Clifton Scannell Emerson Associates

Traffic & Transport Assessment Barnhill Garden Village

Client: Alanna Homes and Alcove Ireland Four Ltd

Date: 11th July 2022

Job Number: 19_121

CONSULTING ENGINEERS

Civil Engineering | Structural Engineering | Transport Engineering | Environmental Engineering | Project Management | Health and Safety

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Executive Summary

CSEA has been commissioned to prepare a Traffic and Transport Assessment (TTA) for a proposed mixed-use development at a site located in the Barnhill, Clonsilla, Dublin 15.

The proposed development will consist of the demolition of the existing vacant industrial buildings and the construction of 1,243 residential units, approximately 3,174 m2 of commercial and community facilities, and ancillary development. The commercial and community development will include:

- Creche of 942 m2 with capacity for approximately 210 children.
- Medical centre (GP / Dental practice) of approximately 344 m2 with 8 no. consulting rooms.
- Convenience retail unit of 370 m2
- Five independent retail / retail service units ranging in size from 57 m2 to 127 m2 sqm, with capacity to amalgamate some of the units, if required.
- A Café of 158 m2
- A Community Space of 359 m2. This multi-use space will be able to accommodate a range of activities, including for example multi-denominational worship, fitness classes, community meetings etc.
- An Office Hub of 501 m2. The office hub is designed to provide hot-desk and office support facilities to facilitate hybrid working.
- Provision of an access Plaza to Hansfield Train Station, including provision for a commuting bike storage area.
- Development of a cycle / pedestrian priority route along Barberstown Lane North (L-7010-0), with vehicle use restricted to local access only.
- Land set aside for a primary school to accommodate a minimum of 16 classrooms.

The residential units consist of a mix of unit types as detailed in Table 0.1. Buildings range in height from 2-storeys to 12-storeys.

Unit Type	No. of Units
1-bed Apartment	148
2-bed Apartment	589
3-bed Apartment	63
4-bed Apartment	4
1-bed Duplex	5
2-bed Duplex	20
3-bed Duplex	92
3-bed House	286
4-bed House	36
TOTAL:	1,243

Table 0.1 *Proposed Residential Units Mix*

The Proposed development has been designed to promote Active Travel and sustainable public transport trips in accordance with transport policy and the Climate Action Plan.

- The development is situated directly adjacent to the Hansfield Station which at the moment will have a high frequency/capacity rail service. Following implementation of Dart + west, the services on this station are expected to further improve.
- The walking and cycling network within the development is designed to promote active travel access to Hansfield Train Station, the Village Centre, proposed School site, public park, Royal Canal Greenway and surrounding Cycle and pedestrian routes on Ongar Barnhill Road and within Hansfield. This is achieved by the provision of many

pedestrian/cyclist only links throughout the development connecting to a Pedestrianised village centre street (except for Bus) and large pedestrian public plaza conecting to Hansfield Station. It is proposed that Barberstown Lane North will become a main pedestrian and cycle priority artery through the development, with vehicle use restricted to local access only.

- Vehicle traffic circulation at the Village Centre is restricted to promote active travel access to the school site, village centre and staion.
- The pedestrian, cycle and road network design has taken account of pre-planning comments by Fingal County Council, National Transport Authority and An Bord Pleanala.

Fingal County Council Development Plan 2017-2023 sets car parking standards as the ómormô in the case of residential, and maximum in the case of the commercial, in the context of Government policy aimed at promoting modal shift to more sustainable forms of transport. The proposed parking strategy for this development is in accordance with the *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities, December 2020 and the Fingal County Council Development Plan 2017-2023* Policies aiming to ñ*limit the number of car parking spaces at places of work and education so as to minimise car-borne commuting".* Bicycle parking meets or exceeds targets set in the *Development Plan*. Table 0.2 below sets out the car parking and cycle parking proposed for proposed development.

Car Parking	1,593 no. spaces, including 55 no. disabled spaces and 154 no. electric charging spaces. The spaces above will be distributed as follow: 742 spaces for 921 no. apartments/duplex; 615 spaces for 323 no. houses; and 236 no. spaces for visitors/commercials
Cycle Parking	3,337 no. spaces.

Table 0.2 *Summary of Parking Provision*

Due to the COVID-19 pandemic and related restrictions implemented by the Irish Government in December 2020, traffic volumes in the road network surrounding the site have significantly decreased. As a result, the existing flows in the road network do not represent a worst case scenario for traffic conditions in the local area. In light of this, and in order to determine baseline traffic conditions and provide a basis from which the future developmentôs traffic impact can be analysed, 2019 data has been used for the assessment.

The Blanchardstown Local Area Model was used a a baseline to assess the development traffic impacts. Traffic survey data, collected in February 2019 was then used to calibrate and validate the 2019 base LAM to ensure that they provide an accurate representation of the worse case scenario for traffic flow within the study area.

The road assignment within the Blanchardstown LAM is undertaken using the SATURN suite of modelling software. It allocates road users to routes between their desired origin and destination taking cognisance of aspects such as capacity constraints and traffic congestion

The choice data contained within East Regional Model and the Greater Dublin Area (GDA) Strategy was utilised as a base for developing the LAM, with additional network and zonal detail included to provide an enhanced representation of the road network, and route choice, in the study area. The road network was reviewed to ensure that it provides a robust and accurate representation of existing conditions.

Traffic models of critical junctions in the network have been developed to assess the developmentôs impacts to the operation of local road network. The industry standard ARCADY and LinSig traffic modelling software have been used for predicting the capacities, queues, and delays of these junctions.

The road network was modelled at both the AM and PM peak hour for a Do-Minimum and Do-Something. The development's impacts were assessed for the Year of Opening (YoO) which has been assumed to be 2025, Future Year 2030 (YO+5) and Horizon development 2040 (YoO+15).

The traffic modelling has included the following future roads to be delivered in the vicinity of the site:

- **Ongar-Barnhill Road scheme**, which is included in the Barnhill LAP and is to be delivered by FCC as part of their Section 48 programme. This Road link is expected to be Tender in Q3/4 2022 and to be completed by Q2/3 2024. This road is required in order to provide for a coherent sustainable movement and transport strategy and to maximise development capacity within the Barnhill LAP lands.
- **Kellystown Link Road**, this road is not required for the delivery of the proposed development, however it has been included to be able to take into account the traffic generation associated with Kellystown LAP. Pre-draft phase was initiated by Fingal County Council in mid-2019, and this road scheme has been presented to elected councillors.

The local road network will operate within capacity and at satisfactory levels during peak hours for all assessment years. Therefore, the impact of the proposed development is considered ***long-term***, ***neutral***, *and* ***imperceptible***.

During the construction stage, the impact of the proposed development is expected to be ***short-term, negative***, *and* ***not significant.***

1 Introduction

1.1 Overview

CSEA has been commissioned to prepare a Traffic and Transport Assessment (TTA) for a proposed mixed-use development at Site located in the Barnhill area South of Ongar Village, Clonsilla, Dublin 15. This TTA is accompanied by a Mobility Strategy, contained within a separate document.

This Report has been prepared by Carol Diaz-Rosario, *MSc., Beng,* Transportation Engineer with Clifton Scannell Emerson team, on behalf of the Client.

1.2 Site Location and Study Area

The proposed development site is located within the Barnhill Lands, approximately 4km west of Blanchardstown. Figure 1.1 and Figure 1.2, below, sets out the sites location in relation to the local road network. The subject site is currently, for the most part, in agricultural use.

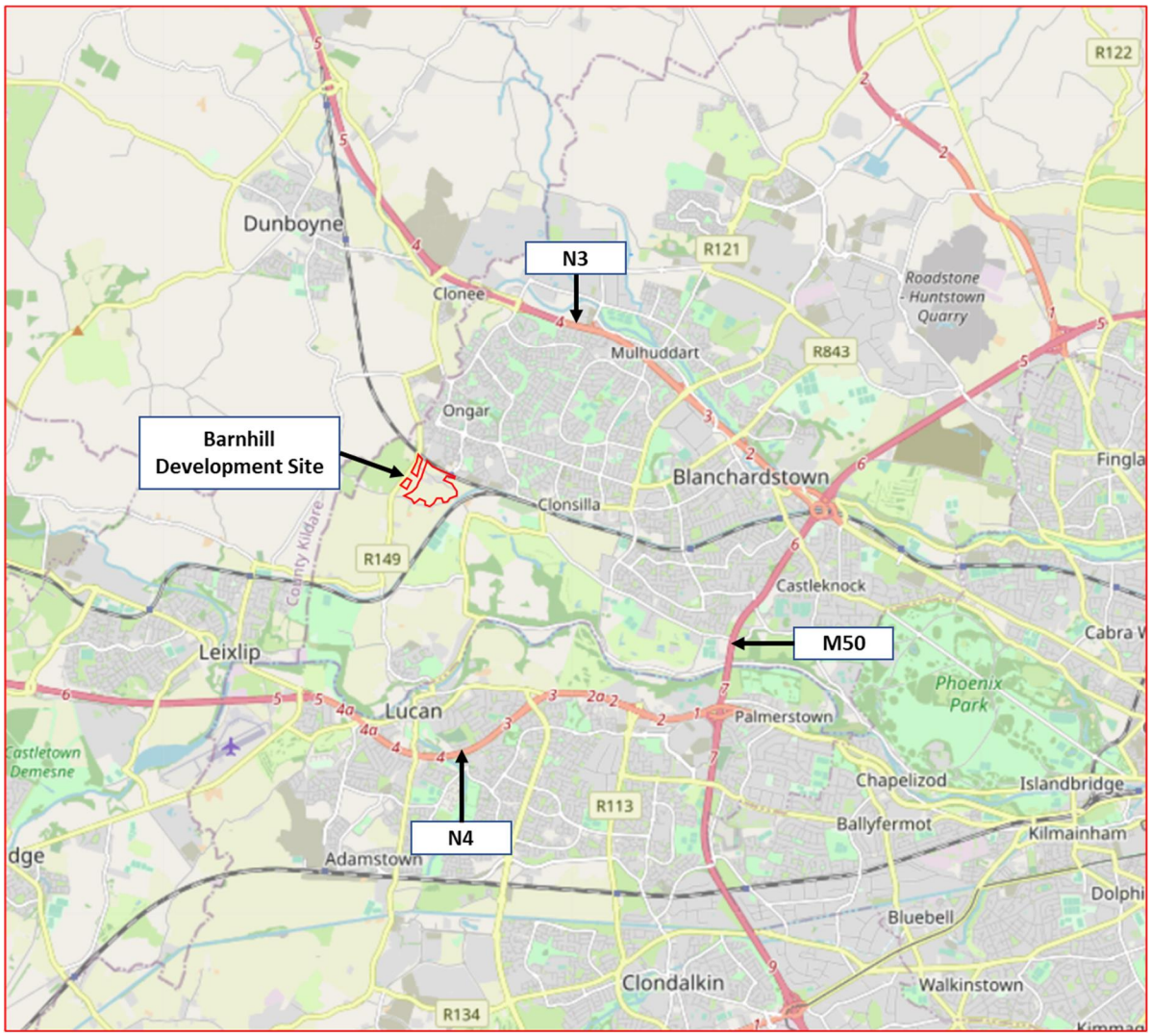


Figure 1.1 *Strategic Site Location (Indicative Red Line Boundary)*

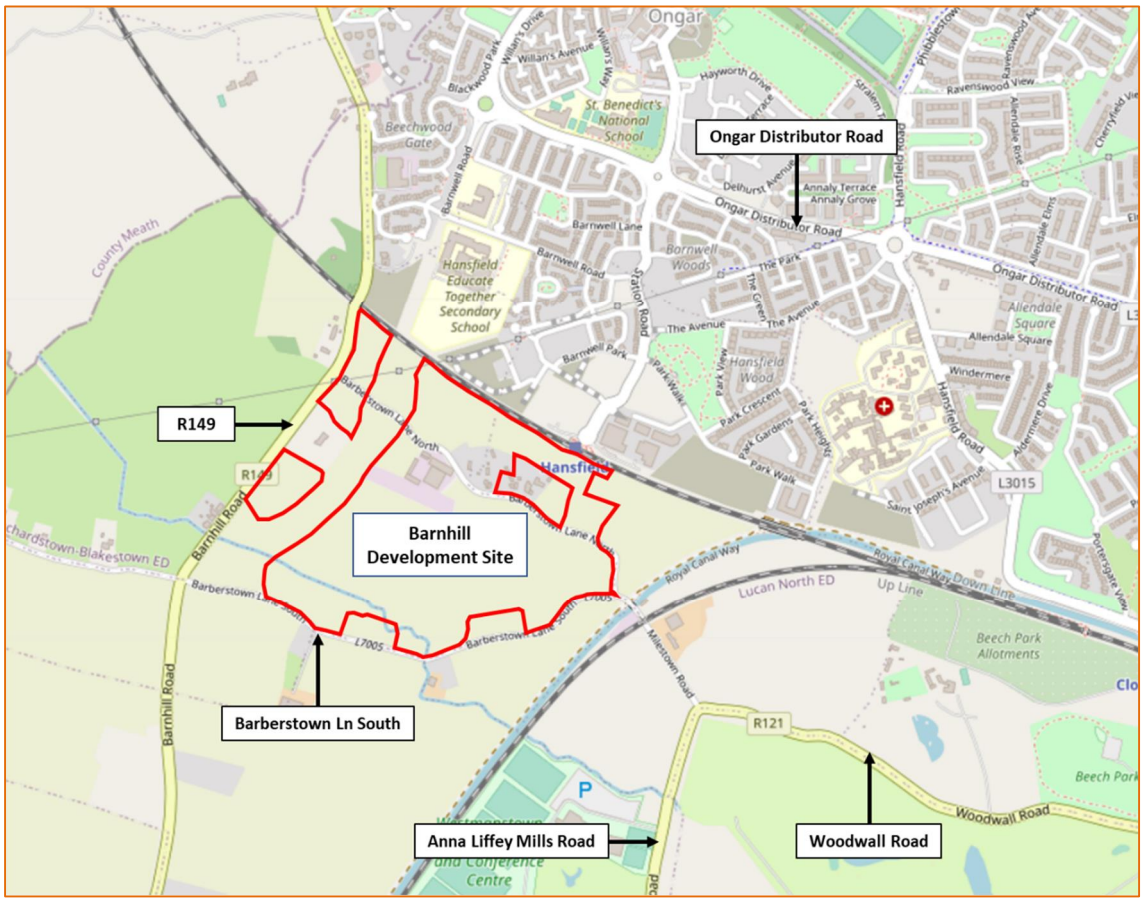


Figure 1.2 *Site Location in Relation to Local Road Network (Indicative Red Line Boundary)*

1.3 Overview of Proposed development

The proposed development will consist of the demolition of the existing vacant industrial buildings and the construction of 1,243 residential units, approximately 3,174 m2 of commercial and community facilities, and ancillary development. The commercial and community development will include:

- Creche of 942 m2 with capacity for approximately 210 children.
- Medical centre (GP / Dental practice) of approximately 344 m2 with 8 no. consulting rooms.
- Convenience retail unit of 370 m2
- Five independent retail / retail service units ranging in size from 57 m2 to 127 m2 sqm, with capacity to amalgamate some of the units, if required.
- A Café of 158 m2
- A Community Space of 359 m2. This multi-use space will be able to accommodate a range of activities, including for example multi-denominational worship, fitness classes, community meetings etc.
- An Office Hub of 501 m2. The office hub is designed to provide hot-desk and office support facilities to facilitate hybrid working.
- Provision of an access Plaza to Hansfield Train Station, including provision for a commuting bike storage area.
- Providing for pedestrianisation / cycle way along Barberstown Lane North (L-7010-0), with vehicle use restricted to local access only.
- Land set aside for a primary school to accommodate a minimum of 16 classrooms, to be delivered by the department of education.

The residential units consist of a mix of unit types as detailed in Table 1.1. Buildings range in height from 2-storeys to 12-storeys.

Unit Type	No. of Units
1-bed Apartment	148
2-bed Apartment	589
3-bed Apartment	63
4-bed Apartment	4
1-bed Duplex	5
2-bed Duplex	20
3-bed Duplex	92
3-bed House	286
4-bed House	36
TOTAL:	1,243

Table 1.1 *Proposed Residential Units Mix*

A detail description of the proposal, including unitsôbreakdown, proposed road network, and parking provision is presented within section 6 of this Report.

The proposed development has been designed in accordance with national best practice, namely the *Design Manual for Urban Roads and Streets* (*DMURS*) and the *Design Standards for New Apartment, Guidelines for Planning Authorities,* and the *Climate Action Plan*

1.4 Scoping

Several pre-planning meetings were conducted with Fingal County Council Transportation Department and An Bord Pleanála in relation to the scheme. The comments provided by the representatives in relation to the road design and transport assessment are presented below. The relevant sections addressing the comments are included in the following Table 1.1.

ABP/Council Comment	Report Section Addressing Comment
The proposed Road Hierarchy in terms of road widths and function would be in accordance with the principals of the LAP and the Design Manual for Urban Roads and Streets.	Section 6.12.4 Drawings Included in CSEA Drawing Pack
Cul-de-sacs should not dominate residential layouts and networks should be based on layouts where all streets lead to other streets.	Section 6.12 Roads have been designed to always be connected for pedestrian and cyclists, but not always vehicles
Creating a new Cul-de-Sac on Barberstown Lane North is needed by the provision of the Ongar Barnhill Road. An extinguishment or Right of Way will be required as part of the provision of new road infrastructure.	An extinguishment of right of way is necessary for the Ongar Barnhill Road scheme which is being delivered by Fingal County Council. This

ABP/Council Comment	Report Section Addressing Comment
	will be undertaken by FCC as part of the road scheme prior to the commencement of the Barnhill development. As part of this application, it is proposed to make the remaining section of Barberstown Lane North a pedestrian and cycle priority, with vehicle use restricted to local access only. See Section 6.13.
Further Discussion in relation to the details of pedestrian and cyclists' connectivity is required with respect to the R149 and access to the North-South Ongar Barnhill Road.	Section 6.12.1 Drawings Included in CSEA Drawing Pack
Additional Detail is required in relation to the design of the pedestrian and cyclists' connection in the scheme. Transition points between the shared pedestrian and cycle facilities and the proposed road network requires further consideration and detail. Similarly, the transition from the on-road cycle lanes to the off-road shared pedestrian and cycle require further analysis and details should be provided.	Section 6.12.1 Drawings Included in CSEA Drawing Pack
The shared pedestrian/cyclists' facilities would be 3.0 metres which is the minimum in order to provide high quality facilities, it is desirable to exceed the minimum.	Section 6.12.1 Drawings Included in CSEA Drawing Pack
Revision of cycle lane and footpath width.	Section 6.12.1 Drawings Included in CSEA Drawing Pack
Seating and cycle parking facilities shall be provided as an integral part of the design, particularly in the vicinity of the train station plaza.	Cycle parking facilities are addressed in Section 6.15.2. For Details on Seating areas please refer to Landscape Drawings submitted within the Planning Pack.
Further Detail is required in to maintaining access to the existing houses and providing for cyclists and pedestrian while maintaining the rural nature of the road.	Section 6.13.1

ABP/Council Comment	Report Section Addressing Comment
The Podium and basement parking areas should be designed in accordance with the requirements of the latest edition of the "Design Recommendations for Multi-storey and underground Car Parks."	Please refer to basement layouts drawings submitted within the planning pack
A Swept Path analysis of the most onerous parking Spaces should be provided.	Drawings Included in CSEA Drawing Pack
Justification for reduced car parking should be supported by a detail assessment of modal split and car ownership trends. Commercial parking quantum should be identified.	Details have been provided within the Mobility Strategy submitted with the Planning Pack.
Greater clarity on the parking breakdown to serve the commercial units, future school, and childcare facilities should be provided in order to assess the proposed parking provision. The provision of commercial parking also requires further consideration in respect of the dominance of surface parking.	A breakdown of the car parking allocation is provided in section 6 for each character area
In relation duplexes, and apartments, parking layouts should include a drawing/schedule indicating the residential parking spaces and visitor parking spaces that are to be associated with each block of apartments/duplexes relating to the number and type of apartments/ retail and creche to be provided.	A breakdown of the car parking allocation is provided in section 6 for each character area Please refer to layoutsô drawings submitted within the planning pack for further info.
The provision of EV and E-bike parking should be addressed in detail.	Section 6.15.2
Details of the set-down arrangements for the childcare facilities and primary school must be provided. The design of the set-down should avoid the need for reverse manoeuvres in the immediate vicinity of the childcare facilities; ensure that turning manoeuvres are eliminated and set down could be self-regulating.	Sections 6.14
Clarification on Staff parking provision for childcare is needed.	Sections 6.5.2
The application should provide further detail to ensure that the proposed layout around the school complies with the design fundamental for front of school environments and that 'school streets' can be accommodated.	Sections 6.14 Pedestrian, Cycle and Bus only Street in Village centre at school access.

ABP/Council Comment	Report Section Addressing Comment
	Carpark for Public Park also to allow for Park and stride to school
Bicycle parking should be of high standard with parking for each unit provided in a secure compartment. Stacking of bicycles can be provided if it is practicable accessible. Individual lockers for each unit would be required.	Please refer to drawings submitted with planning pack specifying the cycle parking locations
A dimensioned layout showing the particular house unit, car parking, cycle parking, and bin storage units should be provided to ensure that there is circulation room for pedestrians.	Please refer to drawings submitted with planning pack
Clarification on Car parking Calculation is needed.	Section 6.15.1
Clarification in relation to individual lockable cycle storage for apartments should be detailed and the provision of space for cargo bikes.	Sections 6.15.2
Clarification on the access to cycle storage facilities should be provided and the most direct accessible from the public road or from a shared area that gives direct access to the public road avoiding unnecessary long access route with poor passive security or slopes that can become hazardous in winter weather.	Please refer to drawings submitted with planning pack specifying the cycle parking locations and basement layouts
A detail TTA would require as part of the EIAR. Further discussion is required in relation to the modelling process and the additional modelling scenarios which would be required to be assessed.	Section 9
The developer will be required and facilitated by the councils to work together with the bus transport providers and the NTA to improve bus services to the area.	Details to be clarify after obtaining planning permission
Swept path analysis of traffic movements within the proposed development particularly the cul-de-sac areas that account for service vehicles and emergency vehicles should be provided. Car should be taken to ensure that the turning paths do not overrun parking areas, footpaths, or areas of public space.	Drawings Included in CSEA Drawing Pack
Further consideration of the documents and justification for the proposed development having regard to the dependency of the development on the delivery of the proposed Ongar-Barnhill Road. The application should identify the timetable for completion of such infrastructure and responsibility for the funding and completion of works in this regard. The provision of such infrastructure should be clearly identified as part of the phasing strategy for the development of these lands.	Ongar Barnhill Road to be completed by FCC Timeframe: Tender Q3/4 2022 Completion Q2/3 2024

ABP/Council Comment	Report Section Addressing Comment
	Funded By FCC as part of their roads programme. Section 2.5
Further clarification and elaboration of the documents as they relate to the proposed pedestrian connection to Hansfield train station. In this regard, specific and detailed design proposals should clearly demonstrate how the development will deliver a high-quality public realm and accessibility for the public both to the station and across the railway to lands in Hansfield to the north. Evidence of the consent of the railway authorities to proposals in this regard should accompany the application6.17	Section 6.12.2
Detailed proposals for the phased development of these lands. Such phasing proposals should clearly identify the road and public transport to be delivered with each phase of residential development.	Section 6.17
Consideration should be given to a more direct connection from the western end of the proposed greenway (Barberstown Lane North) to the pedestrian and cycle infrastructure to be provided on the new Ongar-Barnhill Road	Section 6.12.1 Connection to be provided to Ongar Barnhill Road facilities via stairs provided under FCC scheme including cycle ramp to walk bikes up. The Ongar Barnhill Road is on a high embankment at this point to facilitate the Rail crossing. Detail Drawings illustrating the connection are included in Planning Pack
A detailed Traffic and Transportation Impact assessment. The assessment should clearly describe the scenarios assessed and the traffic distribution considered therein. All assumptions should be clearly stated. The assessment should have regard to existing constraints on the road network to the east of the site, including the capacity of Pakenham Bridge and Barberstown level crossing, and any phased improvements to the road network in the area.	A description of the methodology is presented within Section 2 The Traffic Modelling Results are discussed within section 9 The traffic levels at the Level crossing are shown for each scenario with and without development

ABP/Council Comment	Report Section Addressing Comment
A Quality Audit in accordance with Advice Note 4 of DMURS, including a road safety audit.	Section 7
A Travel Plan / Mobility Management Plan, which should clearly identify targets for modal split and consider the availability of bus and rail services, and any required improvements to such services, to achieve these targets. The application should describe any engagement which has taken place with the NTA / bus providers in relation to this development.	A Mobility Strategy has been submitted with the Planning Pack.
A detailed description of car and cycle parking provision across the development, including the allocation of spaces. The quantum and design of cycle parking should accord with the provisions of the Apartment Design Guidelines and with the provisions of the National Cycle Manual and DMURS. This should include a level of commuter cycle parking adjoining Hansfield train station.	Section 6.15.2 for cycle parking provision across the development and Section 6.4.3 for details on Commuter Cycle Parking at Hansfield Station.
Clarification with regard to proposed pedestrian and cycle routes on the western side of the proposed Barnhill-Ongar Road at Parkside, as indicated in the submitted Design Statement.	Section 6.12.1 Drawings Included in CSEA Drawing Pack
An existing cross section proposed, and future proposed cross section should be provided for Barberstown Lane North.	Section 6.13

Table 1.1 *FCC and ABP Pre-Planning Comments*

The transport elements of the proposal have been designed in accordance the comments mentioned in the above table. The methodology utilised for the assessment presented within this Report have been based on the comments from FCC transport pre-planning comments.

2 Assessment Methodology

2.1 Local Area Model (LAM)

As part of the Maynooth Line Transport Study commissioned by the NTA, a Local Area Model (LAM) was developed covering the area bounded by the N3, N4 and M50 as illustrated in Figure 2.1.

