway, whilst to the north, it provides access to Maynooth town centre and the R148 which runs in a broad east to west direction through the town connecting with Kilcock in the west and Leixlip in the east.

West of Straffan Road the rail line crosses under the Parson Street (R408) and under the L5041 south of Jackson's Bridge. The L5041 connects with the R148 at a priority junction to the north of the Royal Canal. A footway is provided along the southern side of the R148 to the east, and around the radius of the corner of the junction with the L5041 before continuing southwards on the western side of the local road.

6.4.1.1.2 Network Traffic Flows

To understand the level of existing traffic on the road network within the study area during the AM and PM peak hours, a review of the baseline data was undertaken. The resulting baseline traffic flows at the junctions and links are shown in Appendix A6.1 Tables and Figures in Volume 4 of this EIAR. Figure A-1 shows the locations of traffic counts and Table A-1 shows the baseline traffic flows.

Greater detail relating to the results of the traffic surveys undertaken and the results is provided in the TIA, see Appendix A6.2 in Volume 4 of the EIAR.

6.4.1.2 Walking and Cycling

Pedestrian and cyclist counts undertaken between November 2015 and February 2020 were summarised and are provided in Table 6-2.

Table 6-2 Existing Pedestrian and Cycle Counts along the Proposed Development

Zone	Junction / Link	Survey Date	Mode Type	Direction	AM Peak	PM Peak
A/B	Sheriff St Upper Bridge	17/11/2015	p/c	Westbound	44	21
			p/c	Eastbound	31	41
			p/c	Overall	75	62
A/B	Newcomen Bridge	17/11/2015	p/c	Northbound	93	402
			p/c	Southbound	810	68
			p/c	Overall	903	470
A/B	Summerhill Parade Bridge	17/11/2015	p/c	Northbound	35	56
			p/c	Southbound	124	17
			p/c	Overall	159	73
A/B	Russell St Bridge	17/11/2015	p/c	Northbound	18	69
			p/c	Southbound	95	15
			p/c	Overall	113	84
A/B	Drumcondra Rd Lower	06/02/2020	p/c	Northbound	95	270
			p/c	Southbound	303	114
			p/c	Overall	398	384
AB	Cross Guns Bridge, R108	26/11/2019	p/c	Northbound	118	142
			p/c	Southbound	123	30
			p/c	Overall	241	172
C	New Bridge, Ratoath Rd	05/02/2019	p/c	Northbound	4	3
			p/c	Southbound	6	3
			p/c	Overall	10	6
C	Ashtown level crossing	05/02/2019	PED	Northbound	76	188
			PED	Southbound	327	78
			PED	Overall	403	266
C	Ashtown level crossing	05/02/2019	p/c	Northbound	30	17
			p/c	Southbound	28	25
			p/c	Overall	58	42
C	Coolmine Rd level crossing (3-hour count)	05/02/2019	PED	Northbound	395	255
			PED	Southbound	103	81
			PED	Overall	498	336
C	Coolmine Rd level crossing	05/02/2019	p/c	Northbound	7	3
			p/c	Southbound	5	7
			p/c	Overall	12	10
C	Diswellstown Rd Bridge	05/02/2019	PED	Northbound	34	13
			PED	Southbound	117	15
			PED	Overall	151	28
C	Diswellstown Rd Bridge	05/02/2019	p/c	Northbound	14	19
			p/c	Southbound	45	10
			p/c	Overall	59	29

Zone	Junction / Link	Survey Date	Mode Type	Direction	AM Peak	PM Peak
C	Porterstown Rd level crossing (3-hour count)	2018	PED	Northbound	5	149
			PED	Southbound	123	24
			PED	Overall	128	173
C	Porterstown Rd level crossing (3-hour count)	2018	p/c	Northbound	1	41
			p/c	Southbound	37	13
			p/c	Overall	38	54
C	Clonsilla Rd level crossing (3-hour count)	2018	PED	Northbound	23	441
			PED	Southbound	15	15
			PED	Overall	38	456
C	Clonsilla Rd level crossing	05/02/2019	p/c	Northbound	0	3
			p/c	Southbound	3	0
			p/c	Overall	3	3
D	R149 Bridge (@ Hansfield)	05/02/2019	p/c	Northbound	0	0
			p/c	Southbound	0	0
			p/c	Overall	0	0
D	L2222 Stirling Rd Bridge	05/02/2019	p/c	Westbound	0	2
			p/c	Eastbound	1	1
			p/c	Overall	1	3
E	Barberstown Level Crossing	05/02/2019	PED	Northbound	0	0
			PED	Southbound	0	0
			PED	Overall	0	0
E	Barberstown Level Crossing	05/02/2019	p/c	Northbound	1	0
			p/c	Southbound	1	1
			p/c	Overall	2	1
E	Collins Bridge (L3005)	05/02/2019	p/c	Northbound	0	0
			p/c	Southbound	0	0
			p/c	Overall	0	0
E	Blakestown level crossing	05/02/2019	PED	Northbound	0	0
			PED	Southbound	0	2
			PED	Overall	0	2
E	Blakestown level crossing	05/02/2019	p/c	Northbound	1	0
			p/c	Southbound	0	1
			p/c	Overall	1	1

p/c – Pedal cyclist

PED - Pedestrians

The results from counts illustrate that the busiest locations, in terms of cyclist activity are bridges in Zones A and B, which is to be expected within the city centre. The level of cyclists at level crossings is highest at Ashtown and drops significantly on all other locations west of the M50. There is very low activity at both Barberstown and Blakestown level crossings, which reflects the rural nature of both these sites. In relation to pedestrian counts at each of the level crossings, both Barberstown and Blakestown show very low level of usage, which is to be expected. Additional details are provided in the TIA (see Appendix A6.2 in Volume 4 of this EIAR) on how these traffic counts have been utilised in determining what and if mitigation is required.

6.4.1.3 Public Transport

6.4.1.3.1 Bus

There are many bus services located within the study area, or within a short walking distance from the rail stations. The number of buses is greatest in Zones A, B and C, with the number declining further west. Where the study area covers Dublin city centre there are approximately 50 bus stops within a 20-minute walk of the station served by routes extending across Ireland. Further bus services will be available from the proposed station at Spencer Dock. Detail on the services and bus stops located within the study area are included in the TIA, see Appendix A6.2 in Volume 4 of this EIAR.

A review was undertaken of existing bus services within the study area to identify bridges with bus routes running through them. Table 6-3 details number of bus routes running across the rail line.

Table 6-3 Existing Bus Routes crossing the rail line

Zone	Structure ID	Road Bridges along the Proposed Development	Number of Current Bus Routes
A/B	OBO228	Sheriff Street Bridge	20
A/B	OBD227	Strand – Connolly steel railway bridge	17
A/B	OBD226	Newcomen Bridge - N Strand Rd	17
A/B	OBD225	Clarke's Bridge - Summerhill Parade	1
A/B	OBD223	Binn's Bridge - Drumcondra Rd Lower	34
A/B	OBD222	Cross Guns Bridge - Prospect Rd	12
C	OBG5	Adjacent to Broombridge Bridge	1
C	OBG11	Adjacent to Castleknock Bridge	1
C	OBG11C	Diswellstown Road Bridge (Dr Troy Bridge)	1
D	OBCN286	Barnhill Rd Bridge - R149	1
D	OBCN290A	Summerhill Road - L2228	3
E	OBG14	Cope Rail Bridge - R149 (Leixlip Confey)	1
E	OBG16	Louisa Bridge	4
E	OBG16A	Collinstown Bridge - R449	3
E	OBG19	Mullen Bridge - Straffan Rd (Maynooth)	10
F	OBG21	Bond Bridge - Parson St (Maynooth)	1

The highest number of bus routes are at Binn's bridge on Drumcondra Road Lower, where 34 bus routes are passing across this bridge over the rail line. Overall, a high number of bus routes are observed within zones A & B, with much lower numbers in other zones, with the exception of Maynooth, where 10 bus routes are passing over the rail line on Straffan Road.

6.4.1.3.2 Rail

The existing rail line within the extents of the proposed development carries urban rail services between Connolly / Docklands stations in Dublin City centre with Maynooth, in County Kildare and M3 Parkway, in County Meath, as well as regional services to Mullingar and Longford and the national service to Sligo. The M3 Parkway station is the Navan branch line terminus, whilst the Maynooth terminus is located on the mainline to Sligo. There are 16 stations located along the length of the proposed development with connections to the LUAS Red line from Connolly station and at the Docklands area, and to the LUAS Green line from the Broombridge Station.

Each of the stations along the line were reviewed in terms of the facilities that they provide for passengers along with parking provision for both cars and bicycles. The results of the review are set out in Table A-2 (Station Summary) of Appendix A6.1 Tables and Figures in Volume 4 of this EIAR.

Trains operate approximately every 12 minutes between Dublin city centre and Maynooth with journeys taking approximately 40 minutes from Connolly Station. There are some direct trains between Docklands Station and M3 Parkway, where at least two trains per hour operate in the peak periods. In the off-peak there is a shuttle service from Clonsilla to M3 Parkway and passengers are required to change to Maynooth-Connolly services. Journey time for the shuttle service between Clonsilla and M3 Parkway is approximately 13 minutes. Journey time between Clonsilla and Dublin Connolly is approximately 30 minutes.

The train services provide a good level of service between Maynooth and Dublin city centre. Further detail relating to the rail services is provided in the TIA, see Appendix A6.2 in Volume 4 of this EIAR. Existing capacity of the trains between Maynooth and Dublin Connolly is insufficient , and trains are operating above capacity during peak periods.

6.4.1.4 Park and Ride

There are a number of stations which provide no car or cycle parking for patrons. These are at the Docklands, Drumcondra and Broombridge stations where the passengers using these services are expected to utilise other modes such as bus / LUAS and foot to travel to and from the stations. At Broombridge LUAS stop there are limited car and cycle parking facilities that also serve the adjoining railway station. Car parks are provided at seven of the sixteen stations located near the western end of the proposed development. These are Navan Road Parkway, Coolmine, Dunboyne, M3 Parkway, Leixlip Louisa Bridge and Maynooth stations. Detail relating to the parking utilisation levels is set out in Section 6.5 which discuss the potential construction impact.

Although all car parks at stations can be defined as Park and Rides, there are two large Park and Ride sites, which enhance the ability for users of the rail line to travel from wider areas and use the rail line rather drive to their end location. There are currently two Park and Rides along the length of the line at M3 Parkway and Navan Road. A total of 1,200 spaces are provided at M3 Parkway and 102 parking spaces at Navan Road. The NTA 'Park and Ride Strategy: Greater Dublin Area', April 2021 document suggests that there could be an expansion in the number of spaces at Navan Road to provide a total of 400 spaces and this will be provided in parallel to the DART+ West project.

Further Park and Ride provision is being considered as part of the DART+ Programme as set out within the NTA Park and Ride Strategy: Greater Dublin Area document. For the DART+ West line, the locations being considered are Collinstown, between Leixlip and Maynooth, and at the Maynooth depot. The proposal could see up 1,000 spaces provided, with 500 in the initial phase. The provision of Park and Ride facilities along the line would enable those travelling from outside of the Greater Dublin Area to travel by a more sustainable mode of transport upon reaching the outskirts of the city whilst also reducing the number of vehicles travelling within the Greater Dublin Area and alleviating congestion.

6.4.1.5 Road Safety

This section provides a review of the accident data obtained from the RSA website. As the study area for the development is large, specific reference is made to the locations where the level crossings are located. Further detail is provided in the TIA on the remainder of the links included in the study area.

The data provided on the RSA website is only available up to 2016 as the most recent year, and therefore the five-year period between 2011 and 2016 has been reviewed. This represents the most recently available five year data. The data for the years identified was obtained through the use of the options on the website.

Table 6-4 below sets out the number of accidents at each of the level crossings or in the immediate vicinity by classification of their severity, i.e., minor, serious, and fatal. Most of the accidents were minor, and there were no fatal accidents at any of the level crossings between 2011 and 2016. The junctions with the highest number of accidents were Prospect Road Bridge and Binn's Bridge.

Table 6-4 Road Safety (2011-2016)

Zone	Level / Bridge Crossing	Accident Severity			Total
		Minor	Serious	Fatal	
A	Drumcondra Station	7	0	0	7
A	Prospect Road Bridge	7	1	0	8
B	Newcomen Bridge	3	0	0	3
B	Clonliffe Bridge	0	0	0	0
B	Binn's Bridge	7	1	0	8
C	Broombridge Bridge	2	0	0	2
C	Ashtown Crossing	0	0	0	0
C	R102 Road	0	0	0	0
C	N3 Road	3	0	0	3
C	M50 Roundabout / Navan Road	3	0	0	0
C	Old Navan Road	0	0	0	0
C	Castleknock Bridge	3	0	0	3
C	Coolmine Crossing	0	0	0	0
C	Porterstown Crossing	0	0	0	0
C	Clonsilla Crossing	0	0	0	0
D	Barnhill Bridge	0	0	0	0
D	Dunboyne Bridge	3	0	0	3
E	Barberstown Crossing	0	0	0	0
E	Collins Bridge	1	0	0	1
E	Cope Rail Bridge	2	0	0	2
E	Louisa Bridge	0	0	0	0
E	Blakestown Crossing (Deey Bridge)	1	0	0	0
E	Pike Bridge	0	0	0	0
F	Jacksons Bridge	0	0	0	0

In addition to the information available from the RSA website, data on incidents has been provided by Iarnród Éireann for level crossings that are proposed to be closed / amended as part of the DART+ West project. The data provided is summarised in Table 6-5 below.

Table 6-5 Incidents at the Crossings (2015-2020)

Zone	Level / Bridge Crossing	Number of Incidents	Type of Incidence	Patterns
C	Ashtown Crossing	3	Cyclist near miss (1) Vehicle collision with barrier/drives on line (2)	None. Incidents have had little impact on the service through Ashtown between 2015 and 2020. Therefore, the benefit of removing the crossing due to the disruption in traffic, incidents will be minimal to those using the crossing and the services.
C	Coolmine Crossing	21	Vehicle collision with barrier/drives on line (9) Weather (2) Pedestrian near miss (2) Trespass (5)	At this location, the majority of incidents, between 2015 and 2020, involved vehicles colliding with the barriers, or crossing through when then should have stopped. This suggests that there is a lack of adherence to the signals or an issue with visibility of the signals. Removal

Zone	Level / Bridge Crossing	Number of Incidents	Type of Incidence	Patterns
			Pedestrian interference (2) Other (1)	of this crossing would improve the flow of trains through Coolmine, therefore resulting in an improved service.
C	Porterstown Crossing	43	Cyclist near miss (1) Vehicle collision with barrier/drives on line (5) Pedestrian near miss (3) Trespass (18) Pedestrian interference (15) Other (1)	A significant number of incidents have occurred at Porterstown, with the majority involving pedestrians, with trespass and interference in the operation of the barriers and crossing being the type of incident which occurred the most frequently. This route provides a key pedestrian desire line between the St Mochta's Football Club and the Scoll Choim Community National School located to the south of the railway line with the residential areas to the north. The closures as a result of these incidents are likely to have a significant impact on the operation of the services along this section of the line therefore there is significant benefit to the operation of the service in relation to the closure of this crossing not just in making it safe but reducing the ability for pedestrians to access the line and interfere with the barriers.
C	Clonsilla Crossing	1	Trespass (1)	None. Incidents have had little impact on the service through Clonsilla between 2015 and 2020. Therefore, the benefit of removing the crossing due to the disruption in traffic, incidents will be minimal to those using the crossing and the services.
E	Barberstown Crossing	6	Vehicle collision with barrier/drives on line (5) Barrier issues (1)	At this location, the majority of incidents, between 2015 and 2020, involved vehicles colliding with the barriers, or crossing through when then should have stopped. This suggests that there is a lack of adherence to the signals or an issue with visibility of the signals. Removal of this crossing would improve the flow of trains through Barberstown, therefore resulting in an improved service.
E	Blakestown Crossing (Deey Bridge)	3	Cyclist near miss (1) Vehicle collision with barrier/drives on line (1) Trespass (1)	None. Incidents have had little impact on the service through Blakestown between 2015 and 2020. Therefore, the benefit of removing the crossing due to the disruption in traffic, incidents will be minimal to those using the crossing and the services.

6.4.1.6 Future Year Assessment

The proposed development covers a large area, traffic models have been prepared to identify the impacts in the construction and operational phases. To assess the impact of the proposed development for the construction and operational phases, details were extracted from the traffic modelling undertaken. These include:

- Journey time data.
- Traffic flow changes.
- Changes to passenger numbers.

The future year modelling considered 2028 as the proposed development opening year and 2043 as the design year. The Do Minimum Network assumed both the Bus Connects and Metro Link in place before the DART+ West was added in the Do Something option. The results of the future year assessment are set out in the TIA.

6.5 Description of potential impacts

6.5.1 Potential Construction Impacts

6.5.1.1 Construction Duration and Works

The construction of the proposed development is to be provided in phases, which will take place over approximately 47 months. The construction programme has been developed considering efficiency of works and to reduce the potential for environmental impacts. The approximate duration of the main activities are as follows:

- Spencer Dock - 39 months.
- Connolly Station - 18 months.
- Signalling, Electrification, Telecommunications (SET) - 32 months.
- Civil, Track and Building Works - 29 months.
- Depot - 39 months.

Based on information included in Chapter 5, the construction works range from those that are located outside of the railway boundary (thus, having no impact or minimal impact on train operations) to those that will require a temporary closure of a section normally during night-time track possession works or full weekend possession works to limit the impact on rail services. A detailed construction programme has been developed for the proposed development and is included Chapter 5 of this EIAR.

Specific temporary closures at locations along the line are discussed in Chapter 5 and are included within the TIA. Information in relation to full weekend possessions and total closure for some specific activities is provided, namely the OBD227 Railway bridge to OBD221 Glasnevin Maintenance bridge proposal for the track lowering on the MGWR line requires extended closure to the section of the railway line; OBO36 Ossory Road to the North Wall the proposed civil and track works on the railway line will require closure; track lowering along various locations along the line are feasible to be executed during these weekend possessions.

As the construction of the development will be phased, the impact of the development is likely to be limited to certain areas at certain times of the construction programme to reduce the impact of construction on road users. There will however be a peak time when construction occurs over the course of the programme and it is this point in time when the greatest impacts are likely to occur.

Potential effects during the construction phase of the proposed development are typically considered as either temporary or short-term. This is due to the majority of works taking less than a year to complete with works at Spencer Dock and the depot taking approximately 3.5 years to fully complete all elements of construction.

6.5.1.2 Construction Compounds

The construction of the site will result in a number of temporary construction compounds being provided along the length of the line along with changes to the road network and work required to bridges along the length of the line.

The locations of the construction compounds, the land where they are located and their status in terms of being temporary or permanent are set out in Chapter 5. Each of these locations will generate vehicular trips which will impact on the local road network and the cumulative impact of this has been assessed. The haulage routes proposed to each of the compounds are included in Appendix A6.3 Construction Traffic Management Plan of this EIAR as well as being provided in Chapter 5.

In order to provide a number of the compounds over the construction period, there will be a temporary loss of car parking at some locations along the length of the line. Furthermore, due to land requirements to cater for new roads, bridges, and station improvements some spaces will be lost on a permanent basis. Table 6-6 below sets out the number of spaces lost on a temporary or permanent basis as a result of construction.

Table 6-6 Parking Loss Due to Construction

Location	Temporary		Permanent		Notes	Justification
	Public	Private	Public	Private		
Connolly Station Compound	0	16	0	0	15+1 (disabled) - courtyard Iarnród Éireann Head Office's parking	Station compound temporarily using the area
Docklands Station SET Compound	8	0	0	0	3 (station parking) + 5 (coach/bus).	SET compound temporarily using the area. The bus parking facility was due to close permanently therefore no impact on buses. Slight impact on station parking reduction however given its location in the city centre travel by alternative modes is possible.
Docklands Station PW Compound	45	0	0	0	45 (coach/bus)	Pway compound temporarily using the area. The bus parking facility is due to close permanently therefore no impact.
Broombridge Station STR Compound	6	0	0	0	6 (coach/bus)	Structure OBG5 compound temporarily using the area. The bus parking facility is due to close permanently therefore no impact.
Ashtown Bridge Level Crossing	0	0	23	135	135 (local businesses) + equivalent of 23 spaces illegally used on street by the public	Construction of new level crossing and road connections / junctions. Discussions are on-going separately with the impacted businesses regarding the loss of parking at their site.
OBG9-Old Navan Bridge STR Compound	0	10	0	0	Private parking relating to the 12th Local Boutique Hotel and Café Bistro.	Structure OBG9 compound temporarily using the area.
Coolmine Station STA Compound	20	0	0	0	Parking for the station	Station compound temporarily using the area. These spaces will be reverted back as soon as possible.
Leixlip Confey Station (road junction)	0	0	15	0	Provided along the road which accesses the Station	Construction of new road connections / junctions.
Louisa Bridge Station STR Compound	7	0	0	0	Station Road parking	Structure OBG16 compound temporarily using the area.
Louisa Bridge Station STR Compound (West of Station)	15	0	0	0	IE Pay and Display car park	Structure OBG16 compound temporarily using the area.
Maynooth Station SUB Compound	22	0	0	0	Station parking	Substation compound temporarily using the area.
Maynooth Substation	0	0	10	0	Station parking	Construction of a new substation.
Dunboyne PW Compound	160	0	0	0	Station parking	Pway compound temporarily using the area.

Location	Temporary		Permanent		Notes	Justification
	Public	Private	Public	Private		
Dunboyne Sub Compound	20	0	0	0	Station parking	Substation compound temporarily using the area.
Dunboyne Substation	4	0	0	0	Station parking for taxis	Construction of new substation.
Dunboyne Station Parking	0	0	7	0	Five standard bays along with 2 disabled which will be re-provided	New route into the car park
M3 Parkway PW Compound	134	0	0	0	M3 Parkway car park	Pway compound temporarily using the area.
M3 Parkway SET Compound	174	0	0	0	M3 Parkway car park	SET compound temporarily using the area.
M3 Parkway SUB Compound	16	0	0	0	M3 Parkway car park	Substation compound temporarily using the area.
M3 Parkway PSP and SEB	0	0	20	0	M3 Parkway car park	Construction of new technical buildings.

In order to determine if the temporary loss of parking at Coolmine, M3 Parkway and Dunboyne as a result of temporary compounds would have an impact on users of the car parks, a survey of the number of spaces used at location was undertaken during the morning peak on November 2021. The results of the survey are set out in Table 6-7 below. In addition to the survey carried out data for pre-Covid times has been provided by Iarnród Éireann for the car park at Coolmine and this is also included in the table below.

Table 6-7 Station Parking Survey Results

Station	Existing			During Construction	
	Number of Spaces	Number of Spaces Occupied During AM Peak	Number of Spaces Remaining Available	Number of Spaces Lost	Number of Spaces Remaining Available
Coolmine (November 21)	196	26	170	20	150
Coolmine (pre-Covid)	196	136	60	20	40
M3 Parkway	1200	265	935	344	591
Dunboyne	300	70	230	191	39

The results set out in the table above illustrate that generally the three car parks are underutilised with a number of spaces remaining available for use. Once the spaces lost is considered and assuming the same levels of use as identified during the survey, the above table illustrates that there is still a significant number of spaces remaining at each car park.

The impact on parking as a result of the construction compounds is temporary. The potential significance of effect is therefore considered to be *negative and slight*.

To ensure that impact on parking does exceed that set out and remains the case throughout the construction period, Iarnród Éireann will continue to monitor the level of parking at all station car parks, as part of its annual car park surveys, such that should any capacity issues or trends that arise can be identified early. If and when additional car parking capacity is required, Iarnród Éireann, working in collaboration with the National Transport Authority's Park and Ride Office, will implement a separate and site-specific car park project. Car parking spaces will be lost at M3 Parkway, Coolmine and Dunboyne for a short period during the construction programme, as construction compounds are proposed in these facilities.

The contractor will minimise the construction compound footprint throughout the construction programme and return the maximum number of car spaces back to public use.

6.5.1.3 Construction Trips

Construction related vehicular traffic will be generated during the construction phase and will generally comprise trips made by HGVs with a proportion of LGVs carrying out smaller tasks and vehicles associated with staff.

Construction is likely to impact on operation of the traffic network within the vicinity of the proposed development through increased traffic on the network along with changes to the road network including the closure of existing level crossing points to allow for new facilities to be constructed. This will facilitate the electrification of the railway line and assist in increasing the frequency of services. As stated in Section 6.5.1.1, the majority of construction works are to be temporary or short term.

The impact of the construction phases was determined based on the construction occurring without the mitigation measures, i.e., excluding traffic management and a Construction Traffic Management Plan (CTMP) being in place, to identify the worst-case impact during the peak construction period.

The results are set out in Table A-3 in Appendix A6.1 Tables and Figures in Volume 4 of this EIAR. This illustrates that during the construction phase, the proposed development will result in a potentially *significant negative* change at the junctions identified in Ashtown and those links located in Zone F at the proposed depot. The likely effect on all other locations is *slight negative* which will occur over a *temporary* time period.

Further to this, the changes to the road network as a result of the construction are set out in terms of percentage change in traffic flows. It should be noted that only those links or junctions impacted by construction traffic were included either where there has been a positive or negative change.

6.5.1.3.1 Spencer Dock

The results of the distribution of construction traffic onto the network assessed shows that the area surrounding the Spencer Dock Station would see a number of reductions in traffic along the 21 links assessed with some increases identified. Traffic in this area is not only impacted upon by the traffic associated with construction occurring along routes but by the 18 month closure of the Sherriff Street Bridge. This closure has been assessed within the modelling undertaken and therefore the redistribution of all traffic has been considered. There is a potential option to maintain access to Sheriff Street via this bridge if the works at the bridge are undertaken in two halves. This is under consideration however for the purposes of this assessment is assumed to be closed for the full 18 month period and therefore represents a worst case scenario. The results as shown in Table A-3 in Appendix A6.1 in Volume 4 of this EIAR illustrate that in many places there is a reduction in traffic on the links assessed due to traffic finding alternative routes, travelling at other times, or travelling by other modes. Of the 21 links assessed, 14 were identified as experiencing a reduction in traffic flows in the construction phase and therefore the likely effect is *slight and positive* whilst the likely effect on the remaining links is *slight and negative*.