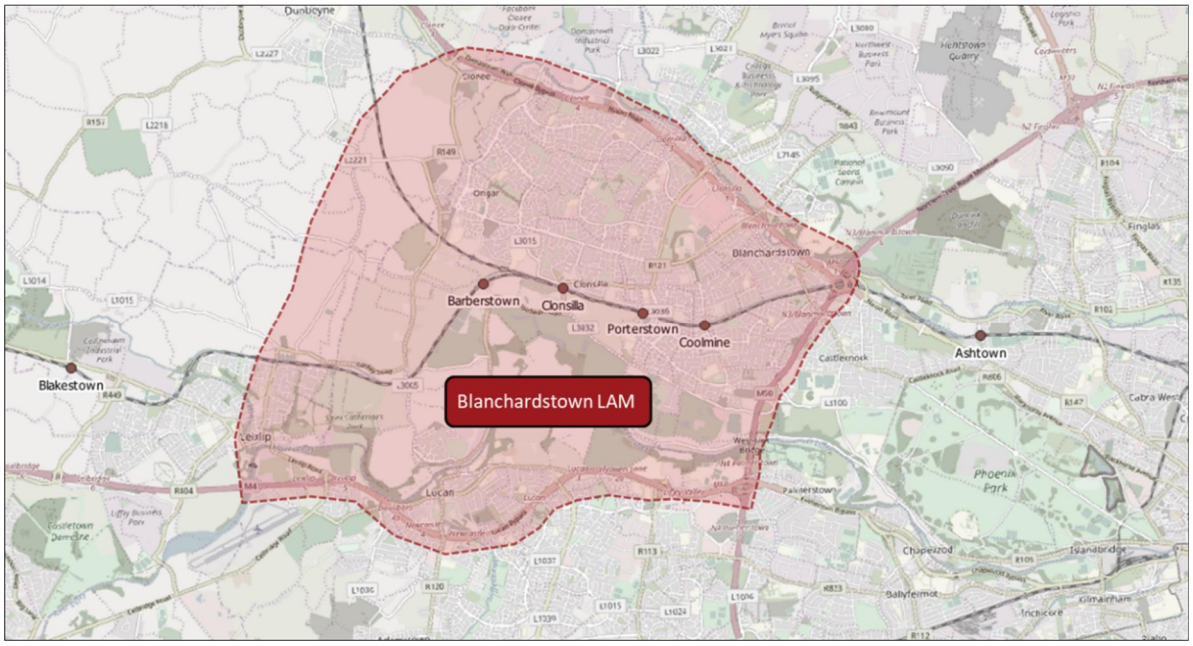


Figure 2.1: *Local Area Model Boundary*

Due to the COVID-19 pandemic and related restrictions implemented by the Irish Government in December 2020, traffic volumes in the road network surrounding the site have significantly decreased. As a result, the existing flows in the road network do not represent a worst case scenario for traffic conditions in the local area. In light of this, and in order to determine baseline traffic conditions and provide a basis from which the future development's traffic impact can be analysed, 2019 data has been used for the assessment.

Traffic survey data, collected in February 2019 (see section 2.2 for details), was used to calibrate and validate the 2019 base LAM to ensure that they provide an accurate representation of worse case scenario traffic flow within the study area.

The East Regional Model (Further discussed in section 2.7.1 of this Report) was utilised as a base for developing the LAM, with additional network and zonal detail included to provide an enhanced representation of the road network, and route choice, in the study area. The road network was reviewed to ensure that it provides a robust and accurate representation of existing conditions.

The Blanchardstown LAM was calibrated and validated in accordance with *Transport Infrastructure Ireland's (TII) Project Appraisal Guidelines (PAG) for National Roads Unit 5.1 – Construction of Transport Models (October 2016)* and has been shown to meet all specified criteria for both the AM (08:00-09:00) and PM (17:00-18:00) peak hours

LAM Road Assignment

The road assignment within the Blanchardstown LAM is undertaken using the SATURN suite of modelling software. It allocates road users to routes between their desired origin and destination taking cognisance of aspects such as capacity constraints and traffic congestion.

2.2 Baseline Traffic Counts

The Blanchardstown Local Area Model has been used as a baseline to assess the development traffic impacts. This model utilised traffic survey data collected in February 2019 to gain an understanding of existing traffic conditions within the study area, and to assist in calibration and validation of the base year local area models. TRACSIS were commissioned to undertake the following surveys:

- Automatic Traffic Counts (ATC) at 35 location;
- Origin-Destination Surveys by automatic number plate recognition (ANPR) at 12 locations on 5th February 2019;
- Pedestrian and Cyclist counts at 2 locations; and
- Junction Turning Counts (JTC) at 48 locations;

This data was supplemented with counts undertaken in the study area in May 2018 by Fingal County Council (FCC), and journey time information on key routes extracted from a database of Satellite Navigation data housed within the NTA. The following sections of this chapter provide information on each of the surveys outlined above including site locations and observed results.

Automatic Traffic Counts (ATC)

Automatic Traffic Counts (ATCs) were undertaken at 35 locations across the network, as illustrated in Figure 2.2, over a 3-week period from Monday 28th January to Sunday 14th February 2019. The ATC data provides information on:

- The daily and weekly profile of traffic within the study area;
- Busiest time periods and locations of highest traffic demand on the network;
- Any issues on the network during the survey period i.e., accidents, road closures etc.; and
- Typical speed of traffic on the network.

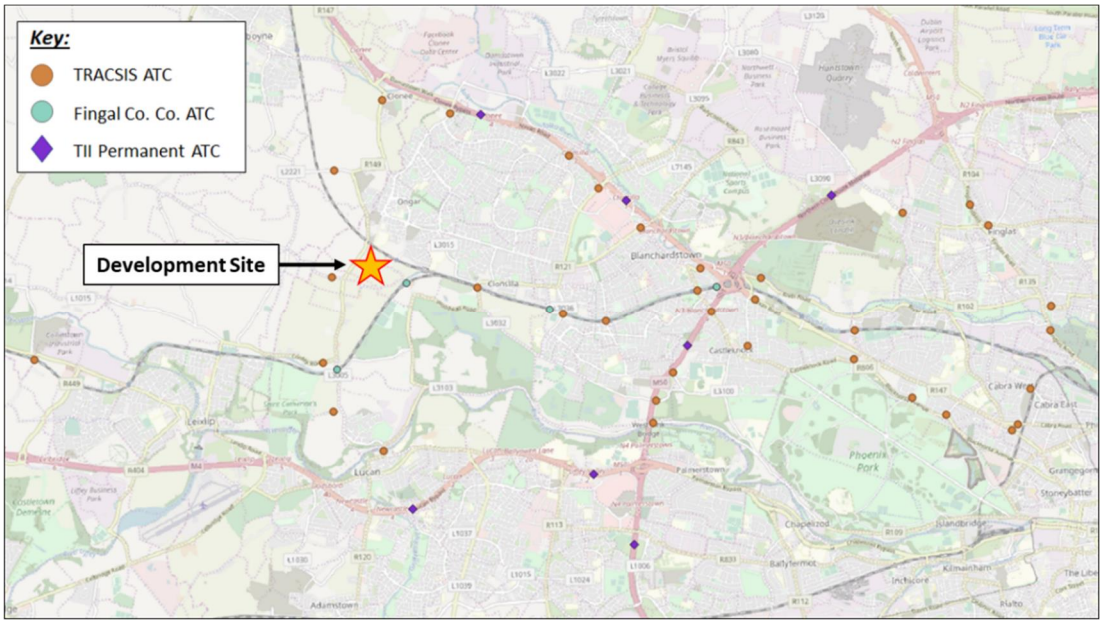


Figure 2.2: *Survey Locations*

2.3 Assessment Years and Scenarios

2.3.1 Assessment Years

The following assessment year has been taken into consideration in the analysis:

- 2019: Baseline Year
- 2025: Developmentôs Year of Opening (YoO)
- 2030: Future Year, YoO+5
- 2040: Horizon Year YoO+15, in line with the National Transport Authority 2040 planning sheet and East Regional Model.

2.3.2 Assessment Scenarios

A ôDo-Minimumô scenario and a ôDo-Somethingô scenario have been assessed to understand the proposed developmentôs impact to the local road network. These scenarios can be described as follow:

- Do-Minimum: This scenario will establish the performance of the road network with background traffic conditions and without the proposed development. The Blanchardstown Local Area Model have served as basis for this scenario. This scenario takes into consideration include all future planned road network discussed in section 2.4, all improvements to the public transport infrastructure proposed as part of BusConnect, Dart + West, and the Cycle Network Plan (see section 5), and the traffic associated with the Hansfield SDZ, and Kellystown LAP lands.
- Post Development/Do-Something Scenario: The with-development or ôdo-somethingô scenario represents traffic conditions following completion of the proposed development, i.e., do-minimum plus additional traffic generated by the proposed development.

The models assessed the AM peak and PM Peak, which have been determined to be 08:00-09:00hrs and 17:00-18hrs, respectively.

2.4 Future Road Network Assumptions

The assessment will take into consideration the road schemes planned in the vicinity of the development site. These are:

- **Ongar-Barnhill Road scheme**, which is included in the Barnhill LAP and is to be delivered by FCC as part of their Section 48 programme. This Road link is expected to be Tender in Q3/4 2022 and to be completed by Q2/3 2024. This road is required in order to provide for a coherent sustainable movement and transport strategy and to maximise development capacity within the Barnhill LAP lands.
- **Kellystown Link Road**, this road is not required for the delivery of the proposed development, however it has been included to be able to take into account the traffic generation associated with Kellystown LAP (to establish a worst case scenario for traffic flows in local network). Pre-draft phase was initiated by Fingal County Council in mid-2019, and this road scheme has been presented to elected councillorswhich is included in the draft Kellystown LAP.

Figure 2.3 (overleaf) sets out the location of these roads in relation to the proposed development site.

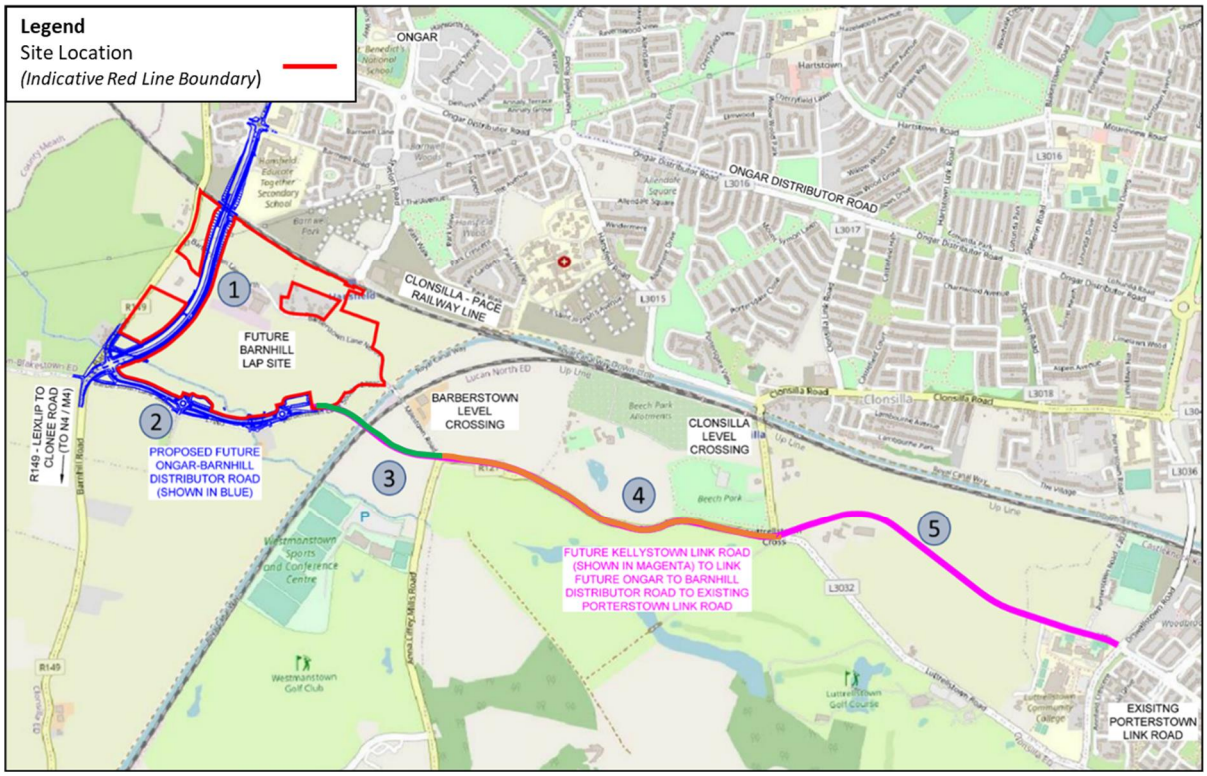


Figure 2.3: *Future Road Network (Indicative Red Line Boundary)*

The main components of these two road schemes, as numbered in Figure 2.3, are outlined below:

1. **Ongar - Barnhill North-South Link Road** ï a dual carriageway distributor road approximately 1.16km long extending from the Ongar Road roundabout in a south-westerly direction to tie into the existing R149 just south of Barberstown Lane South. This road will be delivered by Fingal County Council and is due to be tendered in Q3 2022 with view to start construction in Q1 2023, and finalise in Q2/Q3 2024. Fingal County Council will initilaly build this scheme as a single carraigeway and Construct the rail bridge to facilitate Dual carriageway. The reservation for the second carraigeway will be landscaped as agreed with FCC Parks Department.
2. **Upgrade of existing Barberstown Lane South** ï Barberstown Lane South will connect to the proposed Ongar-Barnhill North-South Link Road via a proposed new signalised junction, to replace the existing crossroads at the R149/Barberstown Lane junction. Upgrade of 650 metres to a single carriageway is proposed in an easterly direction along the existing link between the R149 & the R121 towards Pakenham Bridge.
3. **Barberstown Bridge** - located adjacent to the existing Barberstown railway level crossing and provides a grade separated crossing over the Royal Canal and Railway line when the existing level crossing at Barberstown is closed as part of the DART Expansion Programme. The bridge connects to the Part 8 approved Barberstown Lane South Upgradeôon the west side and to the Kellystown Road proposal ï West of Clonsilla Stationôon its east side. This scheme is to be delivered by Irish Rail under Dart + west and is due to be lodged with An Bord Pleannala in the coming months and funded by NTA.

4. **Kellystown Road –** West of Clonsilla Station. This road would connect to the road leading from the Barberstown level crossing/ the proposed new Barberstown Bridge at its west end at a point where the existing R121 turns through a 90 degree angle to change alignment from north-south to east-west. It would connect to the ôKellystown Road- East of Clonsilla Stationõ at its east end. The proposed Kellystown Road ï West of Clonsilla Station would run parallel to the existing R121. The R121 is not suitable for high volumes of traffic due to its winding alignment and the proposed new road would provide a safer alternative route inluding pedestrain and cyclist facilities.
5. **Kellystown Road** ï East of Clonsilla Station ï road proposal is shown on the FCC development plan and Kellystown LAP. It connects to the north-south section of the R121 (at a point approximately 100 south of the Clonsilla Level crossing)/ future proposed Kellystown Road ï West of Clonsilla Station at its west end. From here it continues east and runs approximately parallel to the Porterstown Road and connects to the recently completed Porterstown Link Road at a point adjacent to and north of Scoil Choilm Community National School at its east end. This section of road is expected to accommodate the Kellystown LAP traffic. Figure 2.3 (overleaf) shows the location of these road proposal in relation to the proposed development site.

For the network traffic modelling and traffic assignment, the following assumptions are proposed in relation to the timeframe for the delivery of these roads.

- 2025 Year of Opening: Roads 1 and 2, as per Figure 2.3, will be in place.
- 2030 (YoO+5): Roads 1, 2, and 5 will be in place.
- 2040 (Horizon Year): Roads 1, 2, 3, 4, and 5 will be in place. Barberstown Level Crossing and Clonsilla Level Crossing will be closed.

2.5 Proposed Ongar-Barnhill Road

The future Ongar-Barnhill Distributor Road is to be constructed to provide access to the Barnhill LAP development and provide an additional road crossing of the Railway Line that will allow for other level crossings to be closed to facilitate Dart + west. The scheme is on the FCC Road Construction Programme and will be completed prior to the commencement of the proposed development.

The Ongar to Barnhill Distributor Road Scheme is expected to commence construction in early 2023 and be complete in mid-2024 Tenders are currently prepared and Tender issue is imminent. The bridge agreement between FCC and Irish Rail is signed off.

The main section of this future road shall connect to the existing Ongar Distributor Road roundabout located to the north of Hansfield and the Barnhill LAP development site. From here, the proposed road shall run in a southerly direction across the existing Clonsilla ï M3 Parkway Railway Line by means of a new railway overbridge and connect to Barberstown Lane South and the existing R149 regional road by means of a new signalised junction. This scheme will also include the realigned upgrade of the Barberstown Lane South Road, complete with the 2 no. National Cycle Manual design roundabouts which will provide access to the Barnhill LAP development. The Barberstown Lane South Road will be upgraded to just after the 2nd roundabout access to the Barnhill LAP site where it shall tie back with the existing Barberstown Lane South Road. A booklet of drawings for the scheme are included in the planning pack.

The abovementioned scheme will also facilitate the Dart+ West Scheme which includes a new bridge from the end of the Barberstown Lane South realignment over the Dublin to Maynooth Railway Line and the Royal Canal which will allow for the future closure of the existing Barberstown Level Crossing.

The Ongar to Barnhill Distributor Road Scheme shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill LAP development for the purposes of the EIAR.

2.6 Proposed Development Occupancy Data Assumptions and Trip Generation

The total number of trips that will access/egress the development during the peak hours have been estimated using a combination of the NTAôs National Demand Forecasting Model (NDFM) and the East Regional Model (ERM). The NDFM is a single national system that provides estimates of the total quantity of daily travel demand produced by, and attracted to, each of the Census Small Areas. Trip generations and attractions are related to zonal attributes such as population, number of employees and other land-use data. The NDFM provides input into the regional models and interacts with a number of key regional model components and utilises planning data to output levels of travel demand at the smallest available spatial aggregation (Census Small Area) for input into each of the Regional Models.

The following general assumptions have been used for estimating land use occupancy within the Barnhill LAP lands that were used as input in the model:

- Population:
  - 2.0 persons per 2- bed apartments
  - 2.4 persons per 3- beds apartments
  - 2.8 persons for all non-apartment units
- Education: 28 pupils per primary school classroom
- 230 children per 900m2 creche
- Employment: 1 employee per 50m2 retail or commercial space

The assumptions on population, employment and education were fed into the NDFM which includes trip rates for various journey purposes and is used to generate overall 24-hour travel demand. This demand was then fed into the ERM which undertakes mode and destination choice and generates travel demand to/from every zone for the peak hours.

The assumptions presented above have been based on the demographic and land-use estimates, including population and levels of employment and education, contained in the NTAôs 2040 planning sheet for testing the GDA Strategy, and the Census 2016 data.

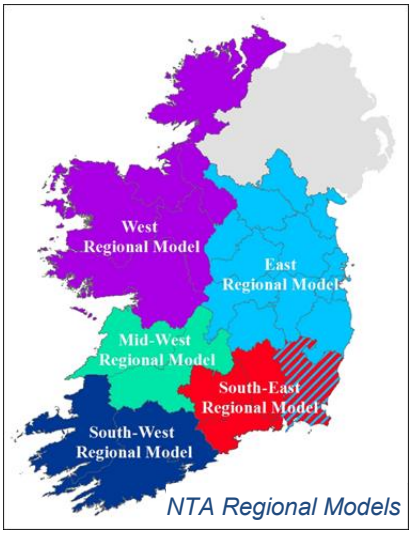
2.7 Development Mode Share and Traffic Distribution Assumptions

2.7.1 East Regional Model and Greater Dublin Area Strategy (GDA)

2025 and 2030 Assessment

The ERM is a strategic multi-modal transport model representing travel by all the primary surface modes ï including, walking and cycling (active modes), and travel by car, bus, rail, tram, light goods and heavy goods vehicles.

It covers the area to the east of Ireland including the counties of Dublin, Wicklow, Kildare, Meath, Louth,



NTA Regional Models

Wexford, Carlow, Laois, Offaly, Westmeath, Longford, Cavan and Monaghan.

The ERM sits within the overall NTA Regional Modelling System which comprises of the following three main components, namely:

- The National Demand Forecasting Model (NDFM);
- 5 Regional Models (including the ERM); and
- A suite of Appraisal Modules.

It is comprised of the following key elements:

- **Trip End Integration:** The Trip End Integration module converts the 24-hour trip ends output by the NDFM into the appropriate zone system and time period disaggregation for use in the Full Demand Model (FDM);
- **The Full Demand Model (FDM):** The FDM processes travel demand, carries out mode and destination choice, and outputs origin-destination travel matrices to the assignment models. The FDM and assignment models run iteratively until an equilibrium between travel demand and the cost of travel is achieved; and
- **Assignment Models:** The Road, Public Transport, and Active Modes assignment models receive the trip matrices produced by the FDM and assign them in their respective transport networks to determine route choice and the generalised cost for each origin and destination pair.

Destination and mode choice within the East Regional Model (ERM) will be utilised for the 2025 and 2030 (YoO and YoO+5) assessment. Growth in vehicular traffic from the ERM has been used to generate forecast year matrices for testing on the road network.

The ERM has been calibrated using two main sources: *Census 2016 Place of Work, School or College - Census of Anonymised Records (2016 POWSCAR),* and the *Irish National Household Travel Survey (2012 NHTS).*

2040 Assessment

The network assessment in the 2040 scenario has been done utilising the destination and mode choice data contained within the Greater Dublin Area (GDA) Strategy. This strategy takes in consideration the changes in mode share expected as a result of major public transport and infrastructure projects to be delivered within the GDA area by 2040. Some of these projects are a BusConnects, DART Expansion Programme, and the Greater Dublin Area Cycle Network Plan.

Demographic and land-use estimates, including population and levels of employment and education, are contained in the NTAôs 2040 planning sheet which is used for testing the GDA Strategy. Figure 2.4 (overleaf) summarises the Modelling Methodology utilised for the assessment.

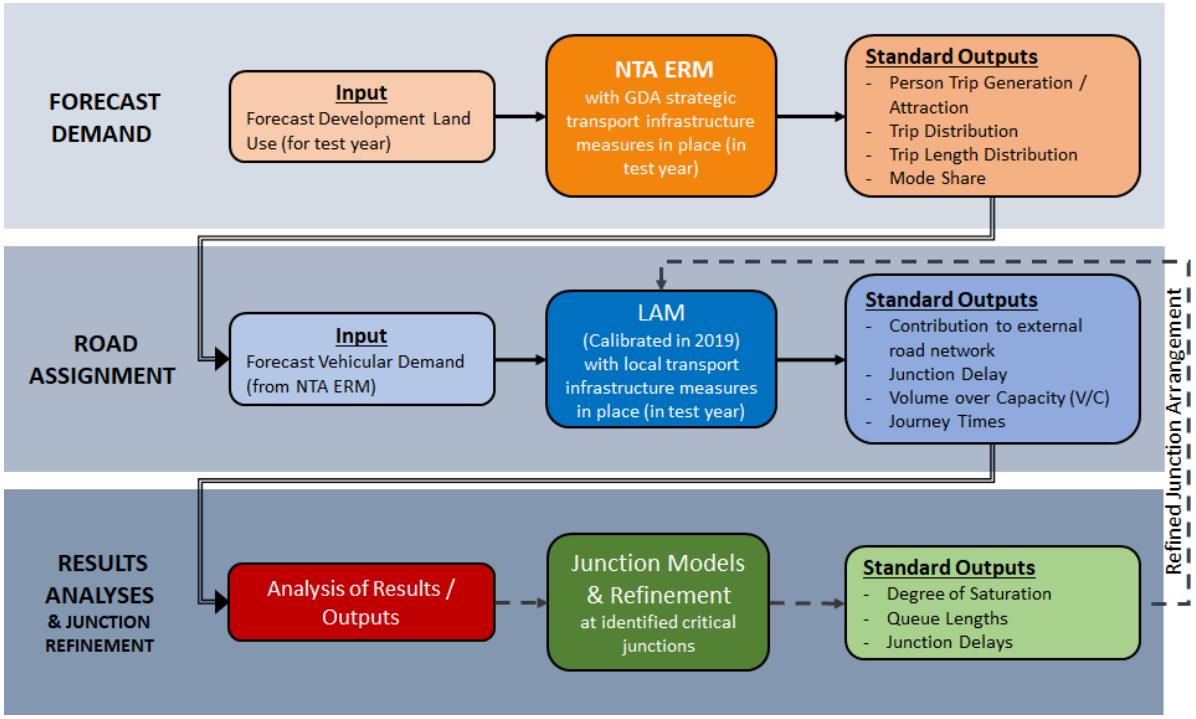


Figure 2.4 *Overview of Transport Modelling Assessment Methodology*

2.8 Hansfield SDZ Development and Kellystown LAP Lands Population Assumptions

The following assumption will be made in relation to the population and phasing for Hansfield and Kellystown:

Hansfield SDZ Development

- Assume full build out in 2040 = 3,000 Residential Units.
- Assume 60% SDZ development completed by 2025; and 100% completed by 2030.
- Population for 2025 is calculated as 2016 population + 60% of difference between 2030 and 2016 populations. Census 2016 population in Hansfield and Barnhill areas (SAPs 267028004/01, 02, 03) = 1,053.
- Assume 120 jobs in 2025 (60% development), increasing to 200 jobs by 2030.
- Assume increase of primary school pupils from 330 to 538 in 2025 (60% development) and up to 896 by 2030. Currently Educate Together school with pupil numbers = 330 from Census 2016.

Kellystown LAP Lands

- Assume full build out in 2040 = 1,000 Residential Units, i.e. 2,800 population.
- Assume 100 jobs and 448 primary school pupils in Kellystown LAP lands by 2040.
- Assume development will commence after 2025, i.e., population, jobs, and education between 2016 and 2026 will remain unchanged. Note: Census 2016 population in Kellystown area (SAP 267102001) = 356.
- Linear interpolation used (2025 to 2040) to get development values for interim test year 2030.

Table 2.1 presents the estimated population for the Barnhill, Hansfield, and Kellystown lands on each assessment year.

LAND USE SCENARIO		ROAD NETWORK		BARNHILL LAP			HANSFIELD SDZ			KELLYSTOWN LAP		
		Ongar-Barnhill Road	Barnhill SHD access road	Population	Employment	Education	Population	Employment	Education	Population	Employment	Education
Base Year (2019)	Base	✓	×	0	0	0	3,257	330	330	356	0	0
Opening Year (2025)	Do-Min	✓	×	0	0	0	5,461	420	538	356	0	0
	Do-Development Phase 1	✓	✓	1,884	30	230	5,461	420	538	356	0	0
Opening Year +5 (2030)	Do-Min	✓	×	0	0	0	8,400	500	896	1,296	38	172
	Do-Development 100%	✓	✓	3,259	45	568	8,400	500	896	1,296	38	172
Future Year (2040)	Do-Min	✓	×	0	0	0	8,400	500	896	2,800	100	448
	Do-Development 100%	✓	✓	2,762	45	568	8,400	500	896	2,800	100	448

Table 2.1 *Estimated population for the Barnhill, Hansfield, and Kellystown lands on each assessment year*

2.9 Assessment Junctions

In order to estimate the development's traffic impact in the local network, it has been deemed relevant to undertake detail traffic modelling of the following critical junctions:

- Junction 1 (J1): Barnwell Road/ Ongar Distributor Road/ Littlepace Distributor Road junction, known as the Barnwell roundabout.
- Junction 2 (J2): Ongar Barnhill NS Link Rd/ R149 Barberstown Lane South Junction.
- Junction 3 (J3): Baberstown Lane South/ Barnhill Development South Access A Junction.
- Junction 4 (J4): Baberstown Lane South/ Barnhill Development South Access B Junction.
- Junction 5 (J5): Milestown Road/ Anna Liffey Mills Road/ Woodwall Road Junction.

The location of these junctions in relation to the proposed development site is shown in Figure 2.5.

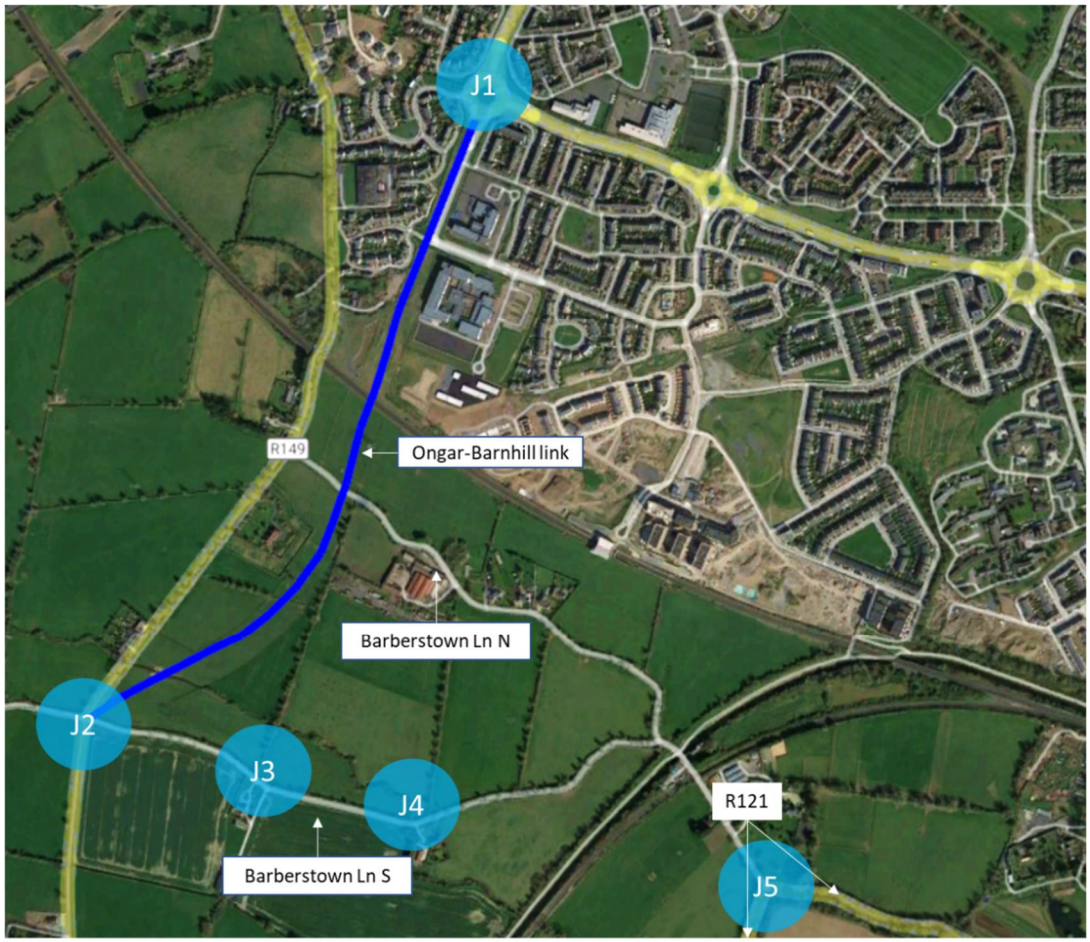


Figure 2.5: *Assessment Junctions*

2.10 Traffic Modelling Software

Detail Modelling of the junctions discussed in preceding section was undertaken utilising the following Modelling Packages:

- ARCADY/PICADY: ARCADY was utilised to assess junctions 1, 3, 4, and 5. ARCADY is a modelling software dedicated for analysing the capabilities of priority-controlled roundabout. Key functions of this software include capacity-based traffic assignment across the roads and lanes forecasting of performance parameters for the and entire network, individual junctions, and individual lanes. The models analyse the junctions in relation to their geometry and traffic flows and calculate the Ration of Flow to Capacity (RFC).

  PICADY was utilised to assess the exiting layout of junction 5, which is currently a priority Y-junction, in the 2025 and 2030 scenario. A roundabout is expected to be in place in junction 5 for the year 2040.

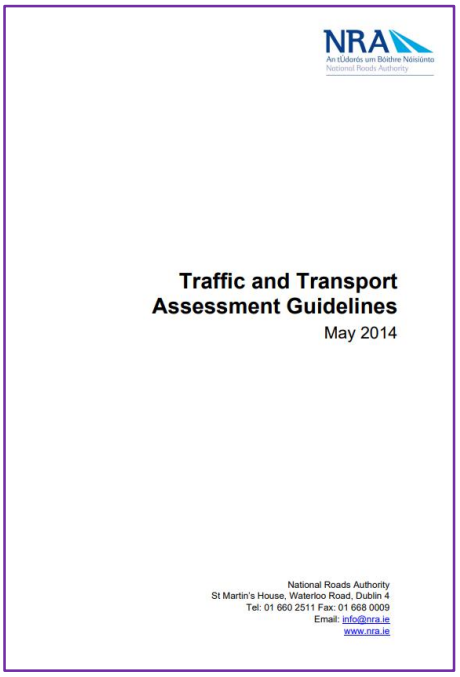
- LINSIG: This modelling software was utilsed to assess the performance of Junction 2. LinSig is a modelling software dedicated for analysing isolated signal-controlled junctions and small junction networks. The models analyse the junctions in relation to their geometry and traffic flows and calculate the Practical Reserve Capacity (PRC).

3 Relevant National and Local Policy

3.1 National Policy

Traffic and Transport Assessment Guidelines (2014)

Transport Infrastructure Irelandôs (TIIôs) *Traffic and Transport Assessment (TTA) Guidelines (May 2014)* provides guidelines for best practice in relation to the preparation of a Traffic and Transport Assessment.



In relation to scoping, the guidance states:

> ñ*The scoping study is a very important part of the TTA process. It is a precursor to the preparation of a TTA and should be undertaken at the earliest stages of planning for development. For a planning application, this phase may be the initial contact between the developer and the planning authority and, as such, the opportunity should be taken to emphasise the role of transport as both a possible asset and liability to the development. The planning authority should avail of such contact to address traffic and transport implications as an integral element of the development proposal.ò*

In relation to the Assessment:

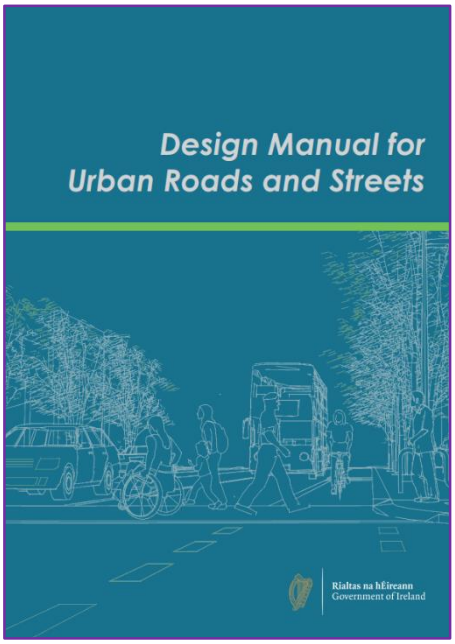
> *ñThe Traffic and Transport Assessment should be written as an impartial assessment of the traffic impacts of a scheme, and it should not be seen to be a ñbest caseò promotion of the development. All impacts, whether positive or negative, should be recorded. The level of detail to be included within the report should be sufficient to enable an experienced practitioner to be able to follow all stages of the assessment process and to reach a similar set of results and conclusions.ò*

Within Table 2.2 of the *TTA Guidelines*, the following threshold is provided in relation to the requirement for a full TTA ñwhere national roads are affectedò i.e., the most onerous thresholds presented in the Guidelines:

> *ñHousing - 100 dwellings within urban areas with a population equal to or greater than 30,000.ò*

The threshold of 100 no. residential units contained within the preceding Guidelines is exceeded by the proposed development, as such a TTA is required.

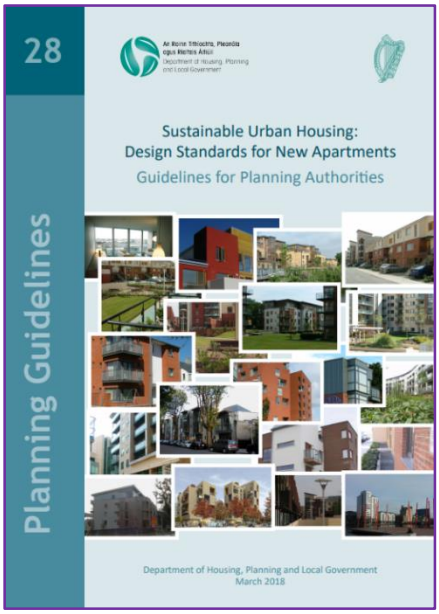
Design Manual for Urban Roads and Streets (DMURS)



The *Design Manual for Urban Roads and Streets (DMURS)* was jointly published by the Department of Transport, Tourism and Sport and Department of Environment, Community and Local Government in 2013, and updated in 2019. The principles, approaches and standards set out in the Manual apply to the design of all urban roads and streets (streets and roads with a speed limit of 60 km/ h or less).

A detail description of the DMURS guidance applicable to the development is presented within section 7 of this Report.

Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities, December 2020



Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities was published in December 2020 and provides guidance on different aspects of new residential developments, including cycle parking and car parking provision.

The design guidance included within this document is only relevant to the apartment units/duplex units proposed with the development.

In relation to cycle parking, Section 4.17 of the Design Standards state *"the accessibility to, and secure storage of, bicycles is a key concern for apartment residents"*, with specific guidance provided in relation to the location, quantity, design, and management of cycle parking facilities. In terms of cycle parking quantity, *"a general minimum standard of 1 cycle storage space per bedroom shall be applied. For studio units, at least 1 cycle storage space shall be provided. Visitor cycle parking shall also be provided at a standard of 1 space per 2 residential units."*

Based on the abovementioned standards, the cycle parking requirements for the apartment units and duplex units is presented in Table 3.1 (overleaf).

Unit Type	Proposed Number of Units	Total no. Beds	Required Cycle Parking Residents	Required Cycle Parking Visitors
1 bed apartment	148	148	148	74
2 bed apartment	589	1,178	1,178	295
3 bed apartment	63	189	189	32
4 bed apartment	4	16	16	2
1 bed duplex	5	5	5	3
2 bed duplex	20	40	40	10
3 bed duplex	92	276	276	46
Total	**921**	**1,852**	**1,852**	**462**

Table 3.1 *Cycle Parking Requirement Design Standards for New Apartments*

As shown above, the Design Standards for New Apartments indicates the requirement of 2,314 no. cycle parking spaces to serve the apartment/duplex units in the development. Of these, 1,852 should accommodate residents and 462 should accommodate visitors.

The proposed cycle parking provision for the apartment/duplex units proposed with the development have been design in accordance with the standards presented above. A total of 3,337 no. cycle parking spaces will be provided to with the proposed development, in excess of the requirements presented above.

In terms of qualitative requirements, it is stressed that cycle storage/ parking facilities shall be sufficiently accessible, offer an adequate level of safety and security, be well-lit and properly maintained. It is further recommended that cycle parking is provided within ña *dedicated facility of permanent construction."*

The proposed development cycle parking provision (both capacity and specification) is consistent with the Design Standardsôrequirements presented above.

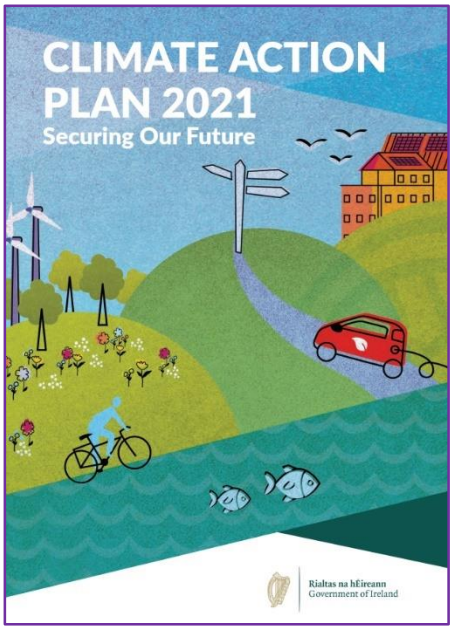
Section 4.18 of the Design Standards stipulates that car parking provision at apartment developments shall have regard to the type o location, based on ñ*proximity and accessibility criteria".* As per Section 4.22, ñ*as a benchmark guideline for apartments in relatively peripheral or less accessible urban locations, one car parking space per unit, together with an element of visitor parking, such as one space every 3-4 apartments, should generally be required*.ò However, as per Sections 4.19 and 4.20 ñ*in larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances. (…) These locations are most likely to be in cities, especially in or adjacent to (i.e., within 15 minutes walking distance of) city centres or centrally located employment locations. This includes 10 minutes walking distance of DART, commuter rail or Luas stops or within 5 minutes walking distance of high frequency (min 10 minute peak hour frequency) bus services*.ò

As detailed above, the Design Standards recommend a reduced level of car parking provision for highly accessible sites which are well served by alternative transport modes. A total of 1593 no. car parking spaces are proposed with the development. This reduced level of on-site car parking provision is deemed appropriate due to the strategic location of the development site, located within a short walk (350 meters) from Hansfield Train station (see section 4.3), and short walk from the amenities and retail available within Hansfield area to the north of the site, and further amenities proposed with the development.

Furthermore, the site is also serviced by several bus stops, located to the north of the site which have high frequency service and are approximately 1 km away from the centre of the new development. These bus stops can be accessed easily via cycling and walking.

The public transport accessibility will further improve in the future with the implementation of BusConnects and Dart+ West.

Climate Action Plan



The *Climate Action Plan 2021* contains the Irish Governmentôs plan for tackling climate breakdown and reduce Irelandôs greenhouse gas emissions. It outlines the current state of play across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture, and charts a course of action towards ambitious decarbonisation targets.

Climate Action Plan aspirations are to achieve a net zero carbon energy system and create a resilient, vibrant, and sustainable country, with modal shift to public transport presented as one of the transport related objectives. *The Climate Action and Low Carbon Development (Amendment) Act 2021 commits Ireland to reach a legally binding target of net-zero emissions no later than 2050, and a cut of 51% by 2030 (compared to 2018 levels). Under the 2021 Act, Ireland's national climate objective requires the State to pursue and achieve, by no later than the end of the year 2050, the transition to a climate-resilient, biodiversity rich, environmentally sustainable, and climate-neutral economy*

Table 3.1 off the plan proposes a 42-50% reduction in transport emissions by 2030, in comparison to 2018. This cut in transport emissions by 2030 will be achieved through measures including:

- *500,000 extra walking, cycling and public transport journeys per day by 2030*
- *Increasing the proportion of kilometres driven by passenger electric cars to between 40 and 45% by 2030, in addition to a reduction of 10% in kilometres driven by the remaining internal combustion engine cars*
- *All replacements for bus and commuter rail vehicles and carriages to be low or zero carbon by 2030*
- *Increased rollout of rural public transport through Connecting Ireland. [42-50% reduction in emissions by 2030*

The proposed pathway of the Plan in relation to transport is focused on accelerating the electrification of road transport, the use of biofuels, and a modal shift to transport modes with lower energy consumption (e.g., public, and active transport).

Furthermore, the Plan commits to expanding sustainable mobility options to provide meaningful alternatives to everyday private car journeys is necessary to reduce transport emissions. It is the goal to provide continued and enhanced investment in our walking, cycling and public transport infrastructure and services across the country.

The Plan aims to achieve the delivering an additional 500,000 daily sustainable journeys by 2030 through the implementation of major transport projects such as:

- BusConnects

- Connecting Ireland
- Expanding rail services and infrastructure in, and around, major urban centres
- A significant increase in our walking and cycling investments

The proposed development has been designed as sustainable community in line with the visions of the Climate Action Plan. 10% of the proposed car parking has been designated for Electric Vehicles and space has been put aside to allow regular parking spots to be turned into EV in the future, as needed.

The development design aims to insensitive modal shift to sustainable transport options by the provision of high-quality cycle parking, in accordance with the standards presented within the *Fingal Development Plan 2017-2023* and the *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities.* High quality and segregated walking and cycling infrastructure will be provided across the development to facilitate more trips in a sustainable manner and reduced the need for cars.

Furthermore, the site location is ideal for the delivery of a sustainable community due to its proximity to the Hansfield station, whose service will be upgraded once *DART + West* is completed. The proposal includes space for amenities and services, such as retail, remote working space, creche, medical facility, and schools (to be provided by the department of Education), in order to limit the number of trips by car and allow more trips to be done by sustainable modes at the local level.

3.2 Local Policy

Fingal County Council Development Plan 2017-2023

The *Fingal County Council Development Plan 2017-2023* sets out the Council's policies and objectives for development in the County over the period from 2017 through 2023.

The Barnhill lands are zoned Objective 'RA', which seeks to 'Provide for new residential communities subject to the provision of the necessary social and physical infrastructure' in the Fingal Development Plan 2017-2023. Figure 3.1, below presents an extract of the *Sheet 13 Blanchardstown South* indicating the zoning objectives for the Barnhill development site and its surroundings.

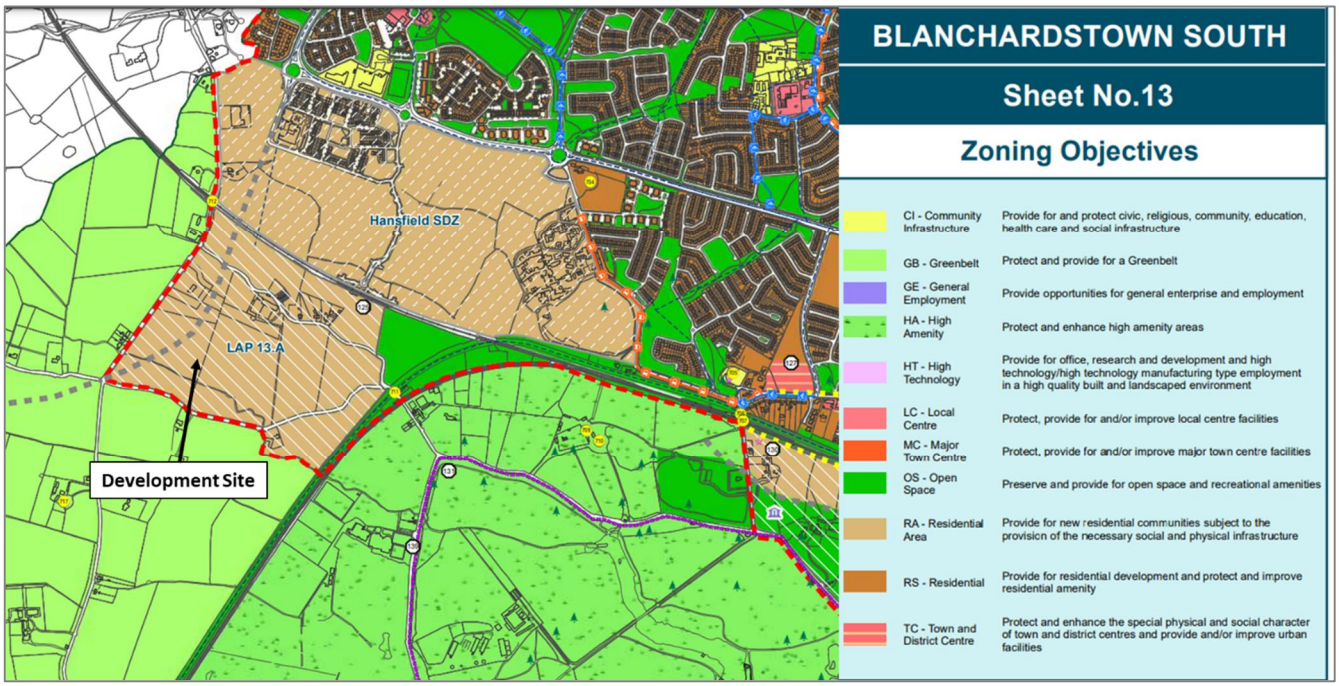


Figure 3.1: *Blanchardstown South Development Map (Source: Extract from Sheet 13, Blanchardstown South Fingal Development Plan 2017-2023)*

Chapter 4 of the Plan presents development strategy of Blanchardstown to include *"the provision of civic, cultural, retail, commercial, residential and employment activity within Blanchardstown at a level appropriate for a Metropolitan Consolidation Town."*

In the Local Area Plans and Master Plans, the Objective 18 Blanchardstown Area inlcudes the following elements for Local Area Plan of Barnhill- *"Construction of houses on these lands will be dependent on the delivery of the proposed new road and bridge over the railway. Ensure the provision of pedestrian access between Barberstown/Barnhill and the Hansfield SDZ by means of a new pedestrian overbridge integrated with adjoining development including the proposed Hansfield rail station. Adoption of the Local Area Plan shall be dependent on the rail station at Hansfield being open, accessible and serviced by train."*

Chapter 7 of the Plan discussed the objectives relating to movement and infrastructure. The following transport related objectives are deemed relevant to the proposed development:

- *Objective MT05: Integrate land use with transportation by allowing higher density development along higher capacity public transport corridors.*
- *Objective MT06: Integrate the County's transport and tourism strategies to promote increasingly sustainable travel patterns and improved linkages between the City Centre, Villages and the Coast among visitors to the County.*
- *Objective MT08: Control on-street parking in the interests of the viability, vitality and amenity of commercial centres by maximising the supply of short stay parking for shoppers, while providing appropriate levels of long- term parking within a reasonable distance for employees.*
- *Objective MT09: Consider the implementation of Parking Demand Management Strategies in housing estates in close proximity to public transport facilities experiencing parking and congestion issues, where deemed appropriate and practicable.*

- *Objective MT10: Facilitate the provision of electricity charging infrastructure for electric vehicles both on street and in new developments in accordance with car parking standards.*
- *Objective MT11: Support the growth of Electric Vehicles and EBikes, with support facilities, through a roll-out of additional electric charging points in collaboration with relevant agencies at appropriate locations.*
- *Objective MT13: Promote walking and cycling as efficient, healthy, and environmentally-friendly modes of transport by securing the development of a network of direct, comfortable, convenient and safe cycle routes and footpaths, particularly in urban areas.*
- *Objective MT16: Promote the provision of adequate, secure and dry bicycle parking facilities and a bike rental scheme at appropriate locations, including stations and other public transport interchanges.*
- *Objective MT17: Improve pedestrian and cycle connectivity to schools and third level colleges and identify and minimise barriers to children walking and cycling to primary and secondary schools.*
- *Objective MT21: Ensure that as soon as possible, but by the end of the lifetime of the Development Plan the environment in the immediate vicinity of schools is a safe and attractive low speed (30kph) environment, and drop-off by car within a given distance restricted.*
- *Objective MT22: Improve pedestrian and cycle connectivity to stations and other public transport interchanges.*
- *Objective MT37: Implement traffic calming on particular roads and in appropriate areas of the County, especially residential areas, to reduce vehicle speeds in the interests of road safety and residential amenity. Ensure that where appropriate, traffic calming is included as a pre-condition as part of the development of all new estates or extensions to existing estates.*
- *Objective MT39: Review the results of the 30km/h Residential Speed Limit Pilot Study, with a view to rolling out a 30km/h speed limit in all residential estates.*
- *Objective MT42: Protect the strategic transport function of national roads, including motorways through the implementation of the DoECLG 'Spatial Planning and National Roads – Guidelines for Planning Authorities'. There is a provision in road schemes to link Barnhill area to Ongar and Leixlip Interchange vis N3-N4 link.*
- *Objective EN04: Encourage development proposals that are low carbon, well adapted to the impacts of Climate change and which include energy saving measures and which maximise energy efficiency through siting, layout and design.*
- *Objective NP04: Ensure that future developments are designed and constructed to minimise noise disturbance and take into account the multi-functional uses of streets including movement and recreation as detailed in the Urban Design Manual (2009) and the Design Manual for Urban Roads and Streets (2013).*
- *Objective DMS117: Require new developments to be designed in accordance with DMURS. In particular they shall have layouts and designs which reflect the primacy of walking and cycling by providing safe, convenient and direct access to local services, employment and public transport. The promotion of cycling as a sustainable mode of transport depends on providing sufficient parking at places of employment and education*

- *Objective DMS119: Support public transport improvements by reserving the corridors of planned routes free from development. Provide setbacks along public transport corridors to allow for future improvement to enable the provision of a safe and efficient network of public transport infrastructure.*
- *Objective DMS126: Ensure that necessary new entrances are designed in accordance with DMRB or DMURS as appropriate, thereby avoiding the creation of traffic hazards.*
- *Objective DMS128: Require developers to provide a Traffic Impact Assessment where new development will have a significant effect on travel demand and the capacity of the surrounding transport network.*
- *Objective DMS129: Promote road safety measures in conjunction with the relevant stakeholders and avoid the creation of traffic hazards.*
- *Objective DMS130: Ensure that new residential developments are designed in accordance with DMURS to create low-speed environments.*

In relation to Car parking , Chapter 7 states the following *" No-one will travel by car if they know that there are no car parking spaces available at their destination. In particular, commuters will use more sustainable modes of transport if they do not have car parking at their place of work or education, and this is the most effective and most widely used form of demand management. The Development Plans for each of the four Dublin Local Authorities currently include standards which limit the amount of car parking at new developments, especially places of work and education. Employment-based developments that are close to public transport need fewer car parking spaces.*

In line with the above, the development plan splits the car parking standards for places of work and education into 2 zones, which are described below:

- Zone 1: areas which are within 1600m of DART, Metro, Luas or BRT, (existing or proposed), within 800m of a Quality Bus Corridor, zoned MC Major Town Centre, or subject to a Section 49 Scheme.
- Zone 2: all other areas.