With regards to the remaining seven locations where increases in vehicular trips are anticipated to occur in the construction phase, the actual numerical change is not considered to be significant The location of the seven links identified as experiencing an increase in vehicular trips are as follows:

- Newcomen Rail Bridge (L18).
- Seville Place (L20).
- Mayor Street (L22).
- Sheriff Street Upper between 2168 and 2314 (L27).
- Sheriff Street Upper between 2314 and 2584 (L28).
- Sheriff Street Upper between 2584 and 2323 (L29).
- E Wall Road between 2253 and 2104 (L34).

Based on the numerical change in vehicular trips, the likely effect of the construction phase on these links is considered to be *moderate negative*. These effects will occur over *short-term*, and reduce over time as the assessment is based on the peak level of trips generated by the construction phase.

It is not considered necessary to undertake any mitigation other than the implementation of the CTMP (available in Appendix A6.3 Construction Traffic Management Plan in Volume 4 of this EIAR) and a Mobility Management Plan for workers and traffic management procedures. Furthermore, the majority of the construction traffic although assessed to occur on the road network in the AM and PM peaks would be managed such that it does not occur at this time further reducing the impact of the construction, and therefore the likely effects would be *neutral*.

6.5.1.3.2 Locations Between Spencer Dock and Depot, excluding Ashtown

Construction traffic at the majority of other locations is considered to have a negative slight impacts and to occur for a temporary period of time. There are proposed temporary closures to five of the bridges along the line at Broombridge, Castleknock, Navan Road, Cope, and Louisa Bridge. The maximum length of closure at the first three bridges will occur for a period of 15 weeks with partial reopening for a period of nine weeks. The remaining two bridges are proposed to be closed for a maximum period of nine weeks with a partial reopening occurring for a maximum 25 week period. Following these periods, each of the bridges will be fully reopened to all traffic. Diversion routes are proposed at all locations were the bridges are to be closed with lengths via from 1.4 kilometres to approximately 8 kilometres. These diversion will only be place during the full close periods with access reopening on a partial basis. The full closure periods are considered to be slight, with the partial reopening limiting the impact of construction at these points. The closures will also occur such that only one of the five bridges along the route is closed at any one time ensuring that traffic is able to move freely along the routes utilising alternative crossing points as well as making use of the wider, alternative routes such as the motorway. Due to the short time period for which these bridges are to be closed these have not been considered within the assessment however the construction traffic associated with the work has been. This illustrated a slight change in the level of traffic on the network in the vicinity of each of the compounds.

6.5.1.3.3 Ashtown Junctions

Within the Ashtown area, three junctions have been assessed to determine the impact of the construction phase. Negative significant changes in traffic flows during construction are expected to occur at these junctions. Mitigation in the form of a CTMP (see Appendix A6.3 in Volume 4 of this EIAR) and Mobility Management Plan as well as restricting vehicular movements to outside of the peak hours would reduce the impact of the construction to *neutral* before returning to normal levels once the construction is complete.

6.5.1.3.4 Proposed Depot

Significant changes in traffic flows during construction are expected to occur on the links in the immediate vicinity of the new depot west of Maynooth. These are however short-term changes and represent the greatest change which would occur over the construction of the proposed development, as peak construction numbers for each location was assumed to occur simultaneously. It is unlikely that the peak construction at each site would occur at the same time and therefore the impact across the network would, in reality be less than that set out in Table A-3 in Appendix A6.1 in Volume 4 of this EIAR. The impact of construction vehicles on the network does represent likely *short term, negative and moderate* effects which would be mitigated and for the duration of construction before returning to normal levels once the construction is complete.

Mitigation measures including traffic management, a CTMP available in Appendix A6.3 Construction Traffic Management Plan in Volume 4 of this EIAR, and a Mobility Management Plan, including detail on how construction workers will be managed, will be implemented to reduce the impact of the construction phase on road users over the course of the construction period.

6.5.1.4 Bus Routes

A review was undertaken of existing and future bus services within the study area to identify if any routes would be disrupted due to the construction works proposed at any of the existing bridges along the rail line. Table 6-8 details number of routes currently passing through or in the future will be passing through the bridges and whether or not they will be impacted by the bridge works. The future proposals for BusConnects are included in the future bus routes analysis.

Table 6-8 Impact of Bridges Modifications on Existing and Future Bus Routes

Zone	Structure ID	Works Required	Road Bridges along the rail line	Number of Current Bus Routes	Number of Future Bus Routes	Potential Significance of Effects / Time Period Bus Route is Affected
A/B	OBD228 - Sheriff Street Bridge	Part demolition and reconstruction of the bridge during the construction of the Spencer Dock Station	Sheriff Street Bridge	20	19	80 weeks Total road closure and traffic diverted along an alternative route during the period of the construction. Negative, significant, short term
A/B	OBD227 - UB7 N. Strand - Connolly steel railway bridge	Modifications involving track lowering (vertical alignment) under bridge	Strand – Connolly steel railway bridge	17	15	No road related construction phase effects. (3 weeks bus route affected)
A/B	OBD226 - Newcomen Bridge	Modifications involving track lowering (vertical alignment) under bridge and overbridge parapet modifications	Newcomen Bridge - N Strand Rd	17	15	No road related construction phase effects.
A/B	OBD225 - Clarke's Bridge	Modifications involving track lowering (vertical alignment) under bridge and overbridge parapet modifications	Clarke's Bridge - Summerhill Parade	1	1	No road related construction phase effects.
A/B	OBD224 - Clonliffe Bridge	Modifications involving track lowering (vertical alignment) under bridge and overbridge parapet modifications	Clonliffe Bridge - Jones' Rd	0	0	No road related construction phase effects.
A/B	OBD223 - Binn's Bridge	Modifications involving track lowering (vertical alignment) under bridge and overbridge parapet modifications	Binn's Bridge - Drumcondra Rd Lower	34	32	No road related construction phase effects.
A/B	OBD222 - Cross Guns Bridge	Modifications involving track lowering (vertical alignment) under bridge	Cross Guns Bridge	12	9	No road related construction phase effects.

Zone	Structure ID	Works Required	Road Bridges along the rail line	Number of Current Bus Routes	Number of Future Bus Routes	Potential Significance of Effects / Time Period Bus Route is Affected
C	OBG5 - Broombridge Bridge	Arch Deck Reconstruction	Adjacent to Broombridge Bridge	1	2	15 weeks of total road closure and 19 weeks of partial road closure with one open lane. Negative, slight, temporary
C	OBG9 - Old Navan Road rail bridge	Bridge Deck lift and overbridge parapet modifications	Old Navan Road rail bridge	0	0	9 weeks of total road closure and 25 weeks of partial road closure with one open lane. Negative, slight, temporary
C	OBG11 - Castleknock Bridge	Bridge deck reconstruction	Adjacent to Castleknock Bridge	1	2	15 weeks of total road closure and 19 weeks of partial road closure with one open lane. Negative, slight, temporary
E	OBG14 - Cope Rail Bridge - R149	Arch deck reconstruction and parapet heightening	Cope Rail Bridge - R149	1	1	15 weeks of total road closure and 19 weeks of partial road closure with one open lane. Negative, slight, temporary
E	OBG16 - Louisa Bridge	Flat deck lifting and parapet modifications	Louisa Bridge	4	4	9 weeks of total road closure and 25 weeks of partial road closure with one open lane. Negative, slight, temporary

A total number of 44 existing bus routes or 43 future bus routes will be impacted by the construction of the proposed development. Detailed list of bus routes is included in the TIA. See Appendix A6.2 in Volume 4 of this EIAR.

6.5.1.5 Potential Construction Cumulative Effects

The likely cumulative effect of the totality of the construction phase of the proposed development is considered to be *short term, negative and moderate*. The negative construction impact have been scheduled throughout the duration of the project and in a way to minimise the severity of impact in any given area. The likely cumulative impact has been assessed assuming worst case scenario.

6.5.2 Potential Operational Impacts

6.5.2.1 Potential Wider Operational Impacts

Operation of the proposed development in 2028 was assessed as the opening year with a future year of 2043 also being considered as well in terms of determining impacts.

Some of the key summary findings from the strategic modelling are presented below in Figure 6-16, which presents the forecast change in modal shares as a result of the DART+ West project in both opening and design years. Modes included are: Cycle, Walk, Public Transport (PT) and Private Car. The mode shares reported below were assessed within 5 km buffer along the DART+ West corridor only, which are shown in Figure 6-15. Furthermore, the area along the DART+ West line was divided by the M50 and the below Figure reports on mode shares along the rail corridor to the east of the M50 and to the west of the M50. The modelling

forecasts a shift towards public transport usage along the rail line across both areas by 2028 which is maintained up to 2043.

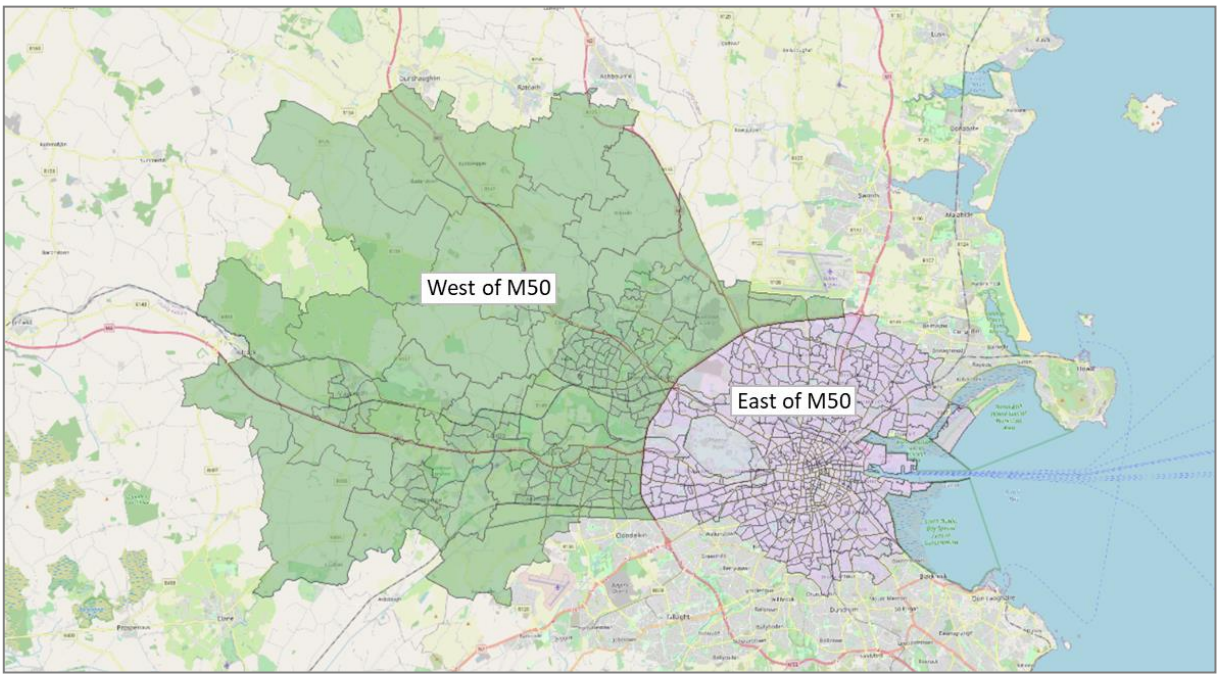


Figure 6-15 5 km Buffer Zone along the DART+ West rail line East and West of the M50

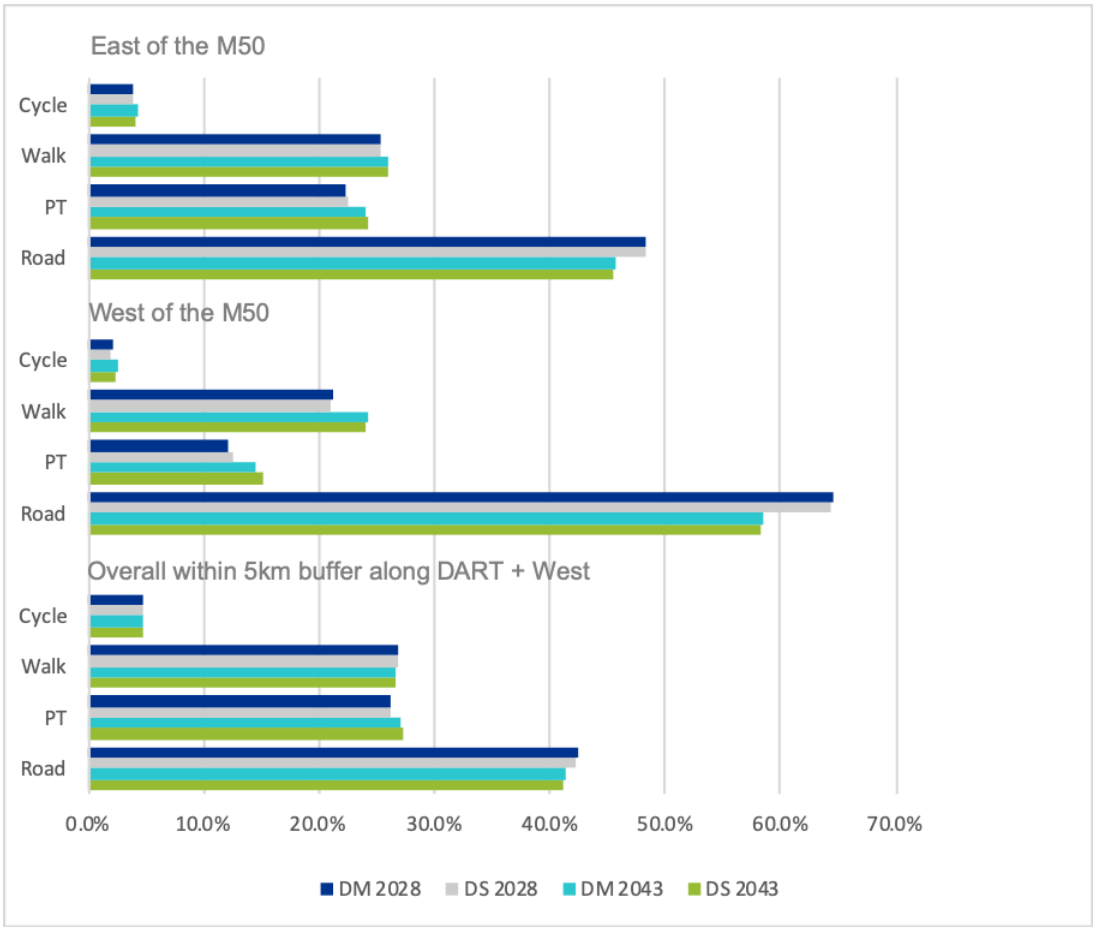


Figure 6-16 Projected Mode Shares within 5 km buffer along the DART+ West rail line 2028 and 2043