The development Plan states that car parking standards for places of work within Zone 1 should be reduced by 50%.

The location of the proposed development site falls within the description of Zone 1, as it is located in closed proximity to the Hansfield Train Station. In light of this, all car parking calculations for commercial/educational units within the proposed development will be reduced by 50%.

Table 12.8, within *Chapter 12* of the Plan, provides guidance in relation to the car parking provision for new developments. Table 3.2, below, provides an overview of the car parking standards and the corresponding car parking required for each land use type.

Land Use	Proposed no. units/ Sqm	FCC Standard	Standard for Visitors	Car Parking Spaces Required
1-bed Apartment/ 1-Bed Duplex	153	1 per apartment	Plus 1 visitor space per 5 units	184
2-beds Apartments/ Duplex	609	1.5 per apartment	Plus 1 visitor space per 5 units	1,036
3-beds Apartments/ Duplex	155	2 per apartment	Plus 1 visitor space per 5 units	341
4-beds Apartments/ Duplex	4	2 per apartment	Plus 1 visitor space per 5 units	9

Land Use	Proposed no. units/ Sqm	FCC Standard	Standard for Visitors	Car Parking Spaces Required
3 bed house	286	2 within Curtilage	-	572
4 bed house	36	2 within Curtilage	-	72
Retail/Commercial units*	871	1 per 30 sqm (reduced by 50%)	-	15
Café	158	1 per 15 (Reduced by 50%)	-	5
Community Space	359.2	1 per 50	-	7
Creche	941.6 (8 classrooms)	0.5 Per Classroom	-	4
Medical Centre (GP / Dental practice)	8 Consulting Rooms	2 per consulting Room	-	16
Total				**2,261**

Table 3.2 *FCC Car Parking Standards (Source: Table 12.8 FCC Development Plan 2017-2023)*
** Land Use Retail – Convenience Stores assumed for commercial units to simplify analysis*

As shown above, the maximum or ónormôcar parking requirement would be 2,261 spaces. Due to the strategic location and good public transport available in the vicinity of the site, a reduced provision of 1,593 no. car parking spaces is proposed for development, of which 641 will be located within the curtilage of the houses.

Such reduced provision is in line with the recommendations of the *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities, December 2020, which states "in larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances (see section 3.1 for details)*

Furthermore, objective *DM113* within the Development Plan aims to *"limit the number of car parking spaces at places of work and education so as to minimisecar-borne commuting".*

The Plan provides guidelines in relation to car parking for electric vehicles and disable users. It is stated that ñ*One space or more per 100 spaces should be reserved for disabled parking bays and one space or more per 100 spaces should be reserved for electric vehicles with charging facilities.*ò

14% of the total off-curtilage car parking spaces provided with the development will be equipped as an EV parking Spot and 5% of the total off-curtilage parking will be designated for disabled users. This represents the provision of 154 no. electric vehicle parking and 55 no. disable parking. Ducting has been provided for all car parking spaces inside the development to allow them to be turn into EV spots in the future. Appropriate ducting will be provided at all houses to facilitate EV charging. all Houses will have ducting for EV Charging. 10% will be provided with charging points.

A detail description of the car parking strategy for the development is provided within section 6 of this report.

In relation to cycle parking provision, Table 12.9 of the Plan sets out the Bicycle Parking Rates for all new developments in the County. Table 3.3 (overleaf), provides an overview of the cycle parking standards and the corresponding cycle parking required for the development.

Land Use	Standard	Visitors	No. Proposed	Cycle Parking Spaces Required
Apartment, townhouse 1 bedroom	1 per unit	Plus 1 visitor space per 5 units	921 Apartments/ Duplex	1,105
Retail/Commercial units*	1 per 100 sqm	-	870.5	9
Cafe	1 per 150 sqm	-	158 sqm	1
Creche	0.5 Per Classroom	-	942 sqm (8 Classrooms assumed)	4
Community Space	1 per 100 sqm	-	359.2	4
Medical Centre	1 per 4 consulting Rooms	-	8 consulting Rooms	2
Total				**1,124**

Table 3.3 *FCC Cycle Parking Standards (Source: Table 12.9 FCC Development Plan 2017-2023)*

** Land Use Retail - Convenience assumed for commercial units to simplify analysis*

As shown on above, a total of 1,124 no. cycle parking spaces must be provided with the proposed development. A total of 3,337 no cycle parking spaces are proposed in excess of the Development Plan Standards.

Cycle parking provision for the apartments/duplex element of the proposed development has been designed in accordance with the standards presented within the *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities, December 2020,* discussed in Section 3.1 of this Report.

A detail description of the car parking strategy for the development is provided within section 6 of this report.

Barnhill Local Area Plan 2019

The *Barnhill Local Area Plan 2019 sets* out the Councilôs vision, development themes, and opportunities for the Barnhill Area.

The Barnhill lands are zoned Objective ôRAô which seeks to ôProvide for new residential communities subject to the provision of the necessary social and physical infrastructureô in the Fingal Development Plan 2017-2023. The number of residential units supported on the LAP lands has been intended to be in the range of approximately 900 to 1,150 units.

The vision of the council for the Barnhill area is the following:

ñTo create a place to live that is appealing, distinctive and sustainable, maximising the opportunities provided by the surrounding natural environment for improved amenities and the enhancement of biodiversity. It is envisaged that Barnhill will develop as a sustainable

community comprised of new homes, community, leisure and educational facilities based around an identifiable and accessible new local centre which will form the heart of the area."

The LAP incorporates the following sustainable Principles:

- *Optimal use of land through the development at an appropriate density, in particular having regard to proximity of the lands to Hansfield train station.*
- *Maximising opportunities for open space, green connected networks and protection of the natural environment as defining characteristics of the developing area.*
- *Development of a movement and transport strategy which minimises trip generation and promotes cycling, walking, public transport, and sustainable modes of transport through the area.*
- *Creation of sustainable communities through integration of the new community with the established community in Hansfield to provide people with the services/facilities they need close to their homes to encourage lifetime residency and vibrant communities and places.*

Section 6 of the LAP presents the Movement and Transport Strategy for Barnhill. The LAP seeks to achieve a significant proportion of journeys on foot, by cycle and by public transport. To support this, it requires a well-designed pedestrian and cycle networks to ensure ease of access to the high-quality network of public transport which serves the site. A network of attractive and safe footpaths and cycleways, coupled with the provision of frequent and reliable public transport services, will connect major destinations within the area and beyond.

The LAP also requires that that the design and layout of new developments provide permeability, linkages, and connectivity to their surrounding areas, thereby minimising local trips by private car.

The key transport objectives of the LAP are the following:

- *Improve accessibility and maximise public transport use,taking account of the land's location adjoining Hansfield train station.*
- *Encourage use of sustainable transport options. Walking and cycling shall be encouraged, particularly for shorter trips.*
- *Prioritise planned infrastructure that supports public transport, and ensures the land use strategy is informed by, and integrated with transportation objectives.*
- *Seek the interconnection of walking and cycling routes with key public transport and amenity destinations (both existing and planned).*
- *Encourage sustainable densities of population, such that public transport is supported and sustained, and walking and cycle routes are kept active.*
- *Facilitate the provision of electricity charging infrastructure for electric vehicles both on street and in new developments in accordance with car parking standards.*

  The Plan seeks a high level of connectivity, with a network that encourages low traffic speeds by integrating traffic calming measures into road design by providing:
- Frequent crossing points and junctions
- Raised crossing points as required
- Horizontal and vertical deflections
- Minimising formal signage and road markings
- Narrower carriageways
- On-Street parking
- Reduced visibility splays

- Shared street surfaces
- Tighter corner radii
- Appropriate landscaping and urban design to minimise through visibility for drivers

The LAP also presents as a key piece of infrastructure for Barnhill the delivery of the necessary extension of the Ongar-Barnhill Road with provision of a new bridge over the Dunboyne (Pace) ï Clonsilla rail line and provision of a new junction with the existing road network. This will connect the Ongar Road to the existing Clonee-Lucan Road(R149). Furthermore, it is also required the Creation a new cul-de-sac on Barberstown Lane North.

The following is required for the LAP:

- The village centre and area to the front of the train station shall incorporate civic spaces. Seating and cycle parking facilities shall be provided as an integral part of the design.
- The Local Area Plan incorporates a network of pedestrian and cycle routes connecting to the local centre, school, community services and public open space. The pedestrian/cycle routes will connect with existing links in adjoining areas and to the pedestrian/cycle network in the Greater Blanchardstown Area.

Figure 3.2 below, presents the vision of the Council for the Barnhill area, including the movement network, as presented in the LAP.

Figure 3.2 *Barnhill Development Vision as per LAP 2019*

The LAP envisions the development of Barnhill in the Phasing illustrated in Figure 3.3 (overleaf).

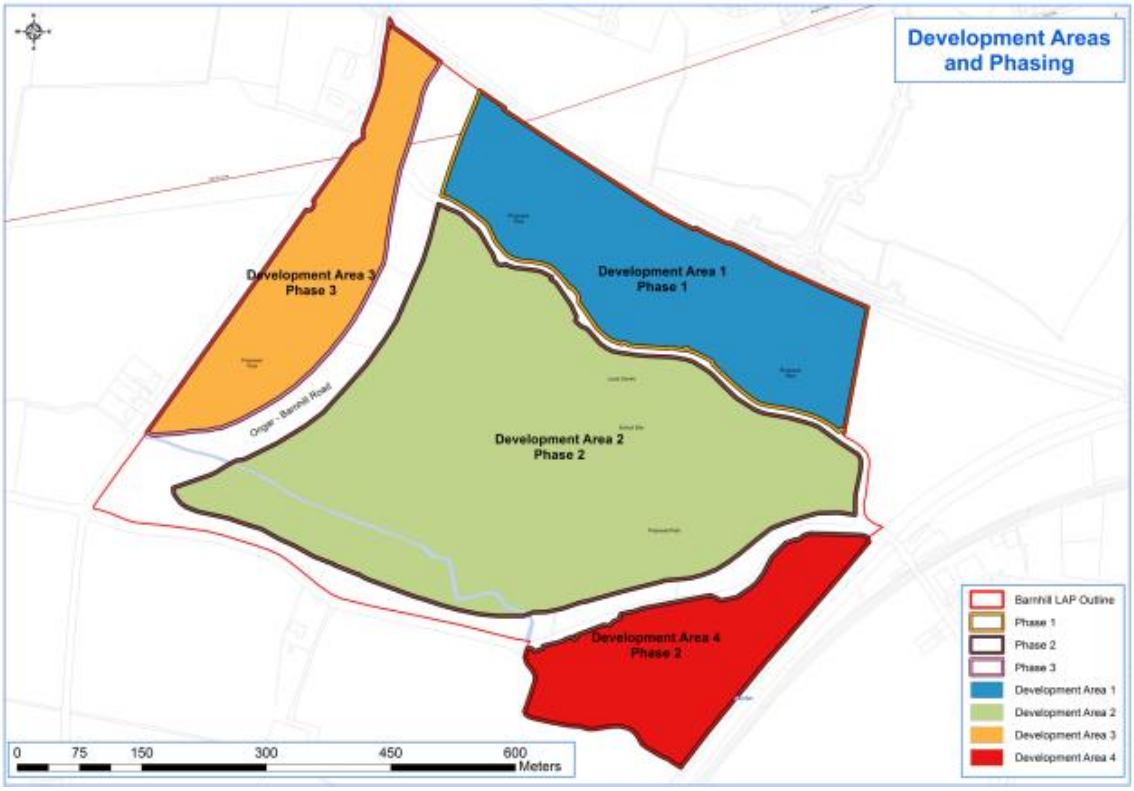


Figure 3.3 *Barnhill LAP development Phasing*

Kellystown Local Area Plan 2021.

The *Kellystown Local Area Plan 2019 sets* out the Councilôs vision, development themes, and opportunities for the Kellystown Area.

Kellystown is located directly to the east of the proposed development site. The LAP proposes the development of ca. a 1,055 - 1,583 residential properties

The Barnhill lands are zoned Objective ôRAö which seeks to ôProvide for new residential communities subject to the provision of the necessary social and physical infrastructureô in the Fingal Development Plan 2017-2023.

The vision for Kellystown *is to promote the development of a distinctive, sustainable, high quality new residential quarter, connected to the neighbouring suburbs of Clonsilla and Carpenterstown. Kellystown will provide a sustainable residential community, comprising a choice of high-quality new homes, with a mix of dwelling types, size and tenure based around a new civic square that incorporates local services with new schools, public open space and access to high-capacity public transport links.*

The councilôs Vision for Kellystown is shown in Figure 3.4 (overleaf).

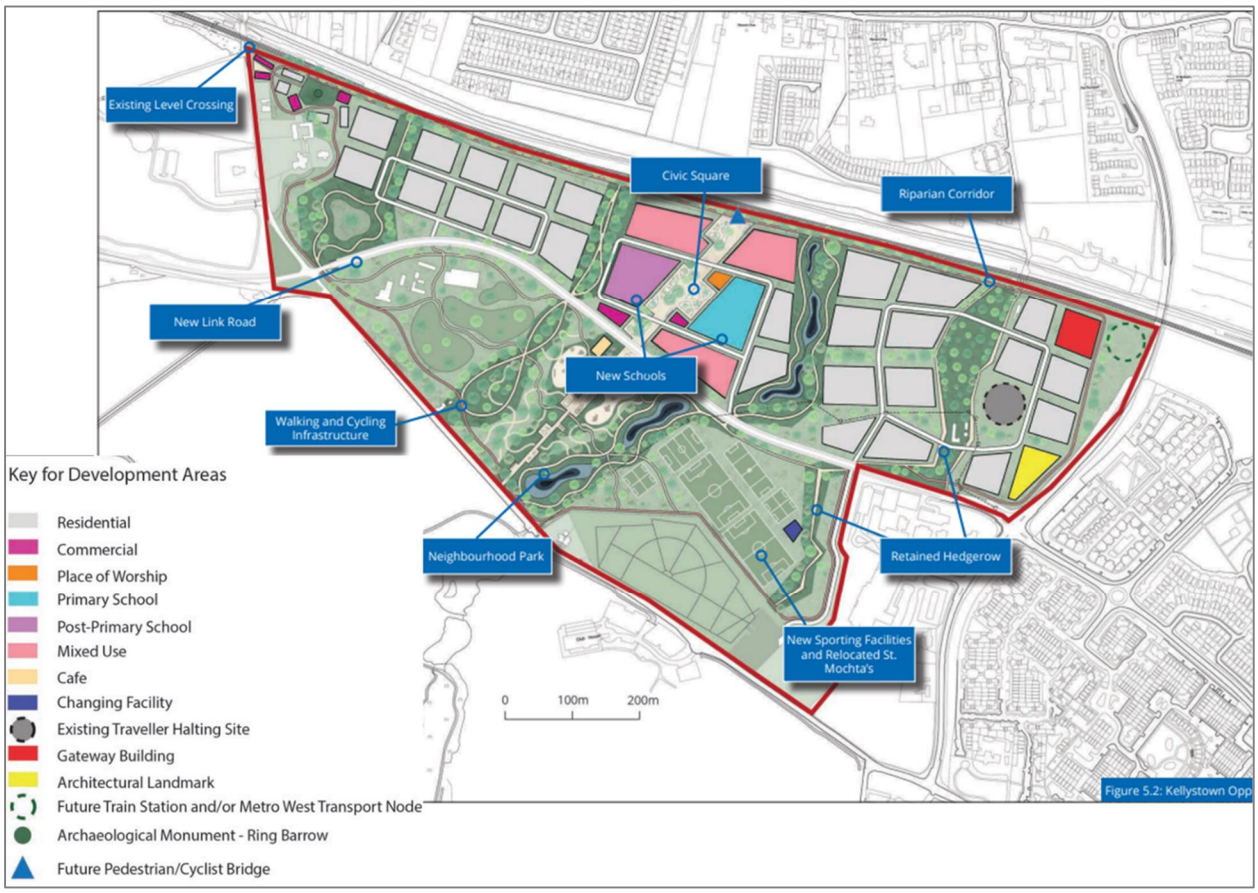


Figure 3.4 *Kellystown LAP*

As shown above, a Link Road is proposed to extend across the Kellystown LAP, which will connect from the R121 to the Diswellstown Road to the east. This road corresponds to road no. 5 in the Future Road network assumptions taken in consideration in the assessment of the Barnhill Development (see section 5.1 for details)

4 Existing Conditions

4.1 Site Location and Use

The proposed development site is located within the Barnhill Lands, approximately 4km west of Blanchardstown. Figure 4.1 and Figure 4.2, below, sets out the sites location in relation to the local road network. The subject site is currently, for the most part, in agricultural use.

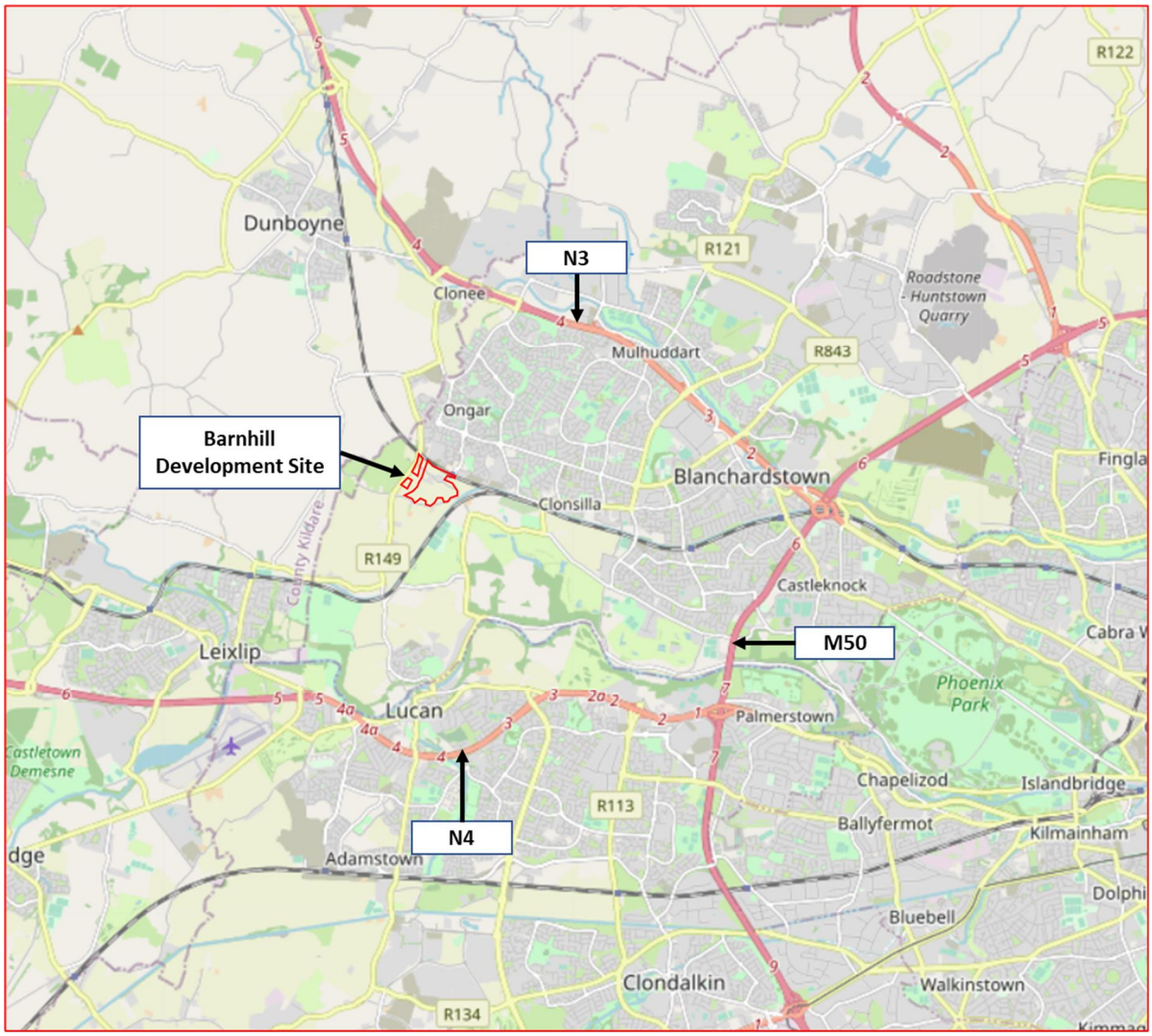


Figure 4.1 *Strategic Site Location (Indicative Red Line Boundary)*

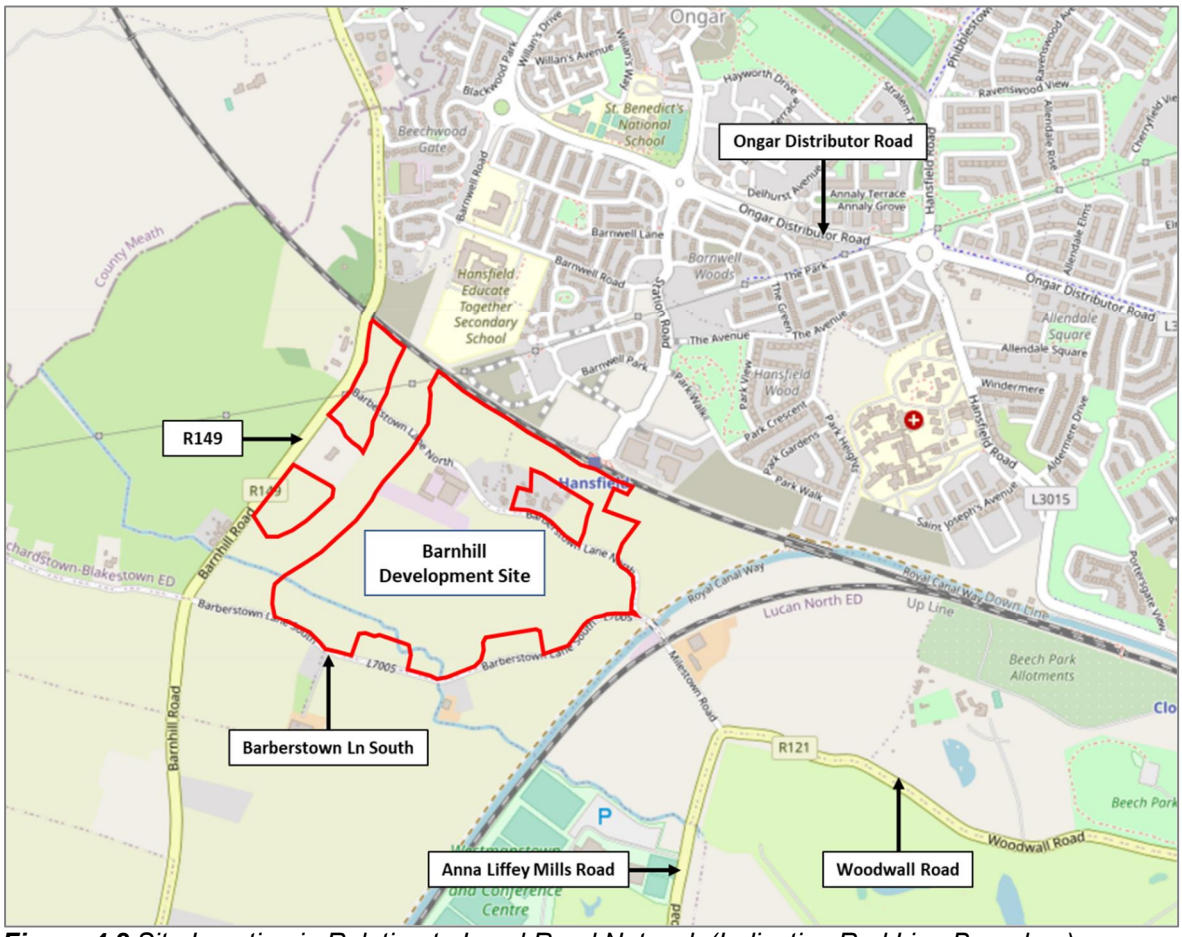


Figure 4.2 *Site Location in Relation to Local Road Network (Indicative Red Line Boundary)*

4.2 Local Road Network

R149

R141 Barnhill Road is a two-carriageway regional road located to the west of the proposed development site. Near the site, this road accommodates one lane for general traffic in each direction. The road connects the development site to the northern developments and bus stops. No pedestrian or cycle facilities are available in this stretch of the road along the development side.

R121

R121 is a regional road and is located to the east of the development site. The road is bifurcated into R121 Woodwall Road in the North and Anna Liffey Mills Road in the South. Both the roads can accommodate two-way traffic and have two lanes. No pedestrian or cyclistsôfacilities are present on the stretch of the road close to development site. Woodwall road connects

the development site to the Clonsilla train station, which is the second closest train station to the development site after Hansfield.

Barberstown Lane North

Barberstown Lane North is a local road which marks the north boundary of the development site. It branches from R149 towards East. The road is open to two-way traffic, and it does not have any road markings.There are some private properties and agricultural land on the roadsides

Barberstown Lane South

Barberstown Lane South is a local road which marks the sorth boundary of the development site. It branches from R149 towards East. The road is open to two-way traffic, and it does not have any road markings. There are some private properties and agricultural land on the roadsides. The road meets Barberstown Lane North via a three-leg junction to the east. The third leg further diverges into R121 North and South.

Ongar Distribution Road

Ongar Distribution Road is a local road located to the North of Hansfield train station.It passes through the residential development to the north of Barnhill Site. The stretch of the road has four roundabouts and a few junctions. The road has dual carriageways to accommodate for two-way traffic. It has bus lanes all along, and a few bus stops are located on the road. It has verge alongside both the carriageways followed by footpaths and cycle lanes.

4.3 Existing Public Transport Services

The Hansfiled Train Station is roughly 350 m from the centre of the site. It connects Barnhill to Dublin City Centre and Longford via M3 Parkway. There are several bus stops towards the north of the site. The nearest bus stop is approximately 1.2 km from the centre of the development to the north of the site. Figure 4.3 illustrates the location of the train station and bus stops in the vicinity of the proposed development site.

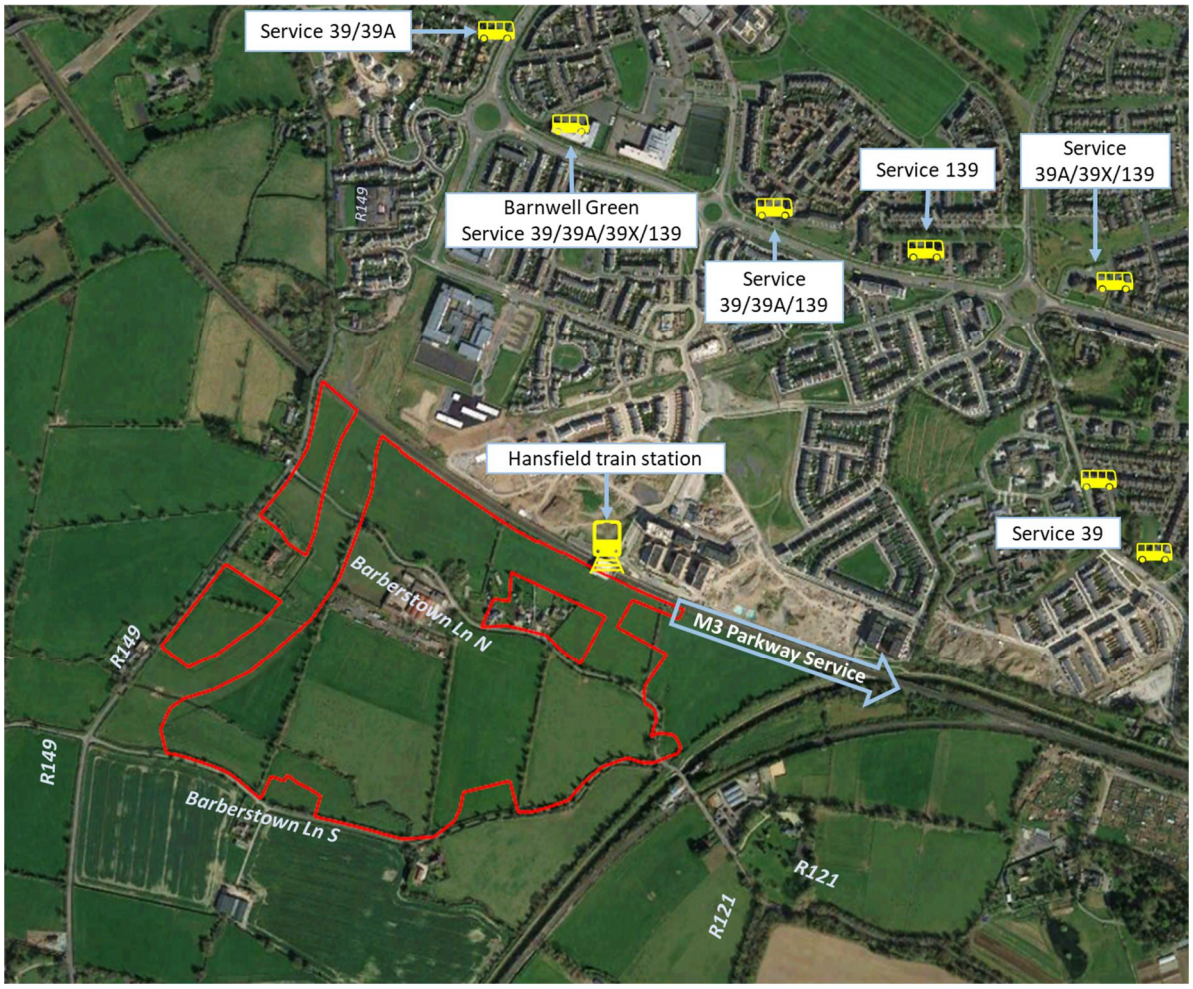


Figure 4.3 *Public Transport stops in the Vicinity of the Site. (Indicative Red Line Boundary)*

Table 4.1, below, summarises the train routes and bus routes available and their frequency.

Stop Name	Route No.	Route	Peak Hour Frequency
Hansfield		Dublin ï M3 Parkway ï Longford	30 minutes
Barnwell Green	39	Burlington Road ï Ongar Road	30 minutes
	39A	Delhurst Estate-UCD	10 minutes
	39X	Burlington Road-Ongar Road	Twice in 30 minutes (operates only in evenings on weekdays)
	139	Naas Hospital - Blanchardstown	2 hours

Table 4.1 *Existing Public Transport Services*

4.4 Existing Traffic Volumes

Due to the COVID-19 pandemic and related restrictions implemented by the Irish Government in December 2020, traffic volumes in the road network surrounding the site have significantly decreased. As a result, the existing flows in the road network do not represent a

worst case scenario for traffic conditions in the local area. In light of this, and in order to determine baseline traffic conditions and provide a basis from which the future developments traffic impact can be analysed, 2019 data has been used for the assessment.

Automatic Traffic Counts (ATCs) were undertaken at 35 locations across the network over a 3-week period from Monday 28th January to Sunday 14th February 2019. The ATC data provides information on:

- The daily and weekly profile of traffic within the study area;
- Busiest time periods and locations of highest traffic demand on the network;
- Any issues on the network during the survey period i.e., accidents, road closures etc.; and
- Typical speed of traffic on the network.

Figure 4.4 shows the traffic flow in the surrounding areas of the Barnhill development site for the base year 2019 between AM (08:00-09:00hrs) and PM (17:00-18:00hrs) peaks.

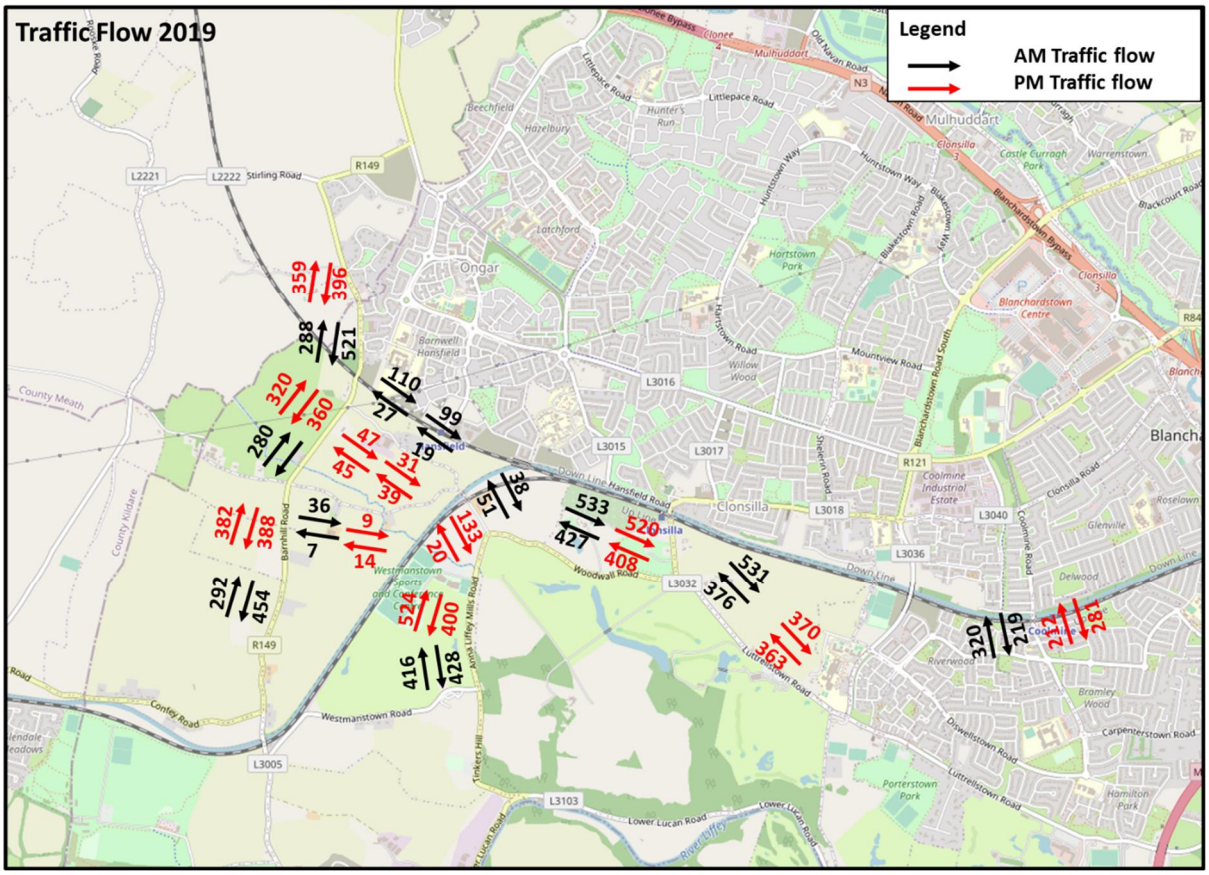


Figure 4.4: *Traffic flow for the year 2019*

4.5 Existing pedestrian and cyclist facilities

There are presently no footpaths and cycle facilities along both sides of roads in the vicinity of the subject site. Ongar Distribution Road, which is located to the north of the development site, has designated bus lanes, cycle lanes and footpath facilities on both the sides of the road all along the stretch.

5 Future Receiving Environment

5.1 Road Network

The following road schemes are planned in the vicinity of the development site:

- **Ongar-Barnhill Road scheme**, which is included in the Barnhill LAP and is to be delivered by FCC as part of their Section 48 programme. This Road link is expected to be Tender in Q3/4 2022 and to be completed by Q2/3 2024. This road is required in order to provide for a coherent sustainable movement and transport strategy and to maximise development capacity within the Barnhill LAP lands.
- **Kellystown Link Road**, this road is not required for the delivery of the proposed development, however it has been included to be able to take into account the traffic generation associated with Kellystown LAP (to establish a worst case scenario for traffic flows in local network). Pre-draft phase was initiated by Fingal County Council in mid-2019, and this road scheme has been presented to elected councillorswhich is included in the draft Kellystown LAP.

Figure 5.1 below, sets out the location of these roads in relation to the proposed development site.

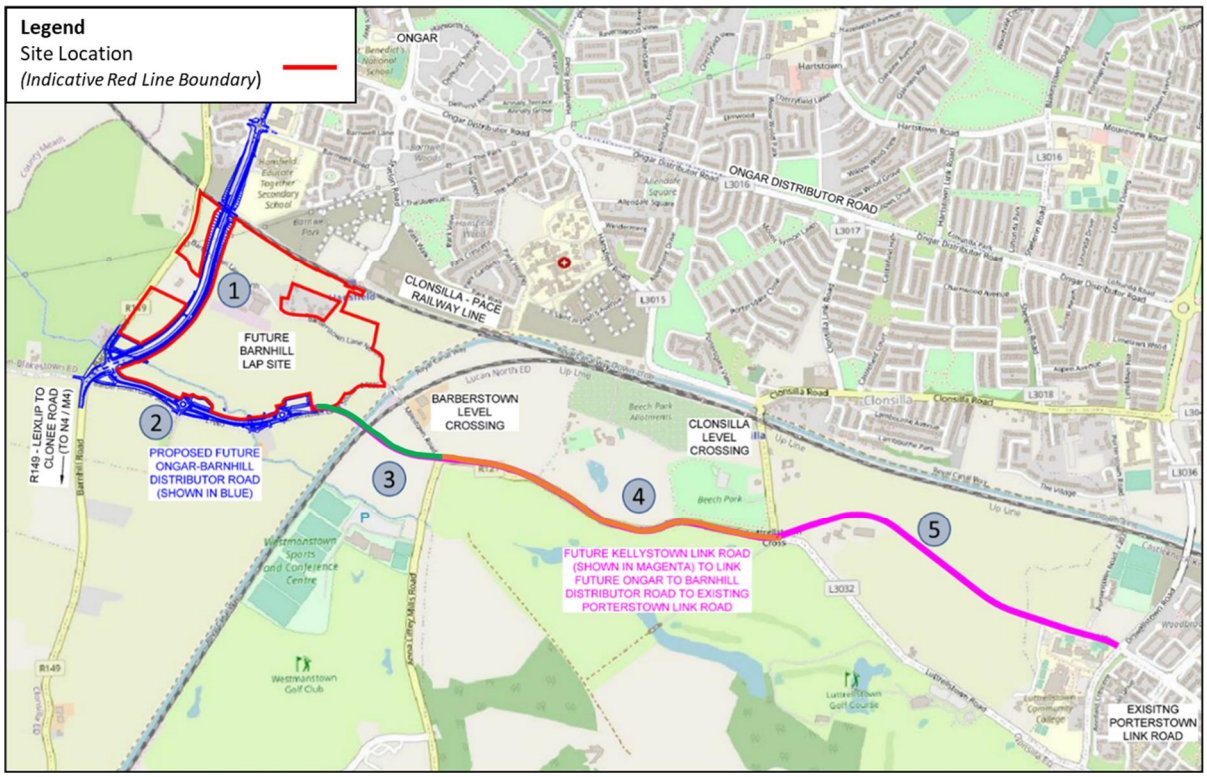


Figure 5.1: *Future Road Network (Indicative Red Line Boundary)*

The main components of these two road schemes, as numbered in Figure 5.1, are outlined below.

1. **Ongar - Barnhill North-South Link Road** ï a dual carriageway distributor road approximately 1.16km long extending from the Ongar Road roundabout in a south-westerly direction to tie into the existing R149 just south of Barberstown Lane South. This road will be delivered by Fingal County Council and is due to be tendered in Q3

2022 with view to start construction in Q1 2023, and finalise in Q2/Q3 2024. Fingal County Council will initilaly build this scheme as a single carraigeway and Construct the rail bridge to facilitate Dual carriageway. The reservation for the second carraigeway will be landscaped as agreed with FCC Parks Department.

2. **Upgrade of existing Barberstown Lane South** ï Barberstown Lane South will connect to the proposed Ongar-Barnhill North-South Link Road via a proposed new signalised junction, to replace the existing crossroads at the R149/Barberstown Lane junction. Upgrade of 650 metres to a single carriageway is proposed in an easterly direction along the existing link between the R149 & the R121 towards Pakenham Bridge.
3. **Barberstown Bridge** - located adjacent to the existing Barberstown railway level crossing and provides a grade separated crossing over the Royal Canal and Railway line when the existing level crossing at Barberstown is closed as part of the DART Expansion Programme. The bridge connects to the Part 8 approved ôBarberstown Lane South Upgradeô on the west side and to the ôKellystown Road proposal ï West of Clonsilla Stationôon its east side. This scheme is to be delivered by Irish Rail under Dart + west and is due to be lodged with An Bord Pleannala in the coming months and funded by NTA. The 110kv pylon near the bridge was relocated by ESB in 2007 to accommodate the bridge.
4. **Kellystown Road –** West of Clonsilla Station. This road would connect to the road leading from the Barberstown level crossing/ the proposed new Barberstown Bridge at its west end at a point where the existing R121 turns through a 90 degree angle to change alignment from north-south to east-west. It would connect to the ôKellystown Road- East of Clonsilla Stationôat its east end. The proposed Kellystown Road ï West of Clonsilla Station would run parallel to the existing R121. The R121 is not suitable for high volumes of traffic due to its winding alignment and the proposed new road would provide a safer alternative route inluding pedestrain and cyclist facilities.
5. **Kellystown Road** ï East of Clonsilla Station ï road proposal is shown on the FCC development plan and Kellystown LAP. It connects to the north-south section of the R121 (at a point approximately 100 south of the Clonsilla Level crossing)/ future proposed Kellystown Road ï West of Clonsilla Station at its west end. From here it continues east and runs approximately parallel to the Porterstown Road and connects to the recently completed Porterstown Link Road at a point adjacent to and north of Scoil Choilm Community National School at its east end. This section of road is expected to accommodate the Kellystown LAP traffic. Figure 5.1 (overleaf) shows the location of these road proposal in relation to the proposed development site. of these road proposal in relation to the proposed development site.

5.2 Public Transport

5.2.1 Rail

The key piece of strategic transport infrastructure to be delivered in future adjacent to the development site is the DART + West Programme. This project aims ï*to deliver frequent, modern, electrified services within the Greater Dublin Area, helping to achieve government climate change targets by reducing greenhouse gas emissions and facilitating a societal shift away from private car use and on to public transport. It will facilitate sustainable mobility and*

development, promote multi-modal transit, active transport and boost regional connectivity, helping make public transport the preferred option for more and more people."

The DART + West will be the first infrastructural projects of the DART+ Programme to be delivered, improving capacity on Maynooth and M3 Parkway to city centre rail corridors. The development site will benefit from the improvements of this programme as it is directly adjacent to the Hansfield Train station (on the M3 Parkway Line).

The project will bring the following improvements to the Line:

- *Increase train capacity from the current 6 trains per hour per direction up to 12 trains per hour per direction subject to demand. Passenger capacity will increase from 5,000 in 2019 to 13,200 passengers in 2025.*
- *Electrification and re-signalling of the Maynooth and M3 Parkway lines (approximately 40km in length). Reduce carbon emissions through the deployment of new electric trains.*
- *Support growing communities, businesses, and future development by providing high-quality integrated public transport service in line with Government policy including the National Planning Framework and Climate Action Plan.*
- *Closure of level crossings and provision of replacement bridges where required, including the level crossings at Closnsilla and Barberstown.*

The 2nd round of Public Consultation on the preferred option for the DART+ West project has now concluded it is expected to that an application to An Bord Pleanála will be lodged in 2022. Figure 5.2 below, illustrates the DART+ West Route Map.

Figure 5.2: *DART+ West Route Map*

Based on the above, it can be stated that the proposed development will continue to have a very frequent and high-quality public transport connectivity, improving the opportunities for sustainable travel. The changes to be delivered with Dart+ West will further improve the already frequent service available at Hansfield Station.

5.2.2 Bus

BusConnects: Bus Network Redesign and Core Bus Corridors Project

The ôBusConnectsôprogramme was launched by the National Transport Authority (NTA) in May 2017 and is described as *ña plan to fundamentally transform Dublinôs bus system, so that journeys by bus will be fast, reliable, punctual, convenient and affordable. It will enable more people to travel by bus than ever before and allow bus commuting to become a viable and attractive choice for employees, students, shoppers and visitors.*ò

The BusConnects programme contains three key elements:

- Dublin Area Bus Network Redesign Project;
- fare and ticketing enhancements; and
- better quality bus infrastructure, including the Core Bus Corridors Project.

The revised proposed bus network plan emerging from the Dublin Area Bus Network Redesign Project was published by the NTA in September 2020. Figure 5.3 presents the proposed bus network in the application siteôs surrounding.

Figure 5.3 *Proposed BusConnects network in vicinity to the site (Source: Blanchardstown Area Network Map)*

As shown in Figure , the development site is located in close proximity to branches B1 and B2 of the proposed BusConnects B-Spine. These branches will be serviced every 8 minutes throughout the day, with a 15-minutes bus frequency. These services will connect the site with Blanchardstown Town Centre, Dublin City Centre and several areas within north and south-west Dublin.

In addition to the B-Spine branches discussed above, the proposed development will be service by Local Routes L52, connecting to Adamstown Station, and Peak Time routes X61/X62, connecting to the city centre.

The Blanchardstown CBC project is programmed to be lodged with An Bord Pleanála in Q3 2022. When implemented, this project will provide significantly enhanced bus priority on the B-Spine corridor, reducing journey times and further enhancing capacity. The bus network in the vicinity of the site will therefore be high frequency in nature following implementation of the proposals contained within the Dublin Area Bus Network Redesign Project.

5.3 Cycle Network- Greater Dublin Area Cycle Network Plan (2013)

The *Greater Dublin Area Cycle Network Plan* was published by the NTA in December 2013 and sets out proposals to develop a cycle network within the region to achieve the national 10% cycle mode share target. It proposes a comprehensive and integrated network of infrastructure comprising primary, secondary, greenway and inter-urban components. The network within the development site's vicinity is presented in Figure .

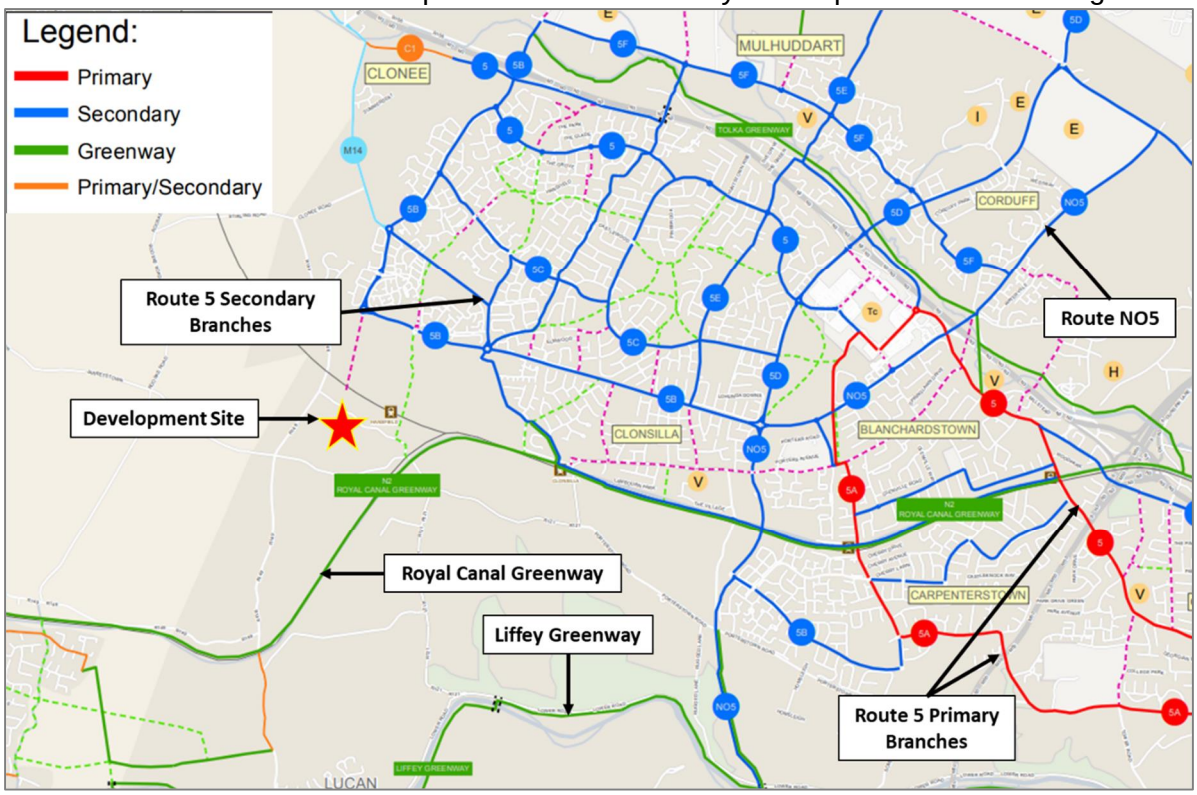


Figure 5.4 Cycle Network Plan in the Vicinity of the Site (Source: Greater Dublin Area Cycle Network Plan, 2013)

As shown in Figure 5.4 the development site is located in closed proximity to the following Cycle Routes:

- Royal Cannal Greenway: from the city centre via Cabra, Ashtown, Castleknock, Coolmine and Clonsilla. Some or all of this greenway will form part of National Cycle Route 2 between Dublin and Galway

- Liffey Valley Greenway: along the southern edge of this sector between Chapelizod and Leixlip.
- Route 5 Primary and Secondary: Liffey Quays to Heuston Station, and then through the Phoenix Park to Castleknock and Blanchardstown.
- Route NO5: from the coast at Kilbarrack to Donaghmede, Coolock, Santry and Finglas

At present, there are existing cycleways within the Hansfield SDZ that link from Hansfield Train Station to secondary routes north and east of the SDZ.

5.4 Walking Network

The planned pedestrian network is similar to the planned cycle network, as discussed in preceding Section 5.3, including the Royal Canal Greenway and the Liffey Valley Greenway. The internal pedestrian routes within the development and how they tie into the existing and proposed pedestrian paths in the vicinity of the site are discussed in section 6 of this Report.

6 Proposed Development

6.1 Proposed Development Description

6.1.1 Development Summary

The proposed development will consist of the demolition of the existing vacant industrial buildings and the construction of 1,243 residential units, approximately 3,174 m2 of commercial and community facilities, and ancillary development. The commercial and community development will include:

- Creche of 942 m2 with capacity for approximately 210 children.
- Medical centre (GP / Dental practice) of approximately 344 m2 with 8 no. consulting rooms.
- Convenience retail unit of 370 m2
- Five independent retail / retail service units ranging in size from 57 m2 to 127 m2 sqm, with capacity to amalgamate some of the units, if required.
- A Café of 158 m2
- A Community Space of 359 m2. This multi-use space will be able to accommodate a range of activities, including for example multi-denominational worship, fitness classes, community meetings etc.
- An Office Hub of 501 m2. The office hub is designed to provide hot-desk and office support facilities to facilitate hybrid working.
- Provision of an access Plaza to Hansfield Train Station, including provision for a commuting bike storage area.
- Providing for pedestrianisation / cycle way along Barberstown Lane North (L-7010-0), with vehicle use restricted to local access only.
- Land set aside for a primary school to accommodate a minimum of 16 classrooms, to be delivered by the department of education.

The residential units consist of a mix of unit types as detailed in Table 6.1. Buildings range in height from 2-storeys to 12-storeys.

Unit Type	No. of Units
1-bed Apartment	148
2-bed Apartment	589
3-bed Apartment	63
4-bed Apartment	4
1-bed Duplex	5
2-bed Duplex	20
3-bed Duplex	92
3-bed House	286
4-bed House	36
TOTAL:	1,243

Table 6.1 *Proposed Residential Units Mix*

6.1.2 Proposed Character Areas

The proposed development will spread over 10 different character areas, namely:

- Link Road West
- Link Road East
- Railway Quarter

- Station Plaza
- Station Quarter South
- Village Centre Residential
- Barnhill Cross
- Barnhill Crescent
- Barnhill Stream
- Parkside

Figure 6.1, below, illustrates the location of each of these character areas within the site. A detail description of the proposal for each area is provided within the remainder of this chapter.