Public Transport (PT) mode share in increasing in the Do Something (DS) scenarios when compared to Do Minimum (DM). The biggest differences between the mode shares are within the 5 km buffer west of the M50, which has higher car mode share than in the buffer east of the M50. This is due to the different level of Public Transport options available east and west of the M50 Motorway.

Overall mode shares impact across the entire ERM model area are presented in Figure 6-17 below.

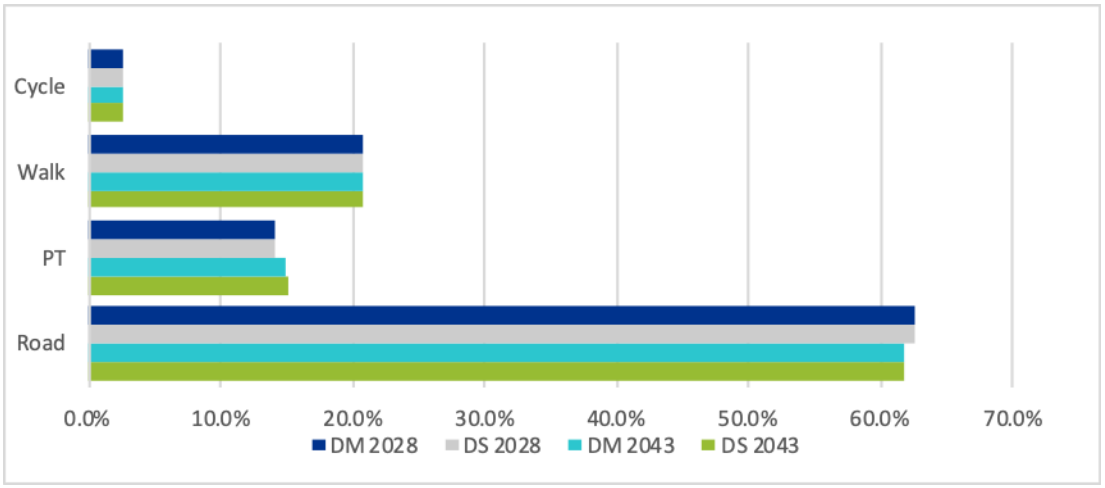
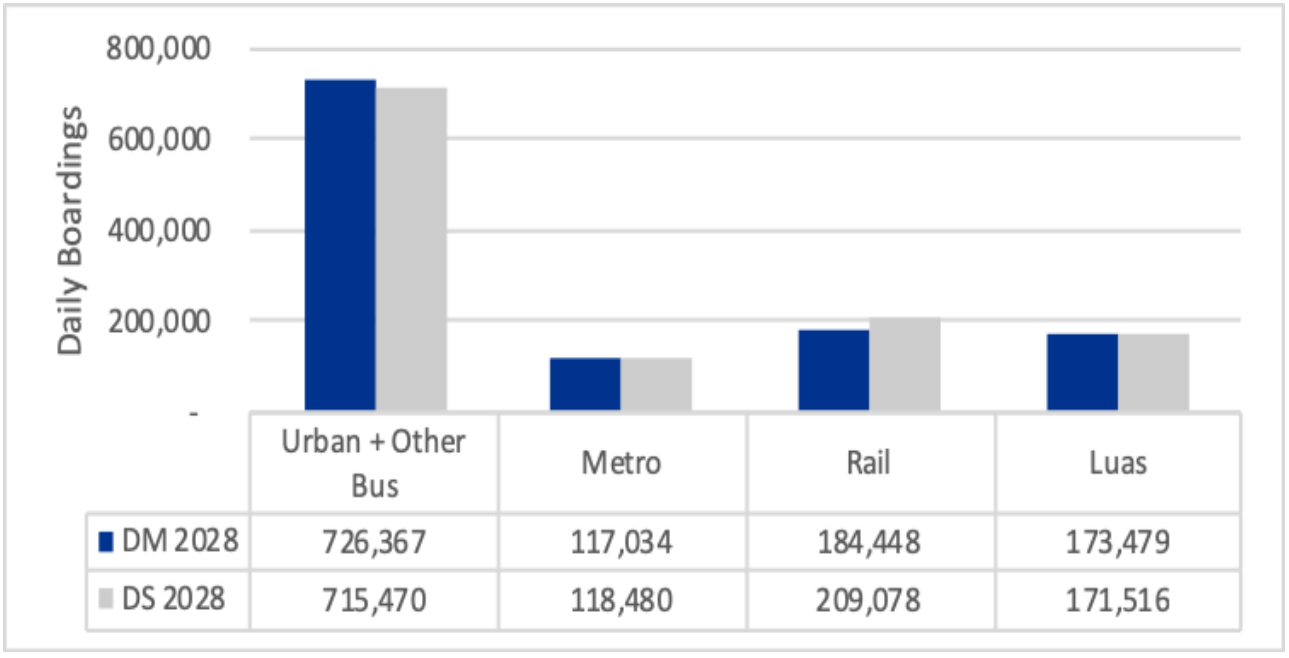


Figure 6-17 Projected Mode Shares with and without DART+ West proposals in 2028 and 2043 ERM

The mode share differences within the scale of the entire ERM model are not as pronounced as in the 5km buffer, which is due to the extent of the ERM.

The mode shift to public transport is delivered through a significant increase in rail passengers which is offset by a slight reduction in bus and LUAS passengers. Introduction of DART+ West project will result in an increase in public transport patronage of around 11 million passengers per annum by 2043 with a 1.5 million reduction in road (private vehicle) demand.

The shares for each public transport mode are presented in Figure 6-18 and Figure 6-19 for years 2028 and 2043 respectively for the entire ERM model.



	Urban + Other Bus	Metro	Rail	Luas
DM 2028	726,367	117,034	184,448	173,479
DS 2028	715,470	118,480	209,078	171,516

Figure 6-18 Projected Daily Boarding's with and without DART+ West proposals in 2028

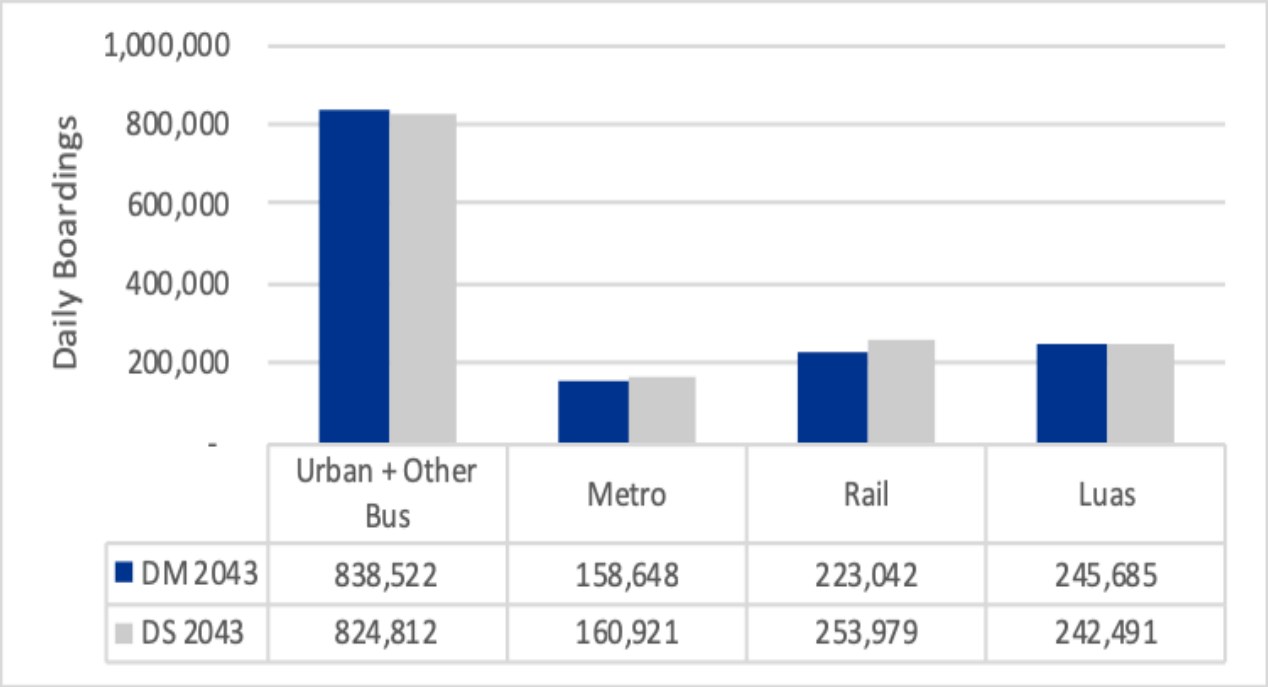


Figure 6-19 Projected Mode Shares with and without DART+ West proposals in 2043

The total boardings show significant shift towards heavy rail with an increase in the region of 25,000-31,000 passenger boardings per day or between 9-11 million per annum for both years 2028 and 2043 respectively.

6.5.2.2 Operational Impact on Traffic

The assessment of impact of the operation of the development on vehicles, pedestrians and cyclists was undertaken along the entire route and the level of impact was determined. The locations where the proposed development is impacting pedestrians, cyclists and vehicular traffic at level crossings were mitigated as appropriate and as determined by the level of impact through analysis.

The changes to the level crossings along with the interventions placed at some bridges and on roads will be permanent therefore be long-term however will remain local to where the change is made.

The modelling statistics, which reports on the average conditions across the entire modelled area was extracted from ERM and LAMs to assess the proportional change in each model. Model statistics are presented below.

Table 6-9 and Table 6-10 set out the impact of the proposed development on the whole network in the Do Minimum and Do Something scenarios on queuing, travel time, travel distance and average speed in the ERM Model for the years 2028 and 2043 respectively.

Table 6-9 Operational Impact 2028 – AM and PM Peak Hour on the entire road network

Indicator	AM Peak			PM Peak		
	Do Minimum	Do Something	% Change	Do Minimum	Do Something	% Change
Queuing (pcu hour)	20,670	20,701	0.1%	20,557	20,601	0.2%
Travel Time (pcu hour)	98,845	98,864	0.0%	93,914	93,953	0.0%
Travel Distance (pcu kilometre)	3,443,902	3,440,533	-0.1%	3,288,489	3,286,013	-0.1%
Average Speed (kph)	35	35	0.0%	35	35	0.0%

Table 6-10 Operational Impact 2043 – AM and PM Peak Hour on the entire road network

Indicator	AM Peak			PM Peak		
	Do Minimum	Do Something	% Change	Do Minimum	Do Something	% Change
Queuing (pcu hour)	27,424	27,510	0.3%	25,785	25,747	-0.1%
Travel Time (pcu hour)	120,058	120,371	0.3%	111,027	110,925	-0.1%
Travel Distance (pcu kilometre)	3,838,400	3,834,667	-0.1%	3,611,607	3,609,578	-0.1%
Average Speed (kph)	32	32	-0.3%	33	33	0.0%

The network wide statistics from ERM indicate that the impact of the development in terms of Queuing, Travel Time, Travel Distance and Average Speed across the entire model area is likely to have *negative slight* effects on the road network, which given the extent of the model it is to be expected.

Table 6-11 and The network wide statistics from the Ashtown LAM indicate that the impact of the development across the modelled area would be positive in terms of queuing, (reduction of -10% in the PM peak), travel time and average speed. Most of the benefits are coming from the removal of the delay from the level crossing. Travel distance is increasing in the AM peak and decreasing in the PM peak, which may be caused by reduced delay at the Ashtown underpass which attracts traffic from nearby crossings. Overall, total demand is decreasing by 0.5% in the morning peak and 1.4% in the evening peak likely having *positive slight to moderate* effects on the road network.