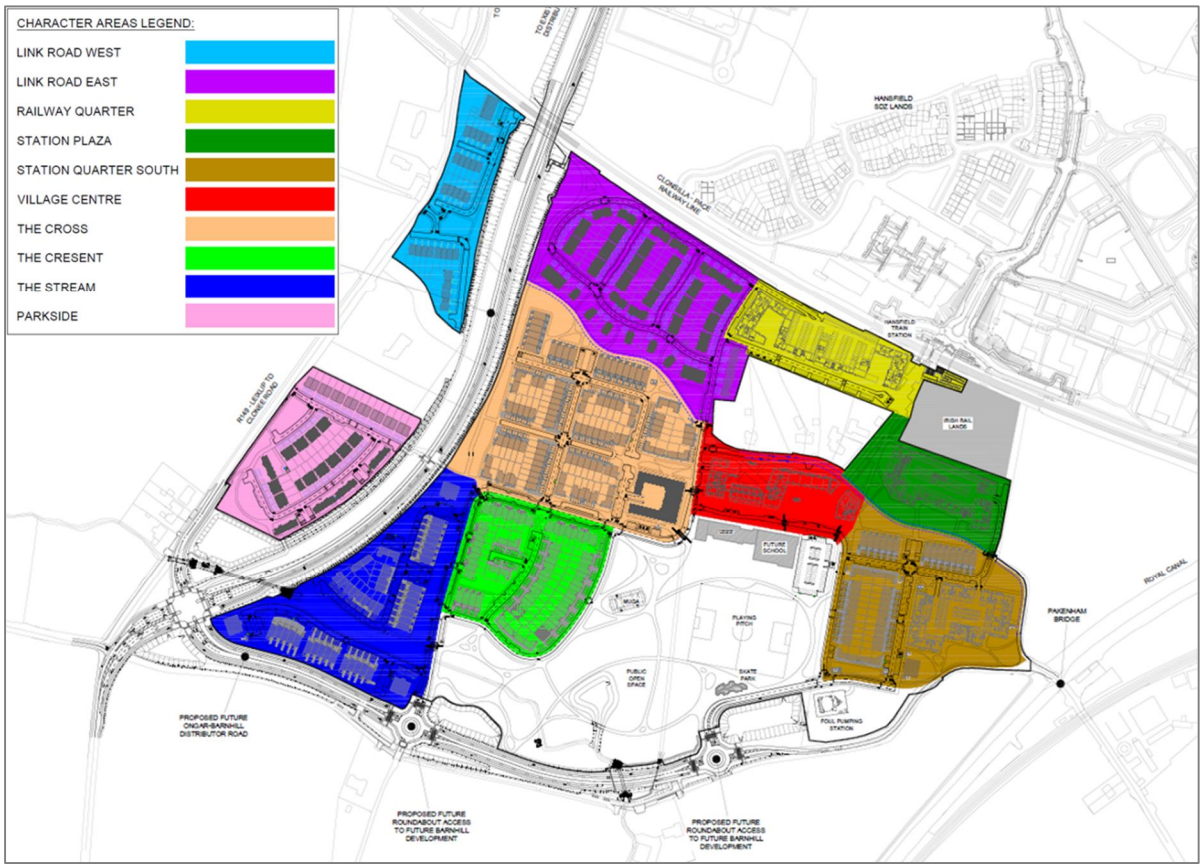


Figure 6.1 *Proposed Character Areas*

Detail layouts for each character areas, illustrating the provision for all users have been provided within the Planning Package.

6.2 Link Road West

6.2.1 Layout and Residential Units Breakdown

As Shown on Figure 6.1, Link Road West is located in the northwest corner of the site, on the western side of the Ongar Barnhill Road. This character Area will include a total of 33 no. residential properties comprising the following:

- 3 no. 2-Bed Duplex
- 3 No. 3-Bed Duplex
- 27 no. 3-Bed Houses

This character area will be accessed from the R149. A pedestrian/ cyclistôs link across the Ongar- Barnhill Road will be available in the northern side of the area to access Link Road Eastôand the eastern side of the development side.

6.2.2 Link Road West Parking

The proposed car parking and cycle parking provision for Link Road West is summarised in Table 6.2.

Proposed Units by Type	Car Parking		Cycle Parking
	Curtilage	Surface	
3 no. 2-Bed Duplex	-	3	6
3 no. 3-Bed Duplex	-	3	9
27 no. 3-Bed Houses	54	-	108*
Visitors	-	5	10
Total	**65**		**133**

Table 6.2 *Proposed Link Road West Parking*
**Dedicated Space (e.g., front of terraced house) or Assumed Capacity (Rear Garden)*

A total of 65 no. car parking spaces will be provided within Link Road West, of which 5 will be EV and 1 will be disable. All Houses will have ducting for EV Charging. 10% will be provided with charging points.

In terms of cycle parking, a total of 133 no. spaces will be provided of which, 4 will be equipped for electric bikes and 4 will be cargo bikes.

6.3 Link Road East

6.3.1 Layout and Residential Units Breakdown

As shown on Figure 6.1, Link Road East is located in the northern edge of the site, to the east of the Ongar Barnhill Road. This character area will be accessed via primary link roads inside the Barnhill site and will include a total of 91 no. residential properties comprising the following:

- 6 no. 2-Bed Duplex
- 6 No. 3-Bed Duplex
- 69 no. 3-Bed Houses
- 10 no. 4-Bed Houses

6.3.2 Link Road East Parking

The proposed car parking and cycle parking provision for Link Road West is summarised in Table 6.3.

Proposed Units by Type	Car Parking		Cycle Parking
	Curtilage	Surface	
6 no. 2-Bed Duplex	-	12	14
6 no. 3-Bed Duplex	-	12	18
69 no. 3-Bed Houses	138	-	207*
10 no. 4-Bed Houses	20	-	40*
Visitors	-	4	24
Total	**186**		**303**

Table 6.3 *Proposed Link Road East Parking*

**Dedicated Space (e.g., front of terraced house) or Assumed Capacity (Rear Garden)*
A total of 186 no. car parking spaces will be provided within Link Road East, of which 20 will be EV and 2 will be disable. All Houses will have ducting for EV Charging. 10% will be provided with charging points.

A total of 303 no. cycle parking spaces will be available in this Character area, of which, 9 will be equipped for electric bikes and 9 will be cargo bikes.

6.4 Railway Quater

6.4.1 Layout and Residential Units Breakdown

As Shown on Figure 6.1, Railway Quater is located in the northern edge of the site. This character Area will include a total of 211 no. residential properties within 4 no. buildings. ranging in height from 2-storeys to 12-storeys. The following no. unit types will be available in this area:

- 58 no. 1-Bed Apartments
- 151 no. 2-Bed Apartments
- 2 No. 2-Bed Duplex

6.4.2 Railway Quarter Parking

The proposed car parking and cycle parking for this Character Area will be accommodated at surface and basement level, summarised in Table 6.4.

Proposed Units by Type	Car Parking		Cycle Parking
	Podium/ Basement	Surface	
58 no. 1-Bed Apartments	48	-	58*
151 no. 2-Bed Apartments	75	45	304*
2 no. 2-Bed Duplex	2	-	4
Visitors	-	-	39
Total	**170**		**405**

Table 6.4 *Proposed Railway Quarter Parking*
**Dedicated Space at surface level*

A total of 170 no. car parking spaces will be provided for Railway Quarter, of which 18 will be EV and 9 will be disable.

In terms of cycle parking, a total of 405 no. spaces will be provided, of which, 366 spaces will be in the basement to accommodate residents and 39 will be at surface level to accommodate visitors. A total of 13 spaces will be equipped for electric bikes and 20 will be for cargo bikes.

Detail layouts of the basement car park has been submitted with the Planning Package.

6.4.3 Hansfield Station Commuter Cycle Parking

A total of 82 no. cycle parking spaces, of which 8 are for cargo bikes, are proposed directly adjacent to Hansfield Train Station. These spaces are anticipated to accommodate the cycle parking demand associate with commuter.

6.5 Station Plaza

6.5.1 Layout and Residential Units Breakdown

As Shown on Figure 6.1, Station Plaza is located in the north-eastern edge of the site. This Character Area will include a total of 166 no. residential properties within 4 no. buildings, ranging in height from 2-storeys to 12-storeys. The following no. unit types will be available in this area:

- 24 no. 1-Bed Apartments
- 117 no. 2-Bed Apartments
- 9 No. 2-Bed Duplex
- 16 no. 3-Bed Apartments

This character area will be directly adjacent to the Hansfield Train Station, which will be connected to the site via a pedestrian plaza. This Plaza will include seating and landscaping areas, in addition to Public Realm cycle parking right outside the Dart Station.

6.5.2 Station Plaza Parking

The proposed car parking and cycle parking for this Character Area will be accommodated at surface and basement level, summarised in Table 6.5.

Proposed Units by Type	Car Parking		Cycle Parking	
	Podium/ Basement	Surface	Podium/ Basement	Surface
24 no. 1-Bed Apartments	10	-	24	-
117 no. 2-Bed Apartments	70	-	234	-
9 no. 2-Bed Duplex	6	-	18	-
16 no. 3-Bed Apartments	10	-	48	-
Visitors	-	4	20	-
Creche Phase 1	4	-	14	-
Total	**104**		**358**	

Table 6.5 *Proposed Station Plaza Parking*

A total of 104 no. car parking spaces will be provided for Station Plaza, of which 11 will be EV and 6 will be disable.

In terms of cycle parking, a total of 358 no. spaces will be provided, all within the basement compound. A total of 18 spaces will be for cargo bikes.

Most parking provision for this character area will be accommodated at basement level (detail layouts provided with the planning package.)

6.6 Station Quarter South

6.6.1 Layout and Residential Units Breakdown

As shown on Figure 6.1, Station Quarter South is located in the eastern edge of the site. This character Area will include a total of 201 no. residential properties comprising the following:

- 3 no. 1-Bed Apartments
- 127 no. 2-Bed Apartments
- 25 no. 3-Bed Apartments

- 14 no. 3-Bed Duplex
- 24 no. 3-Bed Houses
- 4 no. 4-Bed Apartments
- 4 no. 4-Bed Houses

6.6.2 Station Quarter South Parking

The proposed car parking and cycle parking provision for Station Quarter South is summarised in Table 6.6.

Proposed Units by Type	Car Parking			Cycle Parking	
	Curtilage	Podium/ Basement	Surface	Podium/ Basement	Surface
3 no. 1-Bed Apartments	-	-	1	5	-
127 no. 2-Bed Apartments	14	47	6	230	28
25 no. 3-Bed Apartments	-	24	1	90	-
14 no. 3-Bed Duplex	14	-	-	-	42
24 no. 3-Bed Houses	40	-	8	-	72*
4 no. 4-Bed Apartments	-	4	-	19	-
4-Bed Houses	-	-	8	-	16*
Visitors	-	4	27	-	42
Total	**198**			**544**	

Table 6.6 *Proposed Station Quarter South Parking*
**Dedicated Space (e.g., front of terraced house) or Assumed Capacity (Rear Garden)*

A total of 198 no. car parking spaces will be provided within Station Quarter South, of which 13 will be EV and 6 will be disable.

In terms of cycle parking, a total of 544 no. spaces will be provided, of which 18 will be cargo bikes spaces. Detail Basement Car park layout is provided with the drawings in the planning package.

6.7 Village Centre

6.7.1 Layout and Residential Units Breakdown

As shown on Figure 6.1, Village Centre is located in the centre of the site. This character area will include a total of 118 no. residential properties and several non-residential units comprising the following:

- 24 no. 1-Bed Apartments
- 73 no. 2-Bed Apartments
- 8 no. 3-Bed Apartments
- 13 no. 3-Bed Duplex
- 157.5 sqm Café
- 343.8 sqm Medical Centre
- 127.3 sqm Remote Working Hub
- 6 no. Commercial/ Retail Units (870.5 sqm in total)
- 359.2 sqm Community Centre

These will be provided over 5 no. buildings. ranging in height from 2-storeys to 12-storeys.

6.7.2 Village Centre Parking

The proposed car parking and cycle parking provision for Village Centre is summarised in Table 6.7.

Proposed Units by Type	Car Parking		Cycle Parking	
	Podium/ Basement	Surface	Podium/ Basement	Surface
24 no. 1-Bed Apartments	25	-	30	-
73 no. 2-Bed Apartments	80	-	150	-
8 no. 3-Bed Apartments	8	-	26	-
13 no. 3-Bed Duplex	15	-	39	-
Visitors Residential	5	5	25	-
Commercial / Park Visitors	10	17		52
Medical Centre	8	5		30
School	-	48		30
Go-Car Spaces		2		
Total	228		382	

Table 6.7 *Proposed Village Centre Parking*

A total of 228 no. car parking spaces will be provided within Village Centre, of which 23 will be EV and 13 will be disable.

A car park will be provided directly adjacent to the school lands, which is expected to accommodate 77 no. dedicated car parking spaces, of which, 48 will be dedicated for the school, 2 will be dedicated ôGo-Carô Spaces, and the remaining will be for commercial and park visitors.

In terms of cycle parking, a total of 382 no. spaces will be provided, of which 25 will be equipped for electric bikes and 19 will be cargo bike spaces.

6.8 Barnhill Cross

6.8.1 Layout and Residential Units Breakdown

As shown on Figure 6.1, Barnhill Cross is located in the centre of the site. This character area and will include a total of 118 no. residential properties comprising the following:

- 21 no. 1-Bed Apartments
- 65 no. 2-Bed Apartments
- 11 no. 3-Bed Apartments
- 18 no. 3-Bed Duplex
- 70 no. 3-Bed Houses
- 10 no. 4-Bed Houses

6.8.2 Barnhill Cross Parking

The proposed car parking and cycle parking provision for Barnhill Cross is summarised in Table 6.8.

Proposed Units by Type	Car Parking			Cycle Parking	
	Curtilage	Podium/ Basement	Surface	Podium/ Basement	Surface
21 no. 1-Bed Apartments	-	-	-	22	-
65 no. 2-Bed Apartments	12	32	6	99	36*
11 no. 3-Bed Apartments		11		35	-
18 no. 3-Bed Duplex	12	-	6		54*
70 no. 3-Bed Houses	108		24	-	210*
10 no. 4-Bed Houses	10	-	9	-	40*
Visitors Residential	4	-	39		41
Total	273			537	

Table 6.8 *Proposed Barnhill Cross Parking*
**Dedicated Space (e.g., front of terraced house) or Assumed Capacity (Rear Garden)*

A total of 273 no. car parking spaces will be provided within Barnhill Cross, of which 22 will be EV and 5 will be disable.

In terms of cycle parking, a total of 537 no. spaces will be provided, of which 9 will be cargo bike spaces.

6.9 Barnhill Crescent

6.9.1 Layout and Residential Units Breakdown

As Shown on Figure 6.1, Barnhill Crescent is located in the southern side of the site. This character area and will include a total of 77 no. residential properties comprising the following:

- 15 no. 1-Bed Apartments
- 4 No. 2-Bed Apartments
- 4 no. 3-Bed Duplex
- 50 no. 3-Bed House
- 4 no. 4-Bed House

6.9.2 Barnhill Crescent Parking

The proposed car parking and cycle parking provision for Barnhill Crescent is summarised in Table 6.9.

Proposed Units by Type	Car Parking		Cycle Parking
	Curtilage	Surface	
15 no. 1-Bed Apartments	-	15	20
4 no. 2-Bed Apartments	4	-	8*
4 no. 3-Bed Duplex	4	-	12*
50 no. 3-Bed House	56	24	150*
4 no. 3-Bed House	6	2	16*
Residential Visitors	6	13	18
Total	**130**		**224**

Table 6.9 *Proposed Barnhill Crescent Parking*
**Dedicated Space (e.g., front of terraced house) or Assumed Capacity (Rear Garden)*

A total of 130 no. car parking spaces will be provided within Barnhill Crescent, of which 13 will be EV and 4 will be disable.

A total of 224 no. cycle parking spaces will be provided, of which 3 will be cargo bikes spaces.

6.10 Barnhill Stream

6.10.1 Layout and Residential Units Breakdown

As Shown on Figure 6.1, Barnhill Stream is located in the southwestern side of the site. This character area and will include a total of 98 no. residential properties comprising the following:

- 3 no. 1-Bed Apartments
- 47 No. 2-Bed Apartments
- 3 No. 3-Bed Apartments
- 29 no. 3-Bed Duplex
- 14 no. 3-Bed House
- 2 no. 4-Bed House

6.10.2 Barnhill Stream Parking

The proposed car parking and cycle parking provision for Barnhill Stream is summarised in Table 6.10.

Proposed Units by Type	Car Parking		Cycle Parking
	Curtilage	Surface	
3 no. 1-Bed Apartments	-	3	4
47 no. 2-Bed Apartments	23	24	98
3 no. 3-Bed Apartments	-	3	12
29 no. 3-Bed Duplex	24	5	87*
14 no. 3-Bed House	16	12	42*
2 no. 4-Bed House	-	4	8*
Visitors	-	23	21
Total	**137**		**272**

Table 6.10 *Proposed Barnhill Stream Parking*
**Dedicated Space (e.g., front of terraced house) or Assumed Capacity (Rear Garden)*

A total of 137 no. car parking spaces will be provided within Barnhill Stream, of which 16 will be EV and 7 will be disable.

In terms of cycle parking, a total of 272 no. spaces will be provided, of which 5 will be cargo bikes spaces.

6.11 Parkside

6.11.1 Layout and Residential Units Breakdown

As Shown on Figure 6.1, Parkside is located in the western side of the site (west of the Ongar-Barnhill Road). This character area and will include a total of 53 no. residential properties comprising the following:

- 5 no. 1-Bed Duplex
- 5 No. 2-Bed Apartments
- 5 no. 3-Bed Duplex
- 32 no. 3-Bed House
- 6 no. 4-Bed House

6.11.2 Parkside Parking

The proposed car parking and cycle parking provision for Parkside is summarised in Table 6.11.

Proposed Units by Type	Car Parking		Cycle Parking
	Curtilage	Surface	
5 no. 1-Bed Duplex	-	5	5
5 no. 2-Bed Apartments	-	8	10
5 no. 3-Bed Duplex	-	10	15
33 no. 3-Bed House	64	-	99*
6 no. 4-Bed House	12	-	28*
Visitors	-	3	22
Total	**102**		**179**

Table 6.11 *Proposed Parkside Parking*
**Dedicated Space (e.g., front of terraced house) or Assumed Capacity (Rear Garden)*

A total of 104 no. car parking spaces will be provided within Parkside, of which 13 will be EV and 2 will be disable.

In terms of cycle parking, a total of 179 no. spaces will be provided, of which 130 will be equipped for electric bikes and 4 will be cargo bikes spaces.

6.12 Proposed Development Movement Strategy

6.12.1 Internal Pedestrian/Cyclist Network and Circulation

Figure 6.2 below, illustrates the proposed pedestrian/cyclistôs network inside the Site.

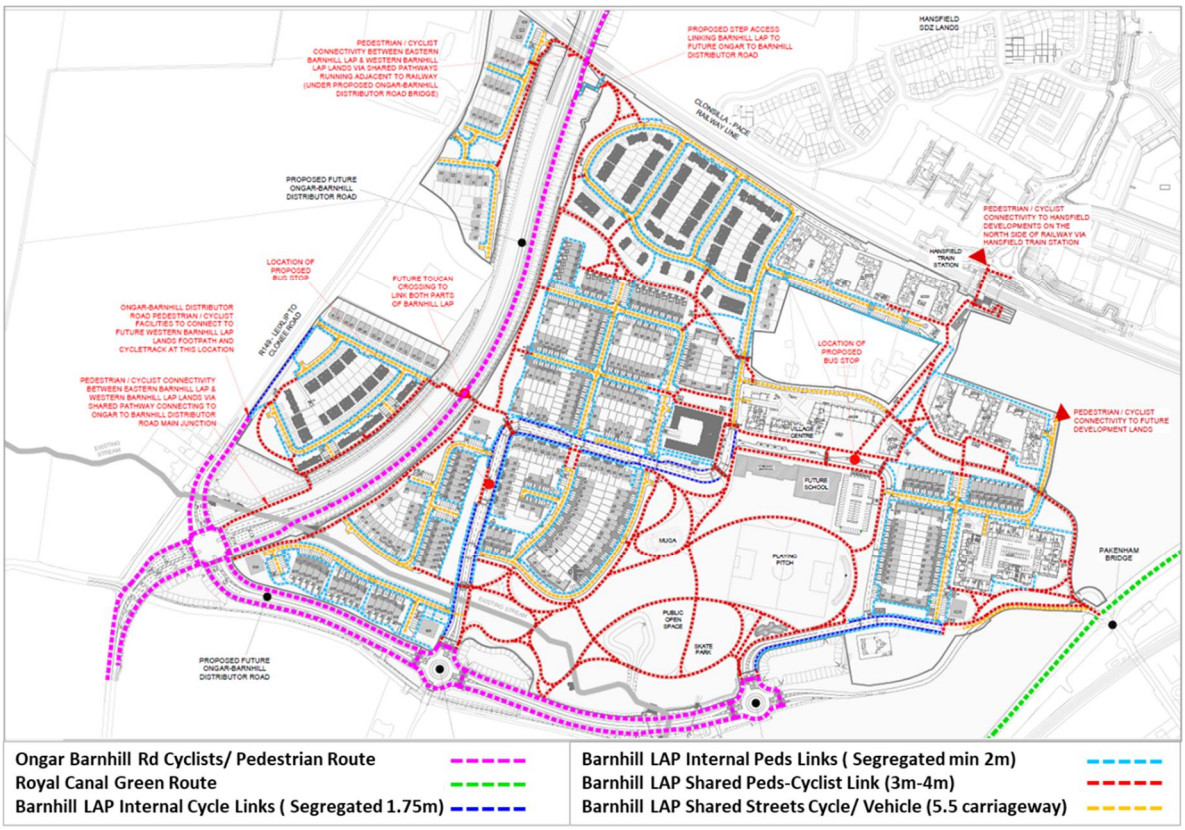


Figure 6.2 *Proposed Pedestrian/Cyclist Network*

As shown above, the network accommodating pedestrians and cyclists extends through the entire development, along all road and parks. Footpaths have been designed to have a minimum width of 2.0 metres. The cycle tracks proposed will be 1.75 metres wide. The areas where pedestrians and cyclists will be accommodated within a shared spaces will measure 3-4 metres wide. Two pedestrian/cycle link will be provided across the Ongar-Barnhill Road, one connecting ôParksideô Character Area to the ôBarnhill Streamô and the second connecting ôLink Road Westô to ôLink Road Eastô

Mid-block crossings have been provided where the distance between junctions is greater than 120m.

Drawings have been prepared illustrating the most convenient walking/cycling routes from each character areas to following key destinations inside the development:

- the railway station
- the village centre
- the school
- the main park

These drawings have been included in the CSEA Drawing Pack (no. 16_053_001 to no. 16_053_007).

6.12.2 Pedestrian/Cyclists Connection to Hansfield and Royal Canal Greenway

A Pedestrian/Cyclists link between the Barnhill Site and Hansfield area will be available via the proposed Ongar-Barnill Link Road and through a link across the Hansfield Train Station. Figure 6.3, below Illustrates the Layout of this connection.

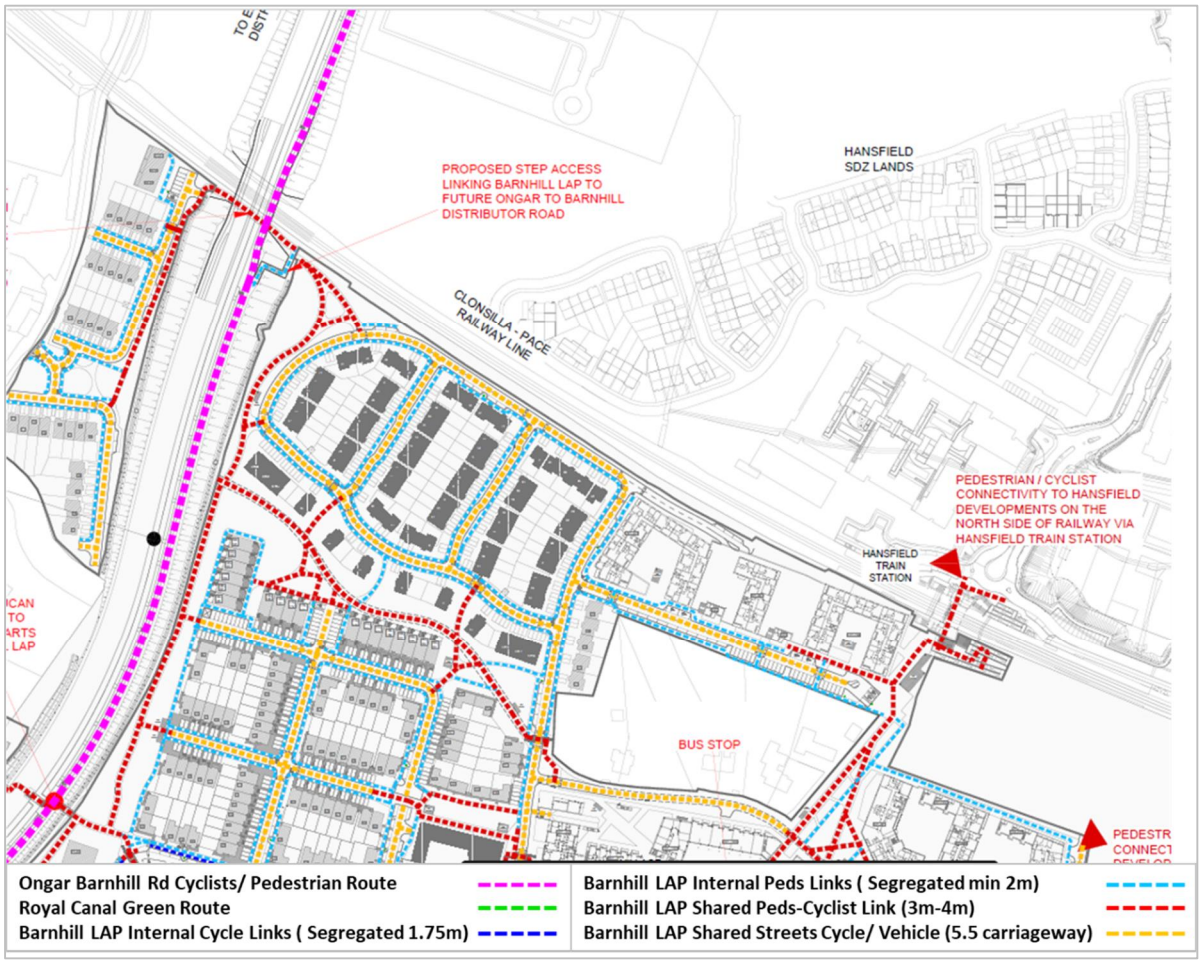


Figure 6.3 *Proposed Pedestrian/Cyclist Connection to Hansfield Area*

The proposal also will have a direct connection to the Royal Canal Greenway. Figure 6.4 (overleaf) illustrates the layout of this connection.