Table 6-12 set out the impact of the proposed development on the whole network in the Do Minimum and Do Something scenario on queuing, travel time, travel distance and average speed in both Local Area Models.

Table 6-11 Operational Impact 2043 – AM and PM Peak Hour Ashtown LAM on the entire road network

Indicator	AM Peak			PM Peak		
	Do Minimum	Do Something	% Change	Do Minimum	Do Something	% Change
Total Demand	15,985	15,899	-0.5%	15,074	14,863	-1.4%
Queuing (pcu hour)	661	655	-0.8%	629	564	-10.4%
Travel Time (pcu hour)	2,194	2,169	-1.1%	2,226	2,109	-5.3%
Travel Distance (pcu kilometre)	45,185	45,270	0.2%	43,298	42,603	-1.6%
Average Speed (kph)	21	21	1.5%	20	20	3.6%

The network wide statistics from the Ashtown LAM indicate that the impact of the development across the modelled area would be positive in terms of queuing, (reduction of -10% in the PM peak), travel time and average speed. Most of the benefits are coming from the removal of the delay from the level crossing. Travel distance is increasing in the AM peak and decreasing in the PM peak, which may be caused by reduced delay at the Ashtown underpass which attracts traffic from nearby crossings. Overall, total demand is decreasing by 0.5% in the morning peak and 1.4% in the evening peak likely having *positive slight to moderate* effects on the road network.

Table 6-12 Operational Impact 2043 – AM and PM Peak Hour Blanchardstown LAM on the entire road network

Indicator	AM Peak			PM Peak		
	Do Minimum	Do Something	% Change	Do Minimum	Do Something	% Change
Total Demand	48,761	48,359	-0.8%	44,768	44,679	-0.2%
Queuing (pcu hour)	2,034	2,106	3.5%	1,455	1,403	-3.6%
Travel Time (pcu hour)	8,916	8,631	-3.2%	7,326	7,330	0.0%
Travel Distance (pcu kilometre)	334,105	333,050	-0.3%	315,619	314,973	-0.2%
Average Speed (kph)	38	39	2.9%	43	43	-0.2%

The network wide statistics from Blanchardstown LAM indicate that the impact of the development across the modelled area would be positive in terms of travel time, travel distance and average speed. The level crossings closures and the increase in rail frequency reduces the total vehicular demand by 0.8% in the morning peak and by 0.2% in the evening peak, therefore representing a likely *positive* effect on the road network.

The redistribution of traffic as a result of the changes to the road network during the operation phase of the proposed development are illustrated on Figure 6-20 and Figure 6-21 for Ashtown area for AM and PM peak hours respectively and on Figure 6-22 and Figure 6-23 for Blanchardstown area.

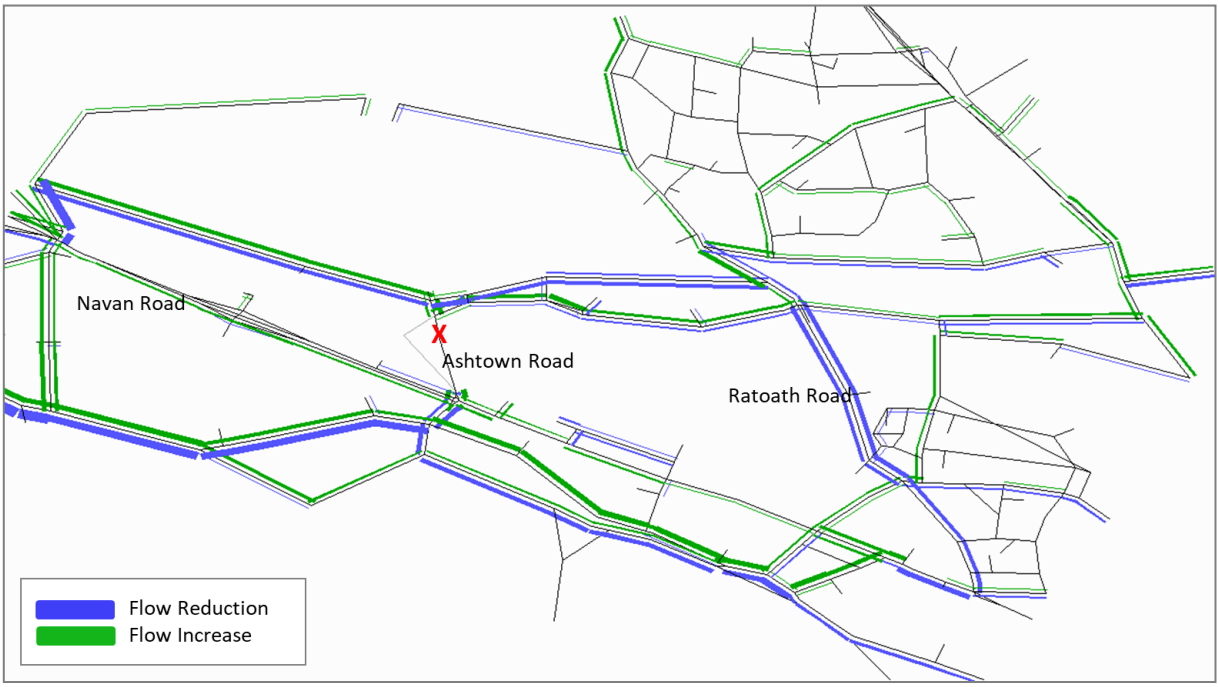


Figure 6-20 Difference Plot - 2043 AM Peak Ashtown LAM

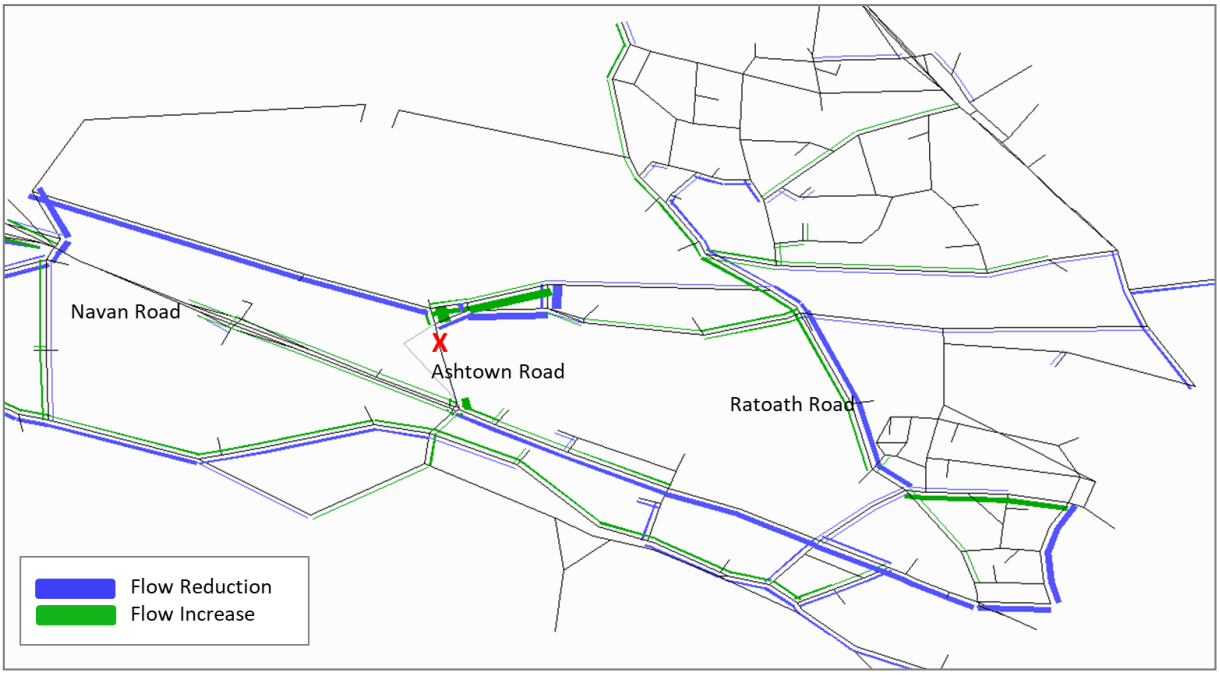


Figure 6-21 Difference Plot - 2043 PM Peak Ashtown LAM

With the Ashtown level crossing closed in the Do Something scenario, the underpass provided at Ashtown Road attracts 36% more traffic in the AM peak and 26% in the PM peak hours than the Ashtown Road level crossing in the Do Minimum (without the proposed development). This leads to proportional reduction at Dunsink Lane / River Road and Ratoath Road in both peak hours. Detailed breakdown of flows on impacted junctions is presented in Section 6.5.2.4.

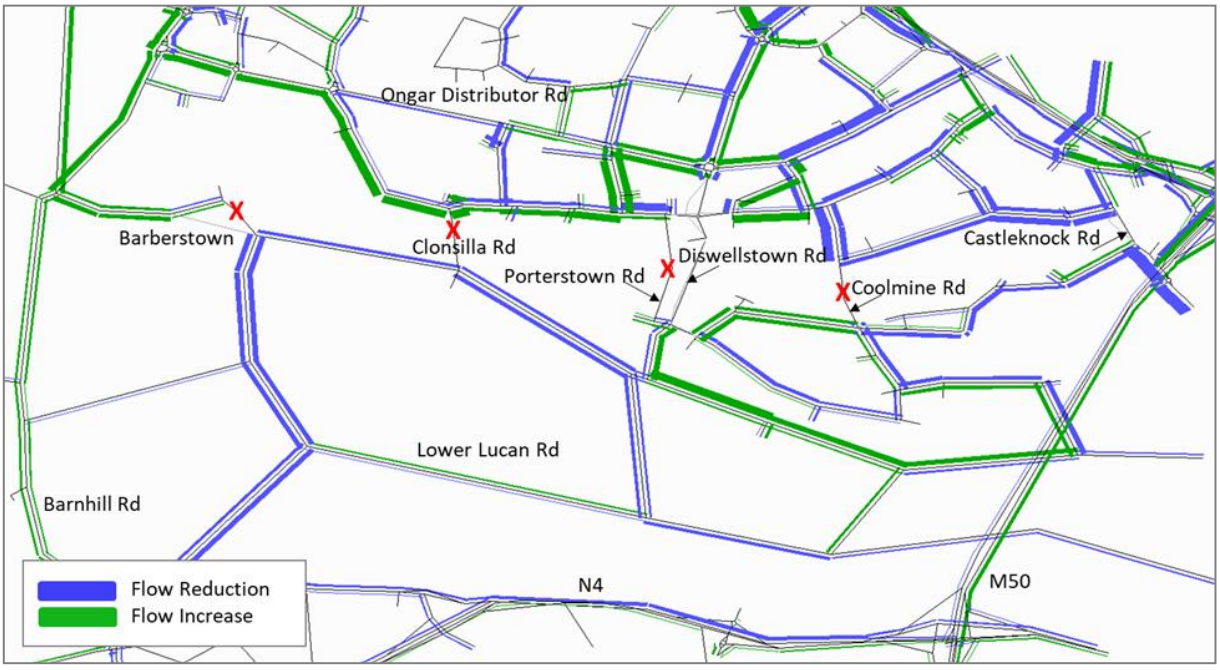


Figure 6-22 Difference Plot - 2043 AM Peak Blanchardstown LAM

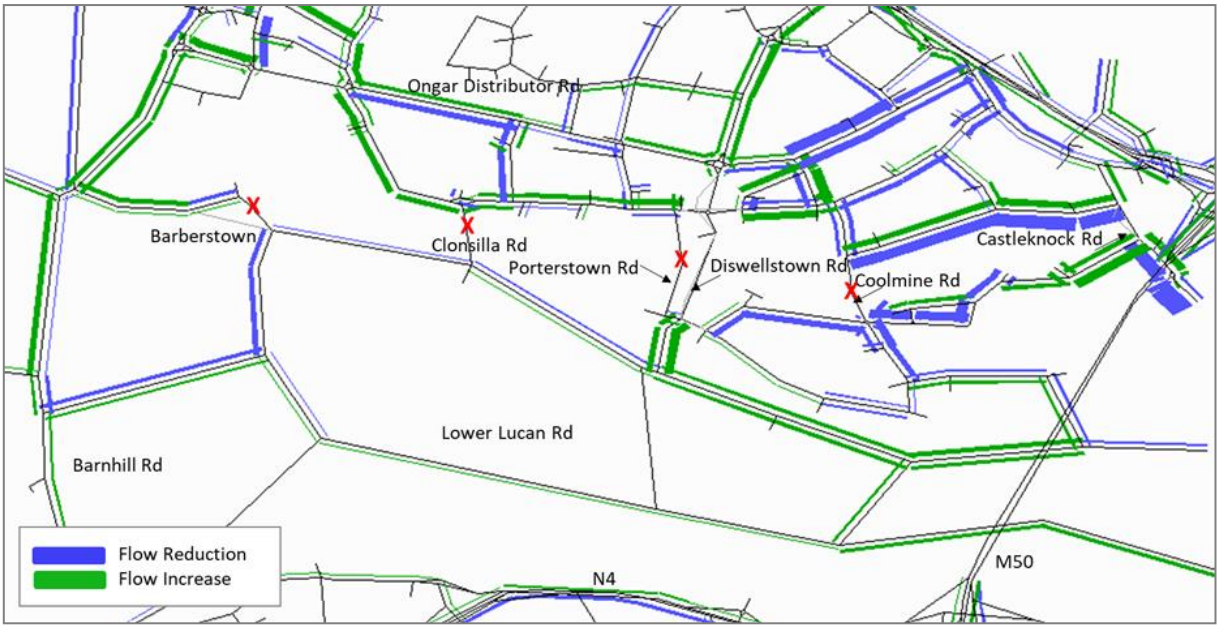


Figure 6-23 Difference Plot - 2043 PM Peak Blanchardstown LAM

Clonsilla Road, Porterstown Road and Coolmine Road in the Do Something scenario are closed, therefore no traffic is shown in the figures above on those links. There are no discernible changes in traffic due to the changes in geometric layout of the links on Barberstown new bridge, Diswellstown Road and Castleknock Road. However, the traffic flow increases on those links are as follows: Barberstown crossing two-way traffic flow increases by 122% in the morning peak (to a total of 239 PCUs) and 28% in the evening peak (to a total of 191 PCUs). Diswellstown crossing two-way traffic flow increases by 22% and 17% in the morning and evening peak hours respectively. Traffic flow on Castleknock Road decreases by 25% and 9% during morning and evening peak hours respectively.