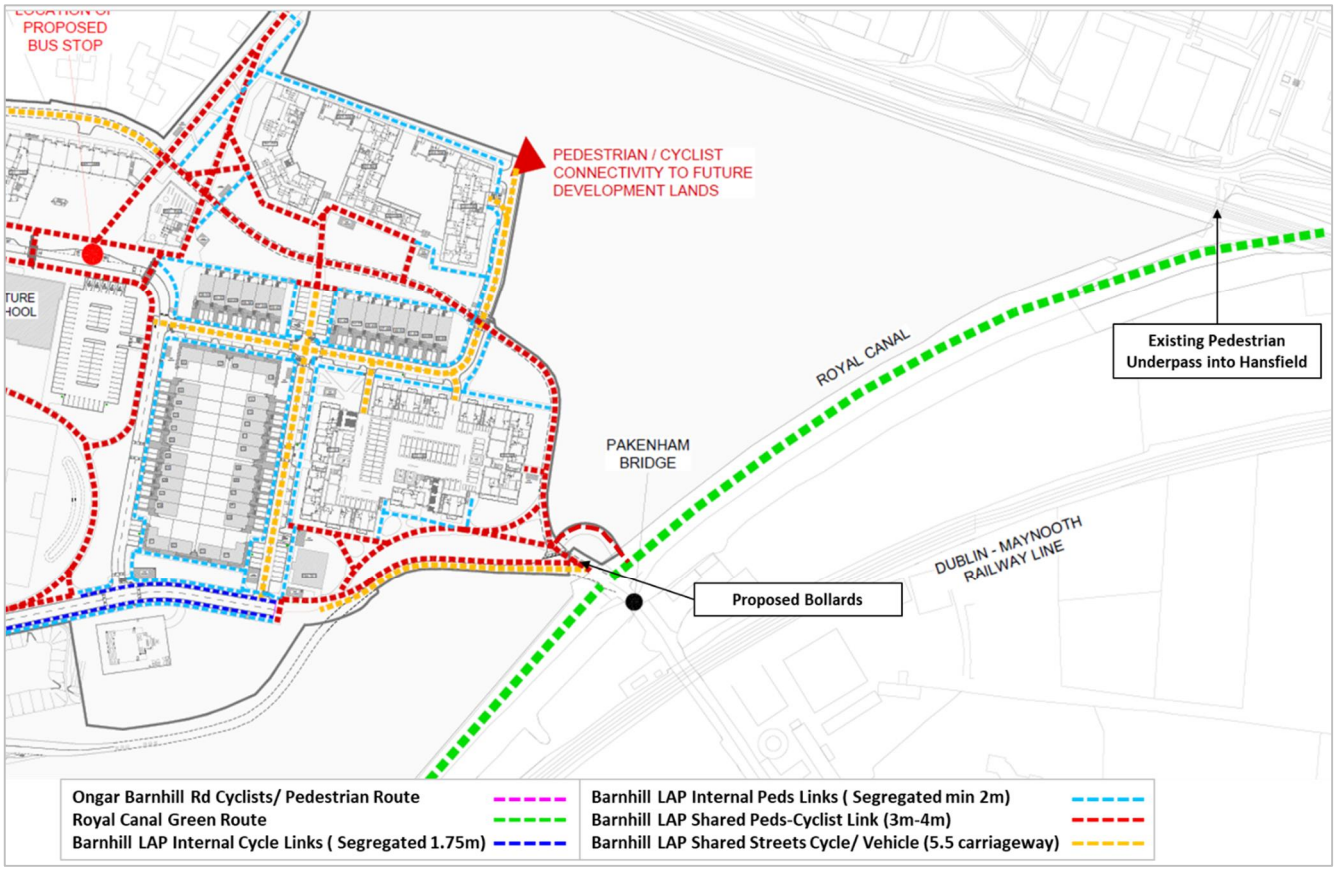


Figure 6.4 *Proposed Pedestrian/Cyclist Connection to Royal Canal*

As shown above, a pedestrian underpass connecting the Royal Canal to Hansfield is currently available. This will provide direct connectivity from the development to amenities available in Future Hansfield Village.

Vehicle movements along Barberstown Lane North will be limited as this will be predominately a pedestrian/cyclists link, with the exception of the access to existing houses. Bollards will be put in place where this road meets Barberstown Lane South and Milestown Road to restrict vehicle movement.

6.12.3 Proposed Pedestrian Crossings and Traffic Calming

Following the guidelines recommended by DMURS in relation to traffic calming, series of horizontal and vertical deflections have been included in the development design. Raised tables, zebra crossings and curves are provided in the road network in order to ensure that a low-speed environment for pedestrians and cyclists.

Raised tables have been provided at the following locations:

- On longer straights where there is more than 70m between junctions.
- At all equal priority junctions
- At all pedestrian crossings
  The provision of on-street car parking also promotes a low-speed environment

Figure 6.5 illustrates the location of the raised tables and zebra crossings throughout the development.

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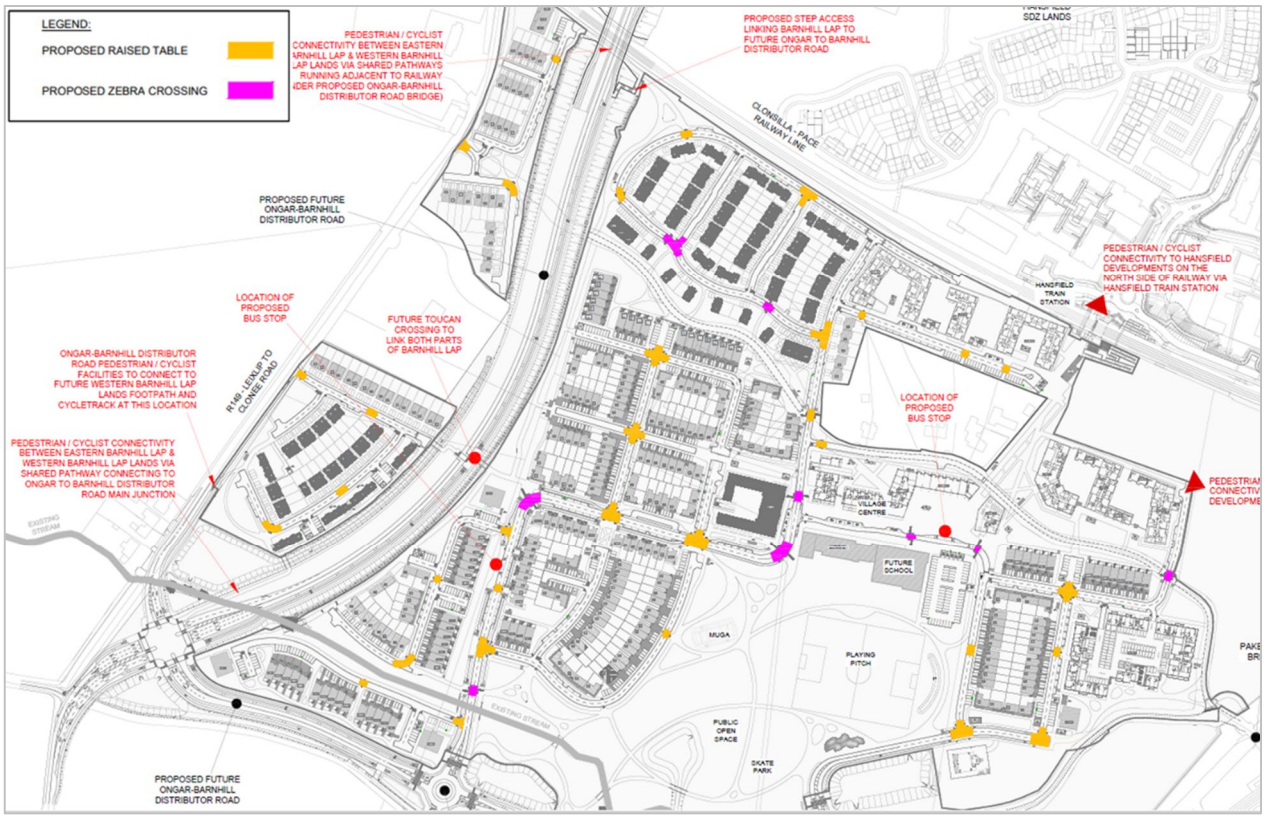


Figure 6.5 *Proposed Traffic Calming and Zebra Crossings*

6.12.4 Internal Vehicular Circulation

Vehicular access to the development site will be via 2 no. access points into Barberstown Lane South. Roundabouts will be available at this access points, which will be delivered by Fingal County Council with the upgrades proposed on this stretch of road.

The proposed Primary Link will have a carriageway of 6.0 metres wide and the proposed secondary roads will have a carriageway of 5.5 metres.

Figure 6.6, illustrate the development's proposed road network.

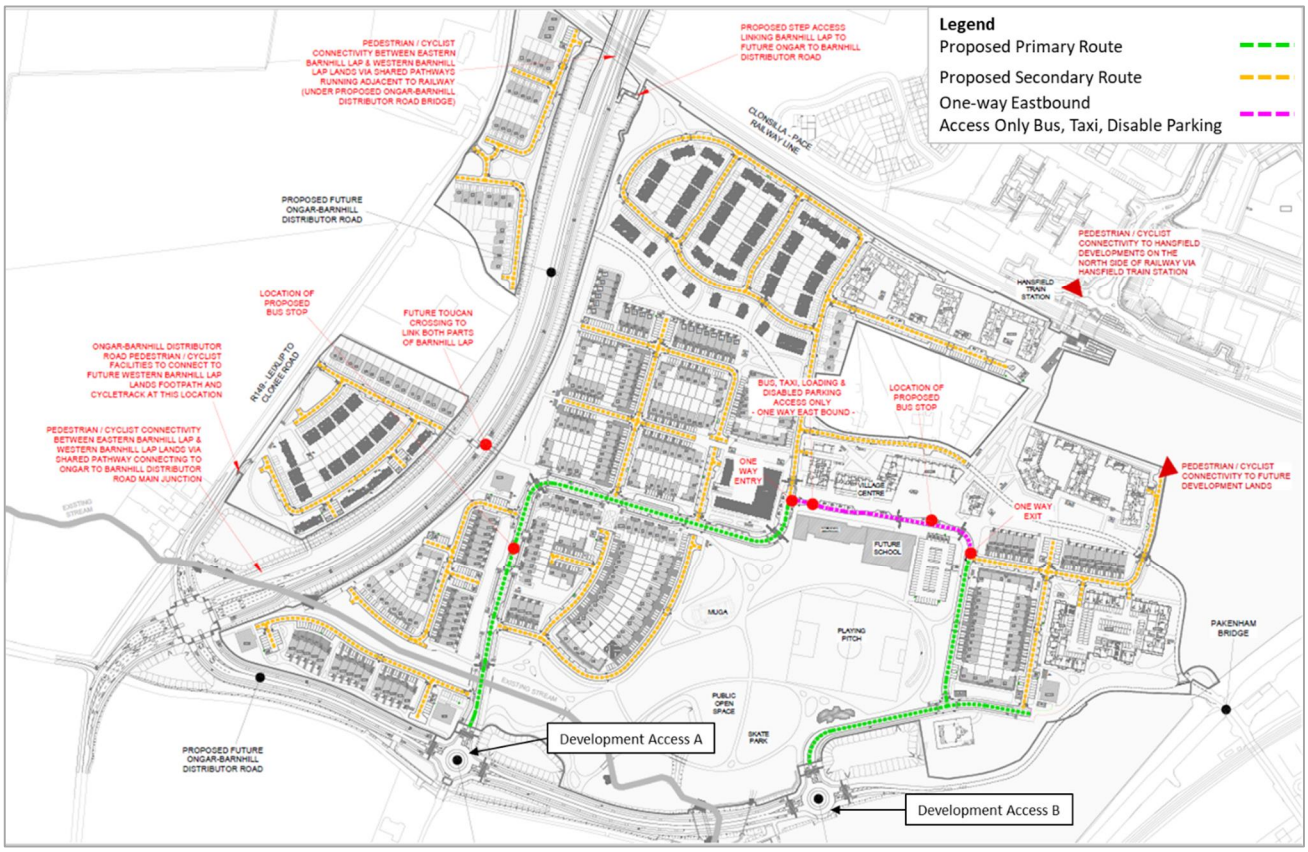


Figure 6.6 *Proposed Road Network*

6.13 Proposed Barberstown Lane North Layout

For most sections of Barberstown Lane North, it is proposed that vehicle movements will not be allowed as this will be turned into a pedestrian/cyclistôs link. The only section of road that will retain vehicle movements will be the access to existing properties within the site.

The pedestrianisation of Barberstown Lane North (east of the existing properties) will be implemented at a later phase in the development, subject to agreement on implementation with Fingal County Council.

The creation of a cul-de-sac will be required on the western end of the road for the delivery of the Ongar-Barnhill Road by Fingal County Council; Bollards will be put in place where this road meets Barberstown Lane South and Milestown Road to restrict vehicle movement (eastern end).

The drawings illustrating the existing and proposed cross-sections for this road have been included in the CSEA Drawing Pack.

6.13.1 Access to Existing Houses Within the Site

The stretch of road currently providing access to the existing properties inside the site will remain as existing. ôAccess Onlyôsignage will be put in place in order to limit the number of vehicle movements in and out the retained section of road. Bollards will be put in place on the approach eastern side of this access road in order to ensure vehicular movements restrictions into the plaza leading to the train station.

Cyclists will be expected to share the road with the vehicles and a 2.8 metres wide footpath will be available accommodate pedestrians. Figure 6.7 illustrates the proposed layout of this

stretch of road and its interaction with surrounding network. Figure 6.8 illustrates the existing and proposed cross section for this access road.

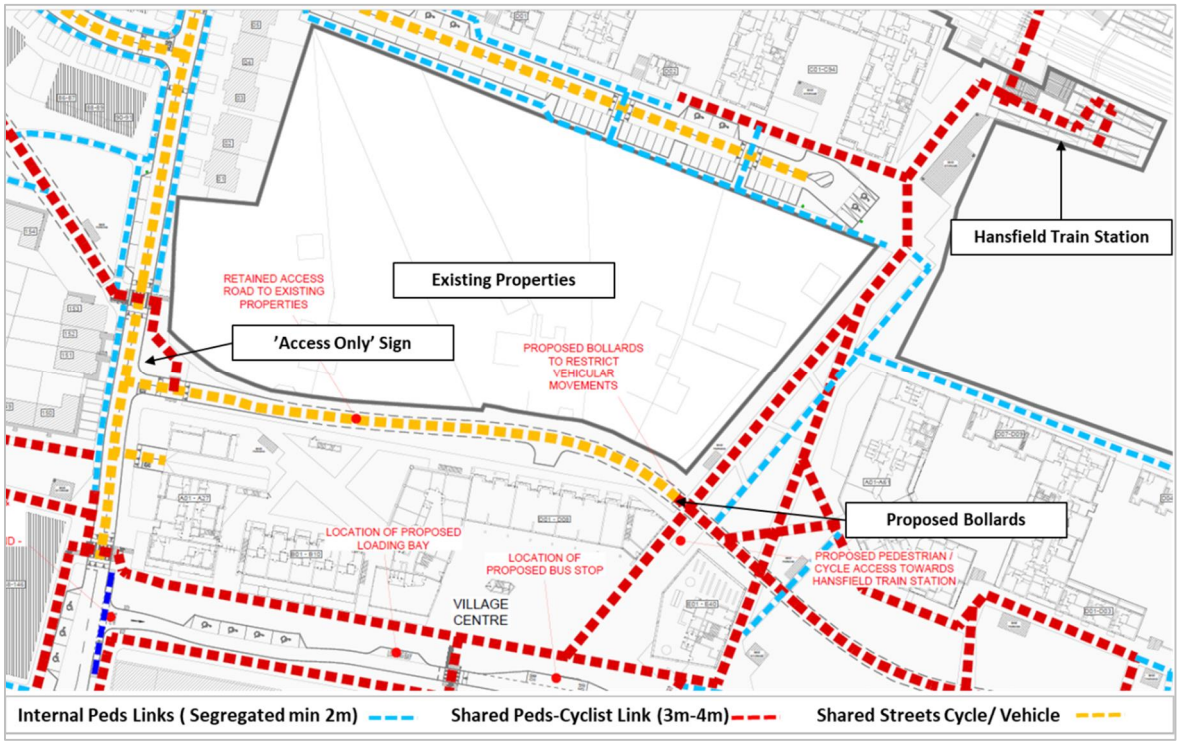


Figure 6.7 *Proposed Access Arrangements to Existing Properties in the Site*

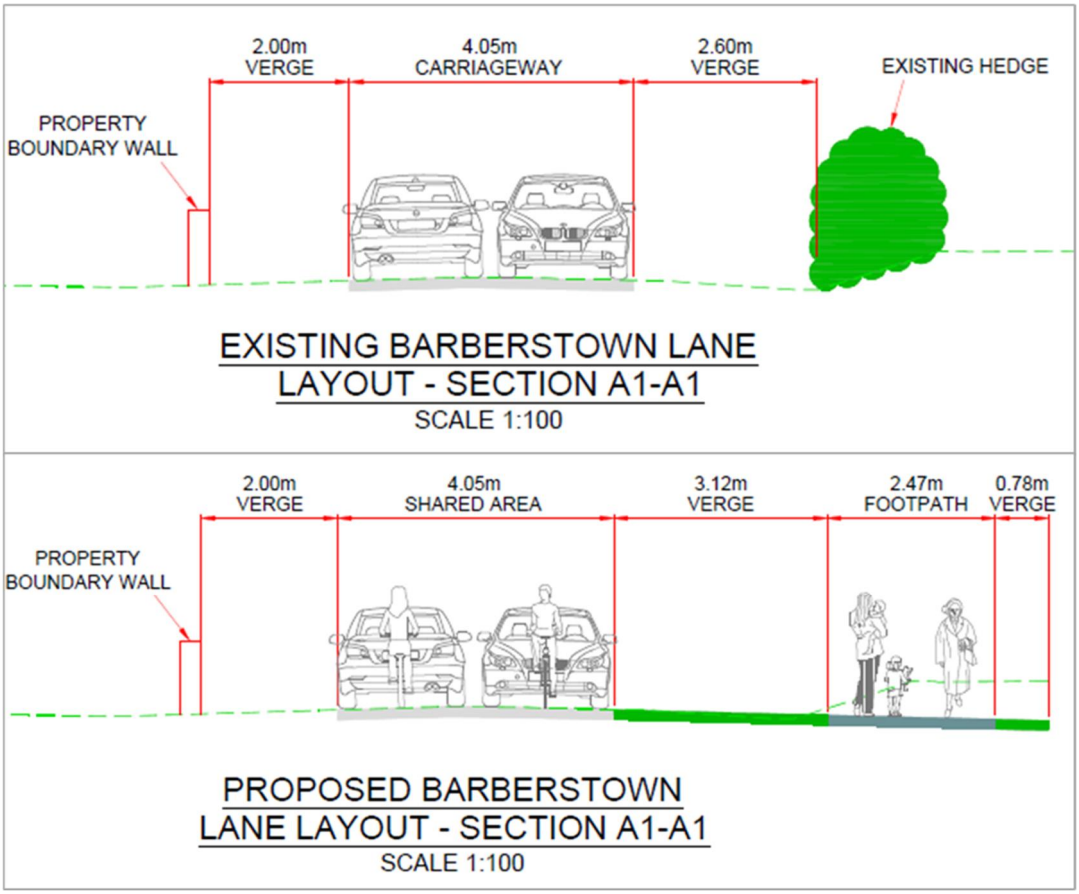


Figure 6.8 *Existing and Proposed Cross Section Barberstown Lane North Access Road*

6.14 School/Creche Access

It is proposed that the road directly to the north of the school will be a One-Way(westbound). General vehicle movement will be restricted, allowing access only for disabled parking users attempting to reach the disabled parking spaces on this road, vehicles to use the loading bay, and buses. This will ensure a safe school street access environment free from traffic and will encourage active travel school access.

The car park to the east of the future school will provide park-and-stride for the school/creche. It is anticipated that this car park will accommodate the car parking demand for the school and the public park.

Designated creche car parking is provided within the basement car park of Station Plaza character area, where the creche is located.

The access arrangements provided for this area have been designed in accordance with *NTA's Safe Routes to School guidance document, March 2022.*

The provision for pedestrian/cyclists in the local area is presented in Figure 6.7.

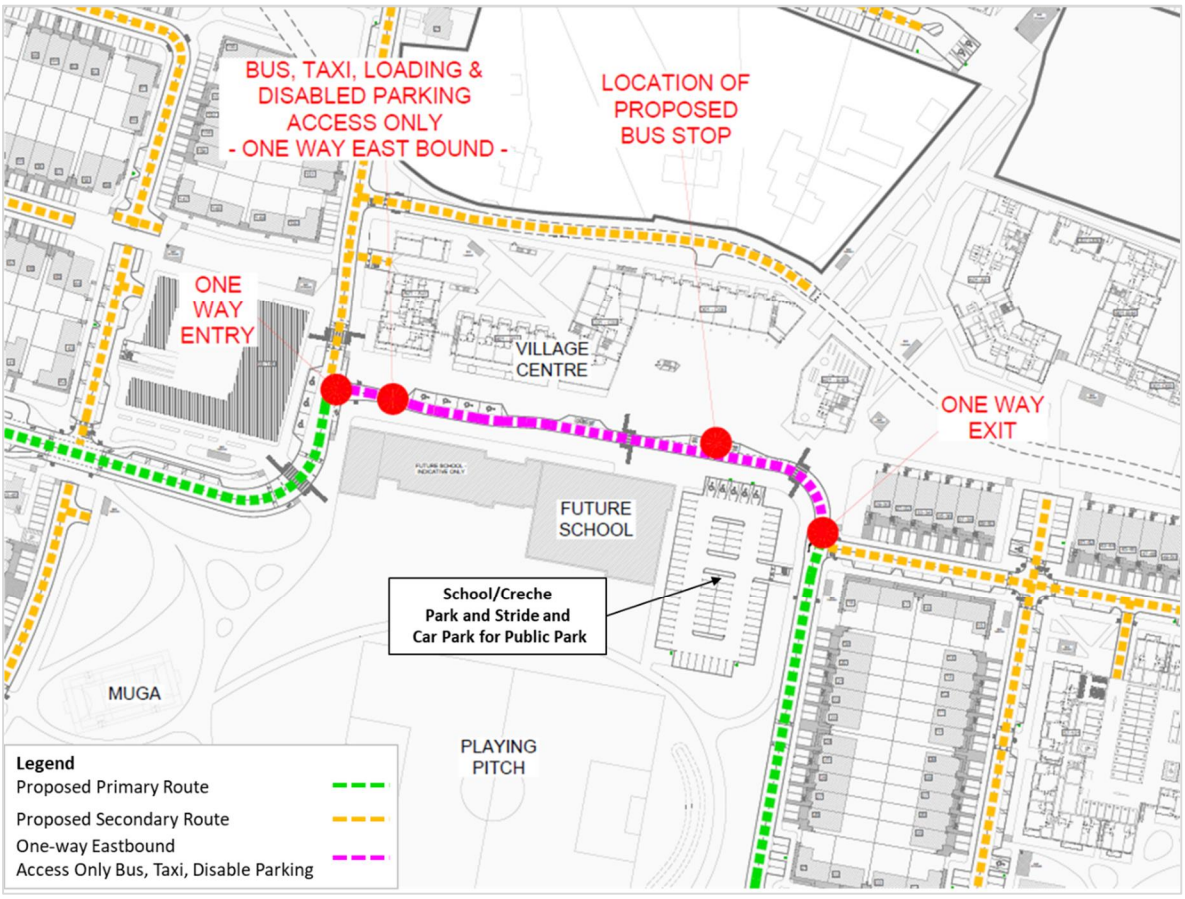


Figure 6.9 *Proposed School/Creche Access Arrangements*

6.15 Proposed Car Parking and Cycle Parking Strategy

6.15.1 Car Parking

Details for the car parking layout is provided individually for each character areas within subsection 6.2-6.11 in this chapter. Figure 6.10, below, illustrates the location of all car parking spaces proposed with the development. Detail layouts for each character areas and

the basement car park have been submitted with the planning package. Appropriate Parking numbers have been provided given the location of the scheme adjacent to the Rail station and to promote Active travel. The Mobility management strategy report outlines the justification of parking numbers in more detail in terms of mode split.

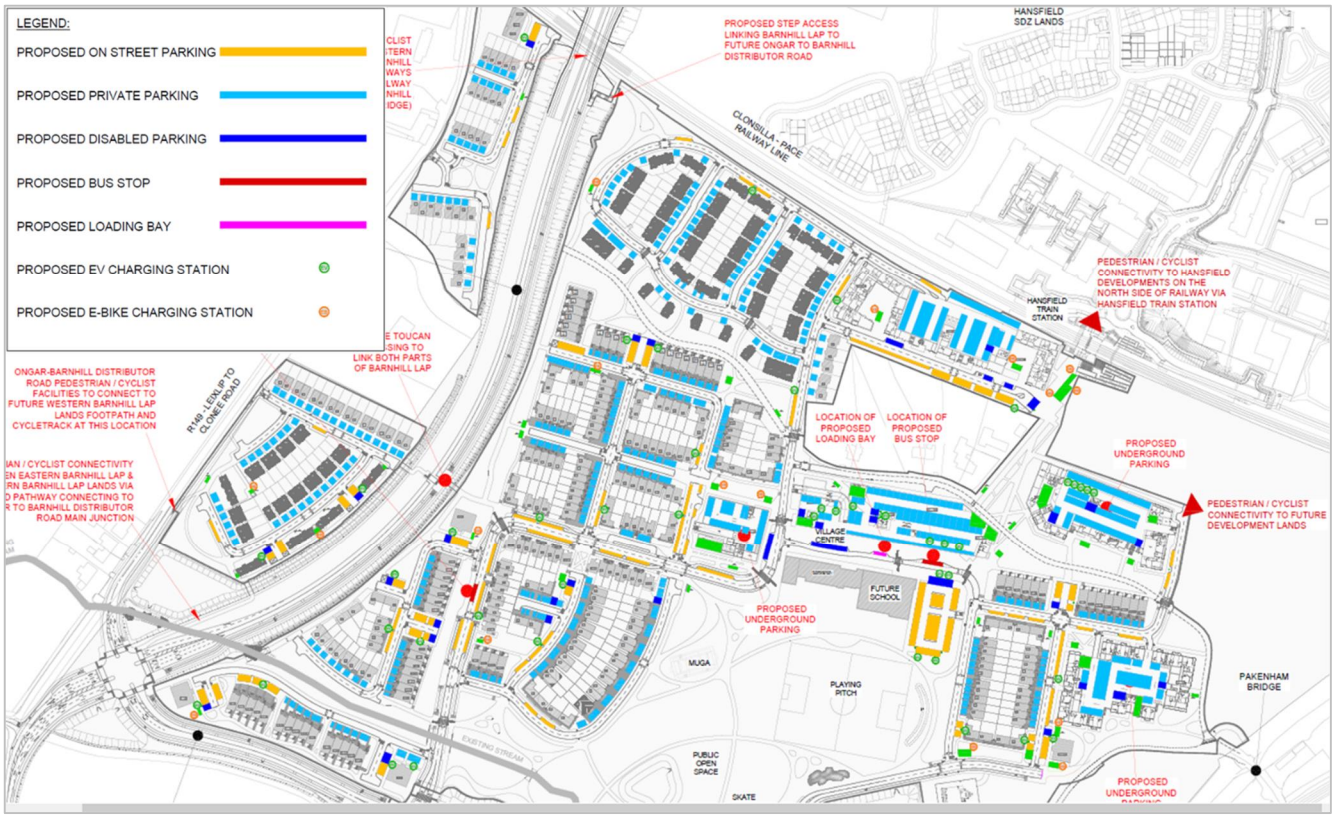


Figure 6.10 *Proposed Development Car Parking Locations*

Table 6.12 summarises the proposed car parking provision for each character area.