In summary, the impact of the proposed development during the operational phase on routing of vehicular trips would occur at and in the vicinity of the areas where bridge and road interventions are taking place and where changes are proposed to the level crossings.

6.5.2.3 Proposed Depot

It is estimated that as part of the operational phase, the new depot will generate approximately 81 two-way staff trips associated with 72 arrivals and nine departures to and from the depot in the AM peak period of 0700-1000 and 72 two-way staff trips associated with 14 arrivals and 58 departures to and from the depot in the PM peak period of 1600-1900, on an average working weekday.

On average working weekday during the operational phase, the peak trip movements associated with the depot are due to occur between 0700-0800 in the AM and 1600-1700 in the PM. The greatest number of two-way movements occur in these hours due to shift patterns identified. During the standard road network peak hours of 0800-0900 and 1700-1800 hours, two-way staff trips of 14 and 6 would be anticipated to be generated. The impact in the road network peak hours is therefore considered to be minimal with the greatest impact occurring in the hours before the standard peak hours.

The level of trips identified are person trips and therefore at worst it would be assumed that all trips would be made by single occupied vehicle however in reality a number of trips would be made using more sustainable modes such as walking, cycling, public transport and car sharing, therefore reducing the impact of the depot on the highway network further.

6.5.2.4 Traffic Impacts

The changes to the road network following the opening of the proposed development were analysed in terms of percentage change for total traffic in both years 2028 and 2043. Table A-4 and Table A-5 in Appendix A6.1 in Volume 4 of this EIAR show the details of the changes in total traffic. The localised changes proposed to the road network as part of the development will result in changes across the network with increases in traffic at locations where vehicles are re-routing however there are also positive changes at other locations, where level crossings are closed such as Clonsilla, Porterstown, Coolmine. The likely effect of the development in the year 2028 is therefore considered to generally be *slight and moderate* with some *localised significant* effects.

The percentage change in all vehicle flows at junctions across the study area in the 2043 between 'Do Minimum' and 'Do Something' scenarios highlights that generally there is a positive change in traffic flows either on an approach or across the junction as whole especially when compared back with the 2028 flows. This illustrates that as time passes the provision of the proposed development will continue to have a positive impact and further reduce traffic flows at the junctions within the vicinity of the proposed development.

Specific reference was made to the change in Heavy Goods Vehicles (HGVs) on the road network in the operational phase due to the re-routing associated with the closure of the level crossing and to allow the impact during the operational phase to be determined. Due to this a percentage change assessment referencing the change in HGVs at junctions located within the assessment areas has been undertaken and is set out in Table A-6 and A-7 in Appendix A6.1 in Volume 4 of this EIAR for years 2028 and 2043 respectively, which highlights that there is generally a reduction in HGV movements, thereby providing a positive impact on the junctions within the vicinity of the proposed development.

The percentage change in HGV flows at junctions across the study area in the 2043 'Do Minimum' and 'Do Something' scenarios generally reduces therefore resulting in a positive impact on the road network. Where the growth shows very high increase proportions they relate to very small absolute numbers, therefore there is likely to be *negative slight* effects overall. This would suggest that economically important freight movements which serve to move goods are not significantly impacted by the level crossing closures giving the low volume currently using these routes.

6.5.2.5 Vehicular Routes

The proposed development is proposing to divert traffic flows at a number of locations. Table 6-13 details the total diversion route length, from one side of the closure around the next available route to the other side, which would only fully affect a very small number of trips. Most traffic diversions will be considerably shorter by about half the distance in the table below, as drivers will proceed on a different route to their destination.

Table 6-13 Operational Impact – Vehicular Diversion Route Length

Zone	Location	Diversion route length [km]
C	Ashtown	0.8km
C	Coolmine	3.4 – 5km
C	Porterstown	1.7km
C	Clonsilla	4.1 - 5.9km
E	Barberstown	1.3km
E	Blakestown	3.4km
E	Jackson's Bridge	2.5km

In all cases the total diversion route exceeds 500m, the likely effect on vehicular traffic is *negative moderate*. In addition to the changes in traffic flows and the routing as a result of the changes made to the road network, the journey times for vehicles on the network will be impacted upon. The information contained within the model has allowed a comparison to be identified between the Do Minimum and Do Something scenarios for a

number of locations along the length of the line with specific reference to those locations where changes to the level crossings are being made. The journey time routes are shown in Figure 6-24 and Figure 6-25, journey times and differences in journey times are set out in Table 6-14 and Table 6-15 below.

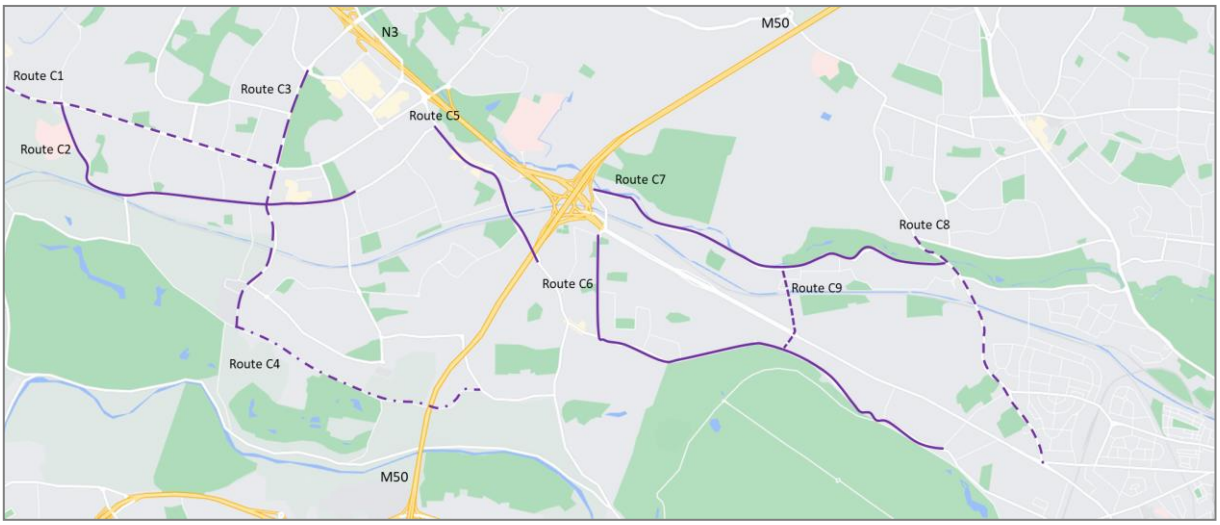


Figure 6-24 Journey time routes in Zone C

Figure 6-25 Journey time routes in Zone E

Table 6-14 Operational Impact - Change in Journey Time 2028

Route	Direction	AM Peak			PM Peak		
		Do Minimum	Do Something	% Change	Do Minimum	Do Something	% Change
Route C1	EB	06:07	06:09	1%	04:00	04:06	3%
	WB	06:16	04:38	-26%	04:58	04:10	-16%
Route C2	EB	06:29	06:18	-3%	05:45	05:33	-3%
	WB	07:56	05:47	-27%	06:24	05:40	-11%
Route C3	SB	05:02	04:44	-6%	05:51	05:33	-5%
	NB	04:14	04:52	15%	04:21	04:52	12%
Route C4	EB	03:49	03:49	0%	03:48	03:49	0%
	WB	04:24	04:27	1%	04:14	04:20	2%
Route C5	SB	09:46	07:53	-19%	08:23	07:01	-16%
	NB	08:14	06:54	-16%	08:57	04:40	-48%

Route	Direction	AM Peak			PM Peak		
		Do Minimum	Do Something	% Change	Do Minimum	Do Something	% Change
Route C6	EB	07:53	07:55	0%	27:08	27:03	0%
	WB	10:45	10:39	-1%	12:01	11:44	-2%
Route C7	EB	05:13	05:15	1%	05:20	05:12	-3%
	WB	05:03	05:02	0%	05:05	05:04	0%
Route C8	SB	04:57	04:56	0%	05:15	05:09	-2%
	NB	04:34	04:32	-1%	04:22	04:23	0%
Route C9	SB	03:34	00:58	-73%	04:16	00:57	-78%
	NB	03:25	01:04	-69%	03:17	01:04	-68%
Route E1	EB	08:39	08:40	0%	08:01	08:03	0%
	WB	08:45	08:42	-1%	10:00	10:08	1%
Route E2	SB	06:52	07:44	13%	05:55	06:39	12%
	NB	05:58	06:42	12%	13:06	13:36	4%
Route F1	EB	03:13	03:13	0%	02:48	02:48	0%
	WB	02:22	02:22	0%	02:50	02:51	1%

Table 6-15 Operational Impact - Change in Journey Time 2043

Route	Direction	AM Peak			PM Peak		
		Do Minimum	Do Something	% Change	Do Minimum	Do Something	% Change
Route C1	EB	07:58	09:00	13%	04:12	04:19	3%
	WB	07:57	05:10	-35%	05:19	04:23	-18%
Route C2	EB	08:05	08:32	6%	05:51	05:40	-3%
	WB	10:23	05:44	-45%	06:55	05:45	-17%
Route C3	SB	06:34	05:51	-11%	06:08	05:38	-8%
	NB	04:13	05:56	41%	04:26	04:59	12%
Route C4	EB	03:49	03:51	1%	03:49	03:49	0%
	WB	09:43	06:00	-38%	04:20	04:23	1%
Route C5	SB	24:00	22:40	-6%	09:10	04:18	-53%
	NB	27:11	12:12	-55%	13:06	08:07	-38%
Route C6	EB	08:01	08:29	6%	29:22	28:16	-4%
	WB	12:47	12:22	-3%	12:46	11:53	-7%
Route C7	EB	05:28	05:47	6%	05:30	05:25	-2%
	WB	05:02	05:02	0%	05:05	05:04	0%
Route C8	SB	04:57	04:54	-1%	05:14	05:13	0%
	NB	04:39	04:37	-1%	04:26	04:26	0%
Route C9	SB	03:46	00:58	-74%	04:22	00:58	-78%
	NB	03:30	01:05	-69%	03:20	01:04	-68%
Route E1	EB	09:17	09:24	1%	08:31	08:47	3%
	WB	09:20	09:10	-2%	10:52	11:16	4%
Route E2	SB	07:02	08:02	14%	05:59	06:44	13%

Route	Direction	AM Peak			PM Peak		
		Do Minimum	Do Something	% Change	Do Minimum	Do Something	% Change
Route F1	NB	06:37	07:11	9%	14:48	15:06	2%
	EB	03:18	03:21	2%	02:47	02:48	1%
	WB	02:25	02:25	0%	02:53	02:55	1%

Journey times along routes, where traffic flow is decreasing (Clonsilla Road, Ongar Distributor Road) would experience a reduction in journey time as a result of the level crossing closures and traffic diverting to other routes. Journey times along routes crossing the rail line are increasing already due to traffic growth, route C3 (Diswellstown Road) is significantly impacted in the northbound direction where journey time increases by 15% in the morning peak in 2028 and 41% in the morning peak in 2043. The speed on that route reduces by 4km/h in 2028 and by 10km/h in 2043 in the morning peak. Journey time on Route C5 along the Castleknock Road is reducing in the Do Something scenario in both years and both peak periods.

The Ashtown LAM Do Minimum scenario includes a level crossing as per existing layout, with barriers to close the road and allow the trains to pass, in Do Something the level crossing is closed and replaced by an underpass, which doesn't have the delays as in the existing road network. Journey times in the Ashtown area in Do Something scenario reduce slightly due to re-routing of some traffic from Ratoath Road and Dunsink Lane to the Ashtown Road, which has the delays associated with the level crossing closures removed in the Do Something scenario. Despite the increase in flows along the Ashtown Road the journey time along that route is reducing in the Do Something scenario.

The traffic modelling results illustrate that the potential effects of the proposed development during the operational phase would be *positive / negative*, *moderate* in nature with *localised significant* effects.

6.5.2.6 Impact on Public Transport – Bus

A review was undertaken of existing and future bus services within the study area to identify if any routes which would be disrupted due to the closure of the level crossings along the rail line. Table 6-16 details the routes currently passing through or in the future will be passing through the existing level crossings.

Table 6-16 Impact on Bus Routes

Zone	Existing Level Crossings	Current Affected Bus Routes	Future Affected Bus Routes
C	Ashtown level crossing	No Routes	No Routes
C	Coolmine level crossing	No Routes	No Routes
C	Porterstown level crossing	No Routes	No Routes
C	Clonsilla level crossing	239 Go-Ahead	L52 BusConnects
E	Barberstown level crossing	No Routes	No Routes
E	Blakestown level crossing	No Routes	No Routes

The table above shows that one existing and one future BusConnects bus route will be affected by the closure of the Clonsilla level crossing.

Currently, only route 239 operated by Go Ahead Ireland travels via the existing Clonsilla level crossing. The route is illustrated in Figure 6-26 below and operates from Blanchardstown Shopping Centre to Liffey Valley Shopping Centre via the Clonsilla level crossing. The service operates approximately once per hour throughout the day in each direction, with one service in each of the AM and PM peaks.

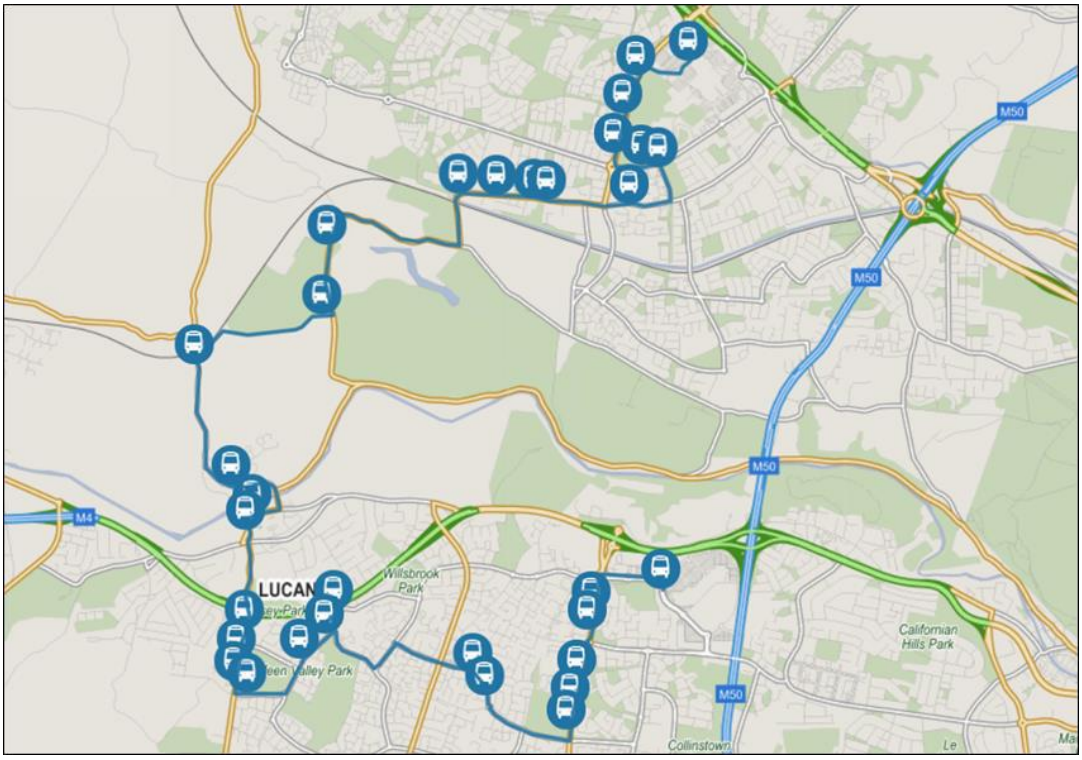


Figure 6-26 Go Ahead Ireland Route 239 (Transport for Ireland Journey Planner Map)

BusConnects will replace route 239 with route L52. Further detail on any diversion of bus routes as a result of the proposed development is set out in the TIA.

6.5.2.7 Impact on Public Transport – Rail

The operation phase of the proposed development will have a significant positive impact on the road network and the movement of people along the length of the line. The electrification will result in the ability for the line to accommodate a greater number of services and therefore a greater number of passengers therefore reducing the amount of vehicles on the local road network. The proposed changes to the existing level crossings will result in changes to traffic flows local to these areas.

It is appreciated that due to the increase in passengers this will result in an increased demand on the facilities at each of the stations and on the immediate highway network. The increase in passenger numbers at each station along the length of the line has been identified and set out in the following section.

The change in passenger numbers as a result of the proposed development at each of the station is set out in Table 6-17 for 2028 and Table 6-18 for 2043.

Table 6-17 Projected Growth in Passengers at each Station in 2028 in AM and PM Peak Periods

Zone	Station	2028			
		AM	PM	AM	PM
		Growth in Boarding's	Growth in Boarding's	Growth in Alighting's	Growth in Alighting's
A	Connolly	40	-220	-350	-20
A	Drumcondra	80	350	360	120
B	Spencer Dock	90	910	1510	190
B	Glasnevin	260	490	630	210
C	Broombridge	90	180	380	120

Zone	Station	2028			
		AM	PM	AM	PM
		Growth in Boarding's	Growth in Boarding's	Growth in Alighting's	Growth in Alighting's
C	Pelletstown	240	60	90	130
C	Ashtown	140	40	80	120
C	Navan Road Parkway	310	90	60	140
C	Castleknock	220	80	110	230
C	Coolmine	300	70	80	320
C	Clonsilla	240	50	60	240
D	Hansfield	70	10	10	80
D	Dunboyne	90	30	30	110
D	M3 Parkway	310	60	20	280
E	Leixlip Confey	70	20	40	80
E	Leixlip Louisa Bridge	160	60	40	230
E	Maynooth	150	50	20	-20

Table 6-18 Projected Growth in Passengers at each Station in 2043 in AM and PM peak periods

Zone	Station	2043			
		AM	PM	AM	PM
		Growth in Boarding's	Growth in Boarding's	Growth in Alighting's	Growth in Alighting's
A	Connolly	50	-170	-390	-20
A	Drumcondra	90	420	470	130
B	Spencer Dock	110	1140	1830	240
B	Glasnevin	290	600	810	250
C	Broombridge	140	390	440	140
C	Pelletstown	290	80	120	200
C	Ashtown	210	50	110	190
C	Navan Road Parkway	440	100	80	190
C	Castleknock	230	90	150	270
C	Coolmine	300	90	120	380
C	Clonsilla	300	60	90	310
D	Hansfield	90	10	10	120
D	Dunboyne	140	50	40	190
D	M3 Parkway	350	80	20	260
E	Leixlip Confey	110	30	50	120
E	Leixlip Louisa Bridge	320	80	50	380
E	Maynooth	230	40	20	-40

The proposed development will increase the capacities of existing trains serving these stations along with the general increase in frequencies. Table 6-19 presents the reduction in waiting time along each section of the rail line in the three hour morning peak period (between 7.00 and 10.00), in the morning peak hour (between 8.00-9.00), evening three hour peak period (between 16.00 and 19.00) and evening peak hour (17.00-18.00). Time savings at Spencer Dock were calculated by comparing waiting time at Docklands.

Table 6-19 Change in waiting time along each section of the rail line in minutes

Zone	Section		AM Peak Period	AM Peak Hour	PM Peak Period	PM Peak Hour
A	Connolly - Broombridge	Inbound	0	-15	0	0
		Outbound	-6	-10	-2	-10
B	Spencer Dock - Broombridge	Inbound	-27	-21	-27	-21
		Outbound	-51	-51	-51	-51
C	Broombridge - Clonsilla	Inbound	-6	-10	-6	-5
		Outbound	-8	-10	-6	-10
D	Clonsilla - M3 Parkway	Inbound	-9	-15	-9	-15
		Outbound	-20	-45	-20	-45
E	Clonsilla - Maynooth	Inbound	-11	-10	-5	-2
		Outbound	-12	-11	-6	-11

The increase in number of services on this rail corridor will have a *slight* to *moderate positive* impact on all passengers using the services as their waiting time will decrease in comparison with baseline. The waiting time at M3 Parkway for inbound services will decrease on average by 15 min in the morning peak hour and 9 min in the morning three-hour peak period. For passengers getting on at Maynooth the average waiting time will decrease by 10 min in the morning peak hour and by 11 min in the morning peak period. Highest reductions in waiting time will be achieved at Spencer Dock (comparison vs Docklands Station) where waiting time will be reduced by 51 min in all time periods. This is due to the number of trains increasing from 1 train per hour to 6 trains per hour.

Table 6-20 shows changes in total capacity for each section of the railway line in the three hour morning peak period (between 7.00 and 10.00), in the morning peak hour (between 8.00-9.00), evening three hour peak period (between 16.00 and 19.00) and evening peak hour (17.00-18.00).

Table 6-20 Changes in train capacity along each section of the rail line

Zone	Section		AM Peak Period	AM Peak Hour	PM Peak Period	PM Peak Hour
A	Connolly - Broombridge	Inbound	-220	1770	-90	50
		Outbound	4630	2990	2100	2990
B	Spencer Dock - Broombridge	Inbound	14090	5030	14090	5030
		Outbound	16180	6070	16180	6070
C	Broombridge - Clonsilla	Inbound	15910	7810	16030	6090
		Outbound	18770	8050	16240	8050
D	Clonsilla - M3 Parkway	Inbound	3880	1980	3880	1980
		Outbound	5960	3020	5960	3020
E	Clonsilla - Maynooth	Inbound	8380	4010	8510	2290
		Outbound	16460	6850	13930	6850

Negative changes at Connolly – Broombridge section relate to changes in vehicle types on that section of the rail line. The biggest increase along the western rail line is due to increase in services to Spencer Dock, from both M3 Parkway and Maynooth. The changes to the line in terms of increased capacity and reduced waiting times will likely result in *positive* effects for rail passengers.

6.5.2.8 Impact on Cyclists

The change in the passenger numbers as a result of the proposed development was derived from ERM Modelling, as was detailed in the previous section. To obtain the growth in number of cyclists an existing mode share split was applied from the Maynooth Corridor. It is expected that the current trend of mode split along this corridor will continue into the future. In the spring of 2020, 4% of passengers using train services along the Maynooth line were cycling to get to the station. Due to the development of the GDA cycle strategy cycle mode share in the future years was increased to 6%.

The growth in cyclist numbers as a result of proposed development at each of the stations is set out in Table 6-21 for both years 2028 and 2043.

Table 6-21 Projected Growth in Cyclists at each Station in 2028 and 2043

Zone	Station	2028		2043	
		AM	PM	AM	PM
		Growth in Cyclists	Growth in Cyclists	Growth in Cyclists	Growth in Cyclists
A	Connolly	3	0	3	0
A	Drumcondra	5	21	5	25
B	Spencer Dock	5	54	7	69
B	Glasnevin	15	30	17	36
C	Broombridge	6	11	8	24
C	Pelletstown	14	3	17	5
C	Ashtown	8	3	13	3
C	Navan Road Parkway	19	5	26	6
C	Castleknock	13	5	14	5
C	Coolmine	18	4	18	5
C	Clonsilla	14	3	18	3
D	Hansfield	4	1	5	1
D	Dunboyne	5	2	8	3
D	M3 Parkway	19	4	21	5
E	Leixlip Confey	4	1	6	2
E	Leixlip Louisa Bridge	10	4	19	5
E	Maynooth	9	3	14	3

The highest growth in cyclists are projected at Navan Road Parkway, Coolmine and M3 Parkway during morning peak period in 2028 and at Navan Road Parkway and M3 Parkway in 2043. The projected growth in cyclists should not limit the number of cycle parking spaces that should be provided at each station, the cycle parking provision should be maximised to encourage sustainable mode shift. Additional or new cycle parking is to be provided at Connolly, Spencer Dock, Ashtown and Coolmine stations. The level of additional / new cycle parking is sufficient to cater for the future demand due to the current underutilization of spaces. Usage of cycle parking at each of the stations along the length of the line will be monitored to ensure that demand for spaces does not exceed availability, and where possible additional spaces will be provided prior to issues with cycles locked to railings or other facilities occurs.

Table 6-22 shows distance and journey time for cyclists in the current network and with the proposed development. Where journey time was provided for existing level crossings the average waiting time at the level crossings was included in the below table.

Table 6-22 Operational Impact of Diversion Routes on Cyclists

Zone	Location	Current Distance [m]	Proposed Distance [m]	Current Journey Time [mm:ss]	Journey Time with Proposed Changes [mm:ss]	% Change in Journey Time
C	Ashtown	378	442	02:11	01:14	-44%
C	Coolmine	67	341	01:19	00:57	-28%
C	Porterstown	72	353	01:20	00:59	-26%
C	Clonsilla	77	303	01:21	00:51	-38%
E	Barberstown	471	719.5	01:19	02:00	53%
E	Deey Bridge Blakestown	520	3400	01:27	09:27	554%
E	Jackson's Bridge	400	2500	01:07	06:57	525%

The impact on cyclists at Ashtown, Coolmine, Porterstown and Clonsilla, is *positive*, as the proposed cycle crossing facilities are to be provided. At Barberstown, Blakestown and Jackson's Bridge the diversion routes are longer, however very small number of cyclists are currently using those bridges/crossings therefore the likely effects are considered to be *negative slight*. Overall, the likely effects on cyclists are *positive* due to improved facilities and reduced conflict with motorised vehicles improving safety.

6.5.2.9 Impact on Pedestrians

The increase in patronage at stations due to the proposed development will increase the footfall around the stations. Where existing level crossing closures are proposed, alternative footbridge crossings are proposed at every location except for Blakestown, where extremely low pedestrian activity was observed. The impacts of the proposals are detailed in Table 6-23. It shows distance and journey time for pedestrians in the current network and with the proposed development. Where journey time was provided for existing level crossings the average waiting time at the level crossings was included in the total journey time.

Table 6-23 Operational Impact of Diversion Routes on Pedestrians

Zone	Location	Current Distance [m]	Proposed Distance [m]	Current Journey Time [mm:ss]	Journey Time with Proposed Changes [mm:ss]	% Change in Journey Time
C	Ashtown	378	400	06:23	05:33	-13%
C	Coolmine	67	105	02:04	01:27	-29%
C	Porterstown	72	120	02:08	01:40	-22%
C	Clonsilla	77	127	02:12	01:46	-20%
E	Barberstown	471	719.5	06:32	10:00	53%
E	Blakestown	520	3400	07:13	47:13	554%
E	Jackson's Bridge	400	2500	05:33	34:43	525%

The likely effects on pedestrians at all existing level crossings is *positive*, as the proposed footbridges allow segregated crossing of the railway line for the pedestrians, as necessary. At Barberstown, Blakestown and Jackson's bridge the diversion routes are longer, however very small number of pedestrians are currently using those bridges/crossings therefore the likely effects are considered to be *slight* albeit *positive* for the majority of pedestrians.

The modifications proposed to the junction layouts in Ashtown and Blanchardstown areas as part of the proposed development allow for safe pedestrian crossings at all locations. Details are provided in the TIA, see Appendix A6.2 in Volume 4 of this EIAR. The improvements proposed will improve safety and reduce severance for pedestrians at these locations therefore providing an overall positive impact.

The level crossing closure at Blakestown will sever a number of dwellings along the L81206 and L5057 from access to the Royal Canal Greenway and access to bus stop No.3965 on the R148 Leixlip to Maynooth Road, however the diversion route, as shown in Table 6-23 is the longest and relates to a small number of dwellings. The diversion route via R449 and R148 has fully segregated pedestrian and cycle facilities therefore resulting in *neutral* effects as although it is slightly longer, the facilities provided along the alternative are considered to be positive as they provide a safe route.

The new bridge (OBG23A) proposed to the west of Jackson's Bridge as well as the realigned R149 to the north of the bridge and access road into the new depot will have pedestrian and cycle facilities, the realigned L5041 will have similar cross section as is currently provided. The provision of facilities for pedestrian and cyclists in this area will facilitate the use of alternative modes of travel to the new depot, potentially having a *positive* effect. This will provide safe facilities to encourage travel by these modes as well as reducing any severance caused at present by a lack of facilities.

6.6 Mitigation measures

6.6.1 Embedded Mitigation

6.6.1.1 Construction Phase

There are no embedded mitigation measures included in the assessment. All mitigation relating to construction is proposed and set out in the next section.

6.6.1.2 Operational Phase

The mitigation proposed for the operational phase of the development is embedded into the operational assessment and includes the changes to the existing level crossings located at:

1. Ashtown.
2. Coolmine.
3. Porterstown.
4. Clonsilla.
5. Blakestown.

A number of junctions which will experience an increase in traffic or change of traffic patterns due to the closure of Coolmine, Porterstown and Clonsilla level crossings have mitigation measures embedded into the design of the proposed development. The locations of proposed junction upgrades are shown in Figure 6-27.

Figure 6-27 Location of junction upgrades as part of Coolmine and Clonsilla Level crossing replacement works

The changes to Coolmine, Porterstown and Clonsilla level crossings will result in changes in traffic flows occurring at other locations on the local road network due to re-routing. However, the changes will provide improved facilities for pedestrians and cyclists using these routes and the reduction of conflict with motorised vehicles. The removal of vehicular trips at these locations will provide further space for the increase in passenger numbers. Increased provision for pedestrians and cyclists at these locations will also likely ensure that the space is available for passengers when travelling to and from the stations.

Further embedded mitigation includes the changes to the road network proposed as a result of the closure of the crossings, the change in mode share over the course of the assessment period, the increase in rail frequency and capacity. The embedded mitigation is considered sufficient to ensure that the proposed development has either a positive or negligible impact on the highway and sustainable transport network within the study area.

6.6.2 Proposed Mitigation

6.6.2.1 Construction Phase

Mitigation measures are proposed to be incorporated into the construction phase to minimise negative temporary effects. These are detailed in the TIA which sets out a number of mitigation measures which will be implemented during the construction period. The TIA is available in Appendix A6.2 Traffic Impact Assessment in Volume 4 of this EIAR. These will be implemented in order to mitigate any detrimental impact of construction vehicles on the surrounding highway network. Mitigation measures will include the following:

1. Use of sufficient clear signage to ensure that construction vehicles use only designated routes.
2. Routing of HGVs on main roads away from sensitive areas such as schools, residential areas, and areas sensitive in terms of air quality.
3. Time slots for bulk deliveries to ensure that convoys of vehicles do not arrive simultaneously.
4. Provision of holding spaces to avoid congestion on the local road network by waiting vehicles.
5. Coordination of abnormal large loads.

6. Scheduling of deliveries / collections away from peak hours, either before the AM peak or during the inter-peak daytime period.
7. Encouraging construction hours to avoid the AM and PM peak traffic period for construction workers.
8. On-site recycling of materials to reduce export and import vehicle movements, including stockpiling topsoil for landscape works, or crushing existing hard standing material for engineering fill.
9. Keeping the access routes clear of mud using a road sweeper.
10. Implementation of wheel washing facilities to prevent debris being deposited on the highway network.
11. Implementation of appropriate traffic management to ensure that construction of the site access junctions does not give rise to undue disruption.

A Mobility Management Plan will also be implemented to manage staff, to promote use of sustainable modes of transport for travel to and from compounds, encourage car sharing and limiting the impact of staff vehicles on the road network. Monitoring of parking associated with staff at the compounds and the roads in the vicinity of the compounds will be undertaken to ensure that the impact on road users and residents local to the compounds is minimised throughout the construction phase.

In addition, any impacts to the railway will be mitigated through reducing any shutdowns to outside of the peak travel, which will include temporary closures implemented at required locations overnight or over the weekends.

To ensure that impact on parking does not exceed that set out and remains the case throughout the construction period, Iarnród Éireann will continue to monitor the level of parking at all station car parks, as part of its annual car park surveys, such that any capacity issues or trends that arise can be identified early. If and when additional car parking capacity is required, Iarnród Éireann, working in collaboration with the National Transport Authority's Park and Ride Office, will implement a separate and site-specific car park project. Car parking spaces will be lost at M3 Parkway, Coolmine and Dunboyne for a short period during the construction programme, as construction compounds are proposed in these facilities.

The contractor will minimise the construction compound footprint throughout the construction programme and return the maximum number of car spaces back to public use.

6.6.2.2 Operational Phase

The embedded mitigation identified for the operational phase and set out in the previous section is considered sufficient to mitigate the potential effects of the proposed development.

6.7 Monitoring

Ongoing monitoring of the car and cycle parking provided at the stations will be undertaken to ensure that demand does not exceed capacity. Where demand for car parking exceeds capacity, a review of potential measures to encourage travel by alternative modes will be undertaken first and additional parking only provided where absolutely necessary. Additional parking is being considered by the NTA as part of their Park and Ride programme and an additional Park and Ride site at Collinstown or Maynooth is being considered. This would be brought forward in parallel to the Dart+ West Programme.

Further details related to the specific locations impacted can be found in the TIA, see Appendix A6.2 Traffic Impact Assessment in Volume 4 of this EIAR.

6.8 Residual effects

6.8.1 Construction Phase

The construction phase of the proposed development has been developed to minimise the impact on all users in its vicinity. The likely overall effects are considered to be *neutral and slight negative* and mitigation measures have therefore been proposed. These are summarised in Table 6-24 below.

Table 6-24 Summary of Residual Effects (Construction)

	Description of Change	Significance of Effect Without Mitigation	Mitigation / Enhancement Measure	Potential Residual Effects After Mitigation
Vehicle Traveller – Driver Delay	Limited increase in traffic on the surrounding road network during the highway peak hours.	Moderate Negative	*Implementation of a CTMP and Mobility Management Plan*	Slight Negative
Vehicle Traveller – Accidents & Safety	There were a number of accidents within the study area however none where significant patterns were identified	Neutral	*Implementation of a CTMP and Mobility Management Plan*	Neutral
Pedestrian & Cyclist - Severance	Closure of the level crossings and bridges	Moderate Negative	*Alternative routes and reopening of crossing facilities as quickly as possible*	Slight Negative
Pedestrian Delay	Closure of the level crossings and bridges	Slight to Moderate Negative	*Alternative routes and reopening of crossing facilities as quickly as possible*	Slight Negative
Pedestrian / Cycle Amenity	Closure of Public Right of Way and increase in traffic flows.	Slight to Moderate Negative	*Alternative routes and reopening of crossing facilities as quickly as possible*	Slight Negative
Fear & Intimidation	Low increase in HGV flows.	Neutral	*Implementation of a CTMP and Mobility Management Plan*	Neutral
Pedestrian & Cyclist Accidents & Safety	There were a number of accidents within the study area however none where significant patterns were identified	Neutral	*Implementation of a CTMP and Mobility Management Plan*	Neutral
Public Transport Users	Route changes will be required to bus service. Temporary closure of railway line for short periods of times	Moderate Negative	*Re-routing of buses and provision of rail replacement services*	Slight Negative
Car Parking	No additional parking is provided as part of the Proposed Development.	Slight negative	*Continual monitoring of the use of car parks at stations and the roads surrounding the site*	Neutral
Cycle Parking	Limited additional cycle parking is to be provided as part of the Proposed Development	Slight negative	*Continual monitoring of the use of cycle parking at the stations*	Neutral

6.8.2 Operational Phase

The proposed development has been developed to minimise the impact on all users in its vicinity. The overall impact is considered to be neutral and slight negative and mitigation measures have therefore been proposed. These are summarised in Table 6-25 below.

Table 6-25 Summary of Residual Effects (Operational)

	Description of Change	Significance of Effect Without Mitigation	Mitigation / Enhancement Measure	Potential Residual Effects After Mitigation
Vehicle Traveller – Driver Delay	Limited increase in traffic on the surrounding road network during the highway peak hours.	Slight Negative	*Increased rail services and capacity will reduce the number of vehicles on the network by increasing the attractiveness of the rail network over travelling by road*	Neutral
Vehicle Traveller – Accidents & Safety	There were a number of accidents within the study area however none where significant patterns were identified	Neutral	*N/A*	Neutral
Pedestrian & Cyclist Severance	Closure of the level crossings	Moderate Negative	*Provision of new crossing facilities*	Slight Positive
Pedestrian Delay	Closure of the level crossings	Moderate Negative	*Provision of new crossing facilities*	Slight Positive
Pedestrian / Cycle Amenity	Closure of Public Right of Way and increase in traffic flows.	Moderate Negative	*Provision of new crossing facilities*	Slight Positive
Pedestrian & Cyclist Fear & Intimidation	Low increase in HGV flows.	Neutral	*N/A*	Neutral
Pedestrian & Cyclist Accidents & Safety	There were a number of accidents within the study area however none where significant patterns were identified	Neutral	*N/A*	Neutral
Public Transport Users	Route changes will be required to bus service. Changes to the frequency and capacity of rail line. .	Neutral	*N/A*	Moderate Positive
Car Parking	No additional parking is provided as part of the Proposed Development.	Slight negative	*Continual monitoring of the use of car parks at stations and the roads surrounding the site*	Neutral
Cycle Parking	Limited additional cycle parking is to be provided as part of the Proposed Development	Slight negative	*Continual monitoring of the use of cycle parking at the stations*	Neutral

6.9 Cumulative Operational Effects

The combined impact of the totality of the operational phase of the proposed development is considered to be *long term, positive* and *moderate*.

The cumulative assessment of relevant plans and projects is undertaken separately in Chapter 26 of this EIAR.

6.10 References

Environmental Protection Agency, (May 2022), Guidelines on Information to be Contained in Environmental Impact Assessment Reports

Institute of Environmental Management and Assessment, (1994), Guidelines for the Environmental Assessment of Road Traffic

Transport Infrastructure Ireland, (May 2014), Traffic and Transport Assessment Guidelines

Department of Transport, Tourism and Sport and Department of Environment, Community and Local Government, March 2013, Design Manual for Urban Road and Streets (DMURS)

National Transport Authority, (2015), Permeability Best Practice Guide

National Transport Authority, (2011), National Cycle Manual

National Transport Authority, (April 2021), Park and Ride Strategy: Greater Dublin Area