Character Area	Curtilage	Podium or Basement	Surface	Total Car Parking Provision
Link Road West	54	-	11	**65**
Link Road East	158		28	**186**
Railway Quarter	-	125	45	**170**
Station Plaza	-	100	4	**104**
Station Quarter South	68	79	51	**198**
Village Centre Residential	-	151	77	**228**
Barnhill Cross	146	43	84	**273**
Barnhill Crescent	76	-	54	**130**
Barnhill Stream	63	-	74	**137**
Parkside	76	-	26	**102**
Total	**641**	**498**	**454**	**1,593**

Table 6.12 *Summary Proposed Car Parking Provision*

Table 6.13, below provides details about the proposed EV, disabled, and visitorsô car parking provision for each character area.

Character Area	Total Proposed EV	Total Proposed Disable	Total Designated for Visitors	Total Commercial/Creche/ Medical Centres	School Parking
Link Road West	5	1	5		
Link Road East	20	2	4		
Railway Quarter	18	9			
Station Plaza	11	6	4	4	
Station Quarter South	13	6	31		
Village Centre Residential	23	13	10	42	48
Barnhill Cross	22	5	43		
Barnhill Crescent	13	4	19		
Barnhill Stream	16	7	23	-	-
Parkside	13	2	3		
Total	**153**	**55**	**142**	**46**	**48**

Table 6.13 *Summary Proposed EV, Disable, and Visitors Car Parking Provision*

6.15.2 Cycle Parking

Details for the cycle parking layout is provided individually for each character areas within subsection 6.2-6.11 in this chapter. Detail layouts for each character areas, indicating the cycle parking locations, have been submitted within the planning package. Figure 6.9 (overleaf) illustrate the location of the proposed cycle parking for E-bikes. Table 6.14 summarises the proposed cycle parking provision for each character area.

Character Area	Podium or Basement		Surface		Dedicated Space (e.g., front of terraced house or Assumed Capacity Rear Garden)		Total Proposed Cycle Parking
	Residential	Visitors	Residential	Visitors	Residential	Visitors	
Link Road West	-	-	123	10	-	-	133
Link Road East	-	-	279	24	-	-	303
Railway Quarter	-	-	-	39	366	-	405
Station Plaza	324	-	14	20	-	-	358
Station Quarter South	344	-	-	42	158	-	544
Village Centre Residential	245	-	112	25	-	-	382
Barnhill Cross	195	-	-	41	301	-	537
Barnhill Crescent	20	-	20	18	186	-	224
Barnhill Stream	56	-	-	21	195	-	272
Parkside	-	-	157	22	-	-	179
Total	**1,184**	**0**	**705**	**240**	**1,206**	**0**	**3,337**

Table 6.14 *Summary Proposed Cycle Parking Provision*

Table 6.15 provides details about the proposed cycle parking for E-Bikes and cargo bikes on each character area.

Character Area	Total Proposed Cargo Bikes	Total Proposed EV Bikes
Link Road West	4	4
Link Road East	9	9
Railway Quarter	20	13
Station Plaza	18	
Station Quarter South	18	
Village Centre Residential	19	25
Barnhill Cross	9	-
Barnhill Crescent	3	
Barnhill Stream	5	-
Parkside	4	130
Total	**111**	**181**

Table 6.15 *Summary Proposed Cargo and EV Cycle Parking Provision*

6.16 Shared Driving Scheme (Go-Car)

A total of 2 no. Go-Car Car Parking Spaces will be provided in the Village Centre. These spaces will be located in the car park adjacent to the school and will be dedicated for the use of this share driving scheme.

The provision for Go-Car can be increased in the future based on demand.

6.17 Proposed Development Construction Phasing

The proposed development construction will divide into 5 no. phases, illustrated in Figure 6.11, which follows. The order in which the development is planned is from phase 1 to 5.

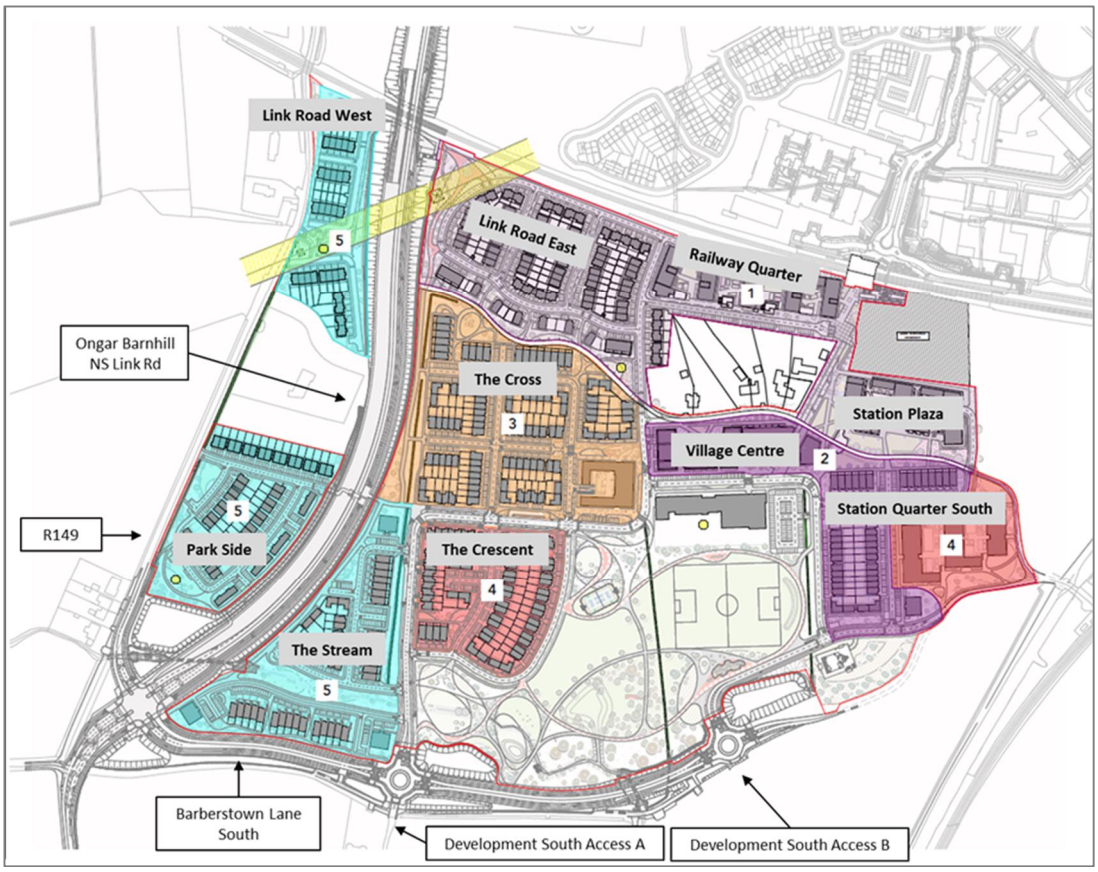


Figure 6.11: *Proposed Development Construction Phases*

As shown above, Railway Quarter and Link Road East are the character areas to be developed first. This this followed by Village Centre and partial Station Quarter in phase 2. The Barnhill Cross will be developed in phase 3; the remainder of station Quarter South and Barnhill Crescent will be developed in phase 4. All remaining Character areas, namely, Park Side, Link Road West, and The Stream, will be developed in Phase 5.

Table 6.1 below shows the timeline of each phase, the character area which each phase development includes, and a breakdown of the residential units.

Development Phases	Phase 1A	Phase 1B	Phase 2	Phase 3	Phase 4	Phase 5
Timeline	*Q1 2025 to Q4 2026*	*Q1 2025 to Q2 2029*	*Q1 2027 to Q2 2029*	*Q3 2028 to Q1 2030*	*Q1 2029 to Q3 2030*	*Q3 2030 to Q3 2032*
3 bed houses	69		24	70	53	74
4 bed houses	10		4	10	2	8
1 bed apartment	21	61	25	21	16	3
2 bed apartments	37	249	93	65	111	55
3 bed apartments	15	7	36	29	28	45
4 bed apartments					4	

Development Phases	Phase 1A	Phase 1B	Phase 2	Phase 3	Phase 4	Phase 5
Timeline	*Q1 2025 to Q4 2026*	*Q1 2025 to Q2 2029*	*Q1 2027 to Q2 2029*	*Q3 2028 to Q1 2030*	*Q1 2029 to Q3 2030*	*Q3 2030 to Q3 2032*
Creche						
Commercial			2,034 sqm			
Medical Centre			344			
School						
Total Residential Units	**152**	**317**	**182**	**195**	**214**	**185**

Table 6.16 *Proposed Development Construction Phasing*

Before the phases are developed, basic infrastructure will be provided within the development site. The timeline for enabling works is 1st October 2024 to 27th August 2025. Phase 1A is the first phase to be developed, and all the phases share an overlapping in timeline. It is expected that almost 50% of the residential units will be in place by the end of Phase 2 development.

6.18 Amenities in Local Area

The proposed development will include the space for the provision of Retail, Commercial, Creche, Medical, and education facilities. These facilities will be primarily located within the Village Centre Area, the creche is to be located in Station Plaza with direct pedestrian access to the Village Centre.

The proposed development site will also benefit from the amenities located within the Hansfield/ Ongar area and the partially developed/under construction Hansfield Village. Figure 6.12 shows the location of the different amenities, such as restaurants, supermarket, pharmacies, and medical facilities available within Hansfield/Ongar over a 1.5 km radius from the centre of the Barnhill Site.

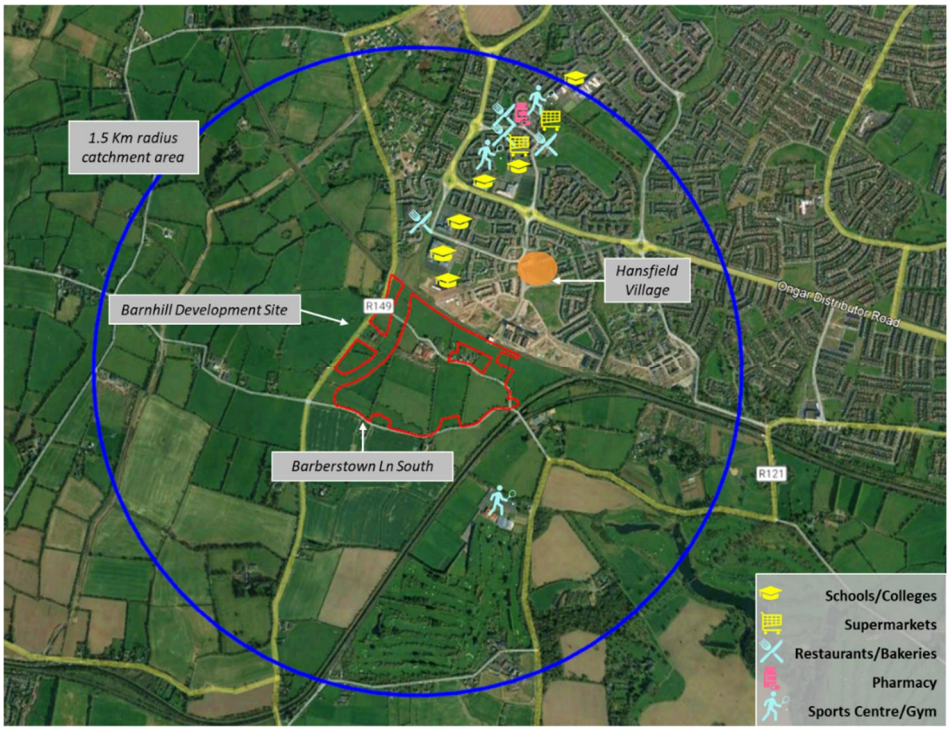


Figure 6.12: Amenities Within Hansfield/Ongar Area

6.19 Fire Access and Servicing

Auto track drawings each character area has been prepared to ensure the development road network is able to successfully accommodate emergency services vehicles. These drawings have been included in the CSEA Drawing Pack as no. 16_053_033.

6.20 Proposed Development Traffic Generation

The total number of trips that will access/egress the development during the peak hours have been estimated using a combination of the NTAôs National Demand Forecasting Model (NDFM) and the East Regional Model (ERM). Further details on the assumptions and methodology are provided in section 2.5 of this Report. The expected trip generation for the Proposed development is summarised in

Assessment Year	AM Peak (08:00-09:00hrs)		PM Peak (17:00-18:00hrs)	
	IN	OUT	IN	OUT
Year of Opening 2025	262	471	351	266
Year of Opening +5 2030	260	449	335	262
Year of Opening + 15 2040	50	321	236	108

Table 6.17 *Proposed Development Peak Hour Trips Generation*

It can be observed that trip generation for the year 2040 is less than the preceding years. As discussed in section 2.6, the traffic modelling for the assessment years 2025 and 2030 have been performed using East Regional Model, whereas for the year 2040, the assessment has been done using the destination and mode choice data contained within the Greater Dublin Area (GDA) Strategy. This strategy takes in consideration the changes in mode share

expected as a result of major public transport and infrastructure projects to be delivered within the GDA area by 2040. Some of these projects are a BusConnects, DART Expansion Programme, and the Greater Dublin Area Cycle Network Plan. The inclusion of such projects has resulted in a modal shift towards more sustainable modes of transport, and hence, a reduction in traffic flow is captured in the assessment year 2040.

Further details about the methology utilised to estimate the proposed development Trip generation can be found in section 2.6 of this Report.

The mode share obtained from the ERM and the GDA model have been included in Appendix A of this Report.

7 Quality Audit

7.1 Overview

This Chapter of the Report outlines the developmentôs compliance with the guidelines established within the *Design Manual for Urban Roads and Streets (DMURS) and the National Cycle Manual* .

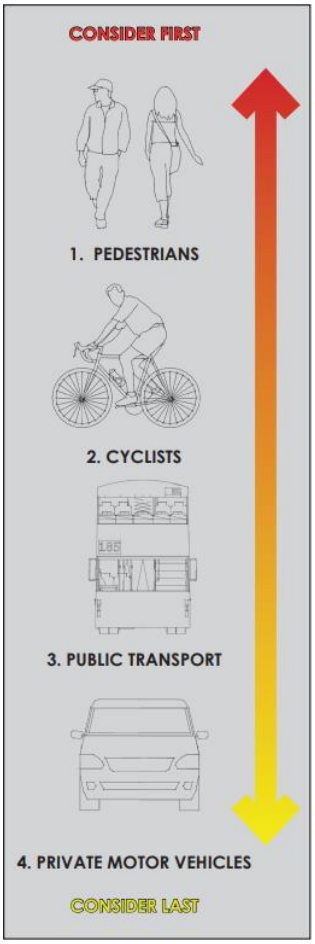
The *Design Manual for Urban Roads and Streets (DMURS)* was jointly published by the Department of Transport, Tourism and Sport and Department of Environment, Community and Local Government in 2013, and updated in 2019. The principles, approaches and standards set out in the Manual apply to the design of all urban roads and streets (streets and roads with a speed limit of 60 km/ h or less.

7.2 DMURS Key Design Requirements and Principles

7.2.1 Pedestrian and Cyclists Movement

User Priority

Section 2.22 of DMURS discusses usersôhierarchy that must be implemented in the design process. To encourage more sustainable travel patterns and safer streets, designers must place pedestrians at the top of the user hierarchy. As seen in image to the right, this is followed by cyclists, then public transport, and lastly private motor vehicles.



Footways and Verges Design

The following design guidelines are stablished by DMURS in the design of footpaths and verges:

- Minimum footway widths are based on the space needed for two wheelchairs to pass each other (1.8m). In densely populated areas and along busier streets, additional width must be provided to allow people to pass each other in larger groups.
- The width of footways should increase according to function from Local (lower activity), Link (moderate activity), to Arterial streets (moderate to higher activity) as connectivity levels increase.
- The footway should be maintained at a consistent width between junctions and should not be narrowed to accommodate turning vehicle.
- Designers should also ensure that the design of vehicle crossovers clearly indicate that pedestrians and cyclists have priority over vehicles.
- There is no minimum requirement for verges on Local Streets, but designers may need to provide space to prevent any encroachment of street furniture into the footway.
- Where on-street parking is provided, a verge (and change in kerb line) may be needed on approaches to junctions to enforce the visibility splays.
- A verge should be provided where cycle tracks are located adjacent to parking spaces.
- A verge (minimum of 0.3m) should be provided in areas of perpendicular parking where vehicles may overhang the footway.

Pedestrian Crossings

Section 4.3.2 establish the principles to design pedestrian crossings. The following must be included in the design of such:

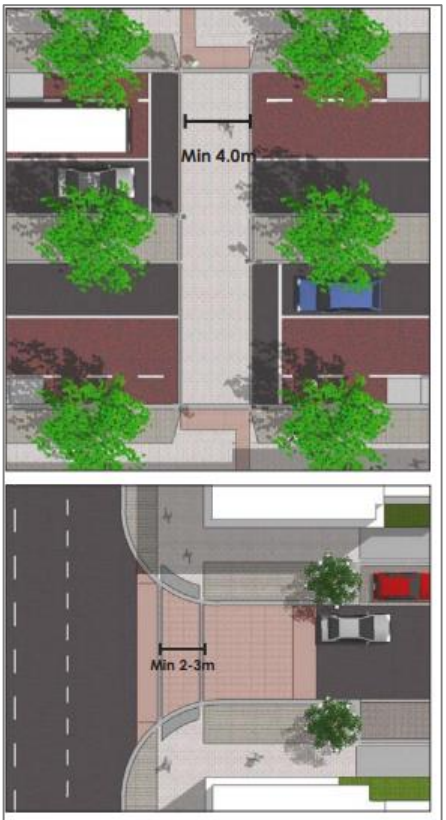


Figure 4.41: Standard crossing widths to be used in most circumstances across the main carriageway of Access or Link streets and across side junctions with Local streets.

- Local streets, due to their lightly-trafficked/ low-speed nature, generally do not require the provision of controlled crossings. The provision of drop kerbs will generally suffice. However zebra crossings or courtesy crossing should be considered where pedestrian demands are higher such as around Focal Points.
- The location and frequency of crossings should align with key desire lines and be provided at regular intervals.
- Provide pedestrian crossing facilities at junctions and on each arm of the junction.
- Minimise corner radii so that crossing points are located closer to corners on pedestrian desire lines.
- Provide regular mid block crossings in areas of higher pedestrian activity, such as Centres, where the distance between junctions is greater than 120m.
- Allow pedestrians to cross the street in a single, direct movement.
- Providing a refuge island (minimum of 2m) for those who are unable to make it all the way across in a reasonable time.
- The minimum width of all other pedestrian crossings should be 2m; The minimum width for Toucan crossings should be 4m.

7.2.2 Road Design

Integrated Network Design

Chapter 3 of DMURs discusses the design principles of integrated networks. The core principle of this chapter focuses on Street Networks designed to maximise connectivity between destinations to promote higher levels of permeability and legibility for all users, in particular more sustainable forms of transport. This will allow people to move from place to place in a direct manner with greater route choice. It states that ñ*Sustainable neighbourhoods are areas where an efficient use of land, high quality urban design and effective integration in the provision of physical and social infrastructure such as public transport, schools, amenities and other facilities combine to create places people want to live in.*"

Additional features of sustainable neighbourhoods include:

- Compact and energy efficient development;
- Prioritising sustainable modes of transport;
- Provision of a good range of amenities and services within easy and safe walking distance of homes.

DMURS also advises that *"the network should be structured to draw people towards Focal Points such as Landmarks, Gateways and other civic buildings and spaces*à This is done to increase the legibility of the routes, allowing pedestrians and cyclists to be better oriented.

Street Layout

Section 3.3.1 discusses the preferred street layout for the design of an integrated network. It recommends that "when designing new street networks designers should implement solutions that support the development of sustainable communities. In general, such networks should:

- Å *be based on layouts where all streets lead to other streets, limiting the use of cul-desacs that provide no through access.*
- Å *maximise the number of walkable/ cycleable routes between destinations."*

Section 4.1.1 Speed limits in excess of 50km/h should not be applied on streets where pedestrians are active due to their impact on place and pedestrian safety**.**

Junction Design

In relation to corner radii, Section 4.3.3 stablishes the following:

- Reducing corner radii will significantly improve pedestrian and cyclist safety at junctions by lowering the speed at which vehicles can turn corners and by increasing inter-visibility between user.
- Where turning movements occur from an Arterial or Link street into a Local street corner radii may be reduced to 4.5m.
- Where design speeds are low and movements by larger vehicles are infrequent, such as on Local streets, a maximum corner radii of 1-3m should be applied.
- In circumstances where there are regular turning movements by articulated vehicles, the corner radii may be increased to 9m.

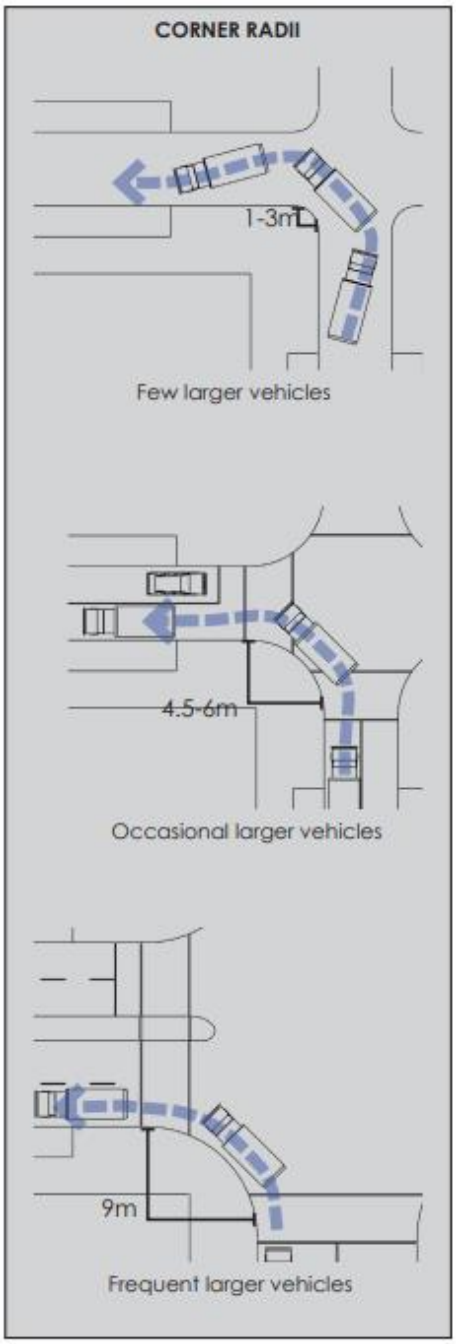
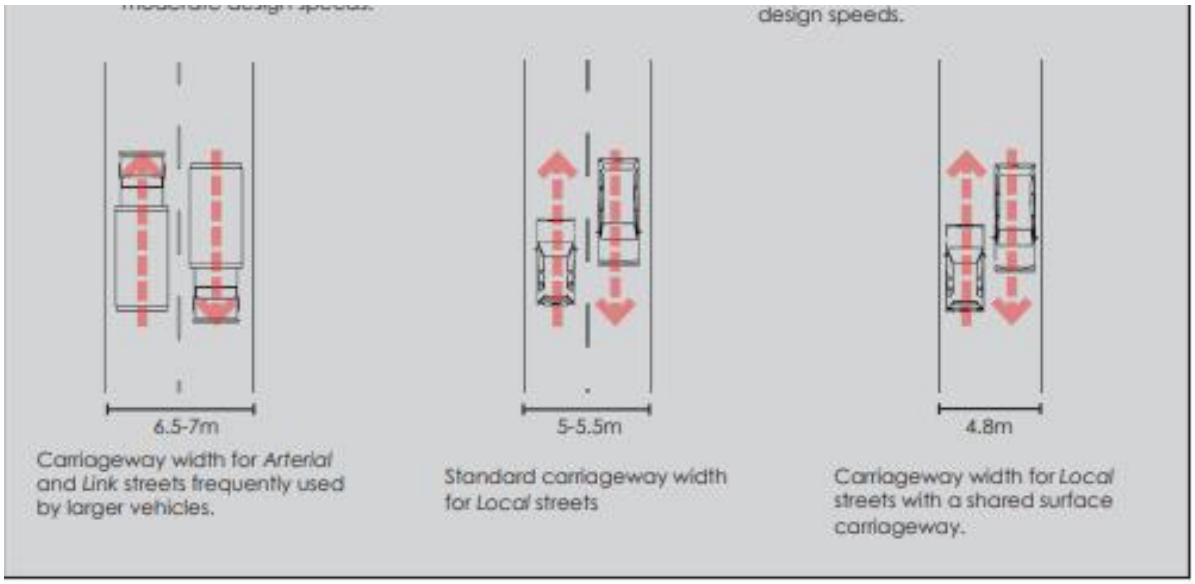


Figure 4.43: Approaches minimising corner radii according to level of service by larger vehicles.

In relation to carriage width,section 4.4 stablishes the following principles:

- the standard lane width on Arterial and Link Streets should lie in the range of 2.75m to 3.5m. Within this range the preferred values are 3.0m and 3.25m
- The standard carriageway width on Local streets should be between 5-5.5m.
- Where additional space on Local streets is needed to accommodate additional manoeuvrability for vehicles entering/ leaving perpendicular parking spaces, this should be provided within the parking bay and not on the vehicle carriageway.



Forward Visibility and Visibility Splays

Forward Visibility, also referred to as Forward Sight Distance (FSD), is the distance along the street ahead which a driver of a vehicle can see. The minimum level of forward visibility required along a street for a driver to stop safely, should an object enter its path, is based on the Stopping Sight Distances (SSD). The DMURS SSD standards are shown in the table below.

Design Speed (km/h)	SSD Standard (metres)
10	7
20	14
30	23
40	33
50	45
60	59

Forward Visibility

Visibility splays are included at junctions to provide sight lines along the intersected street to ensure that drivers have sufficient reaction time should a vehicle enter their path. Visibility splays are applied to priority junctions where drivers must use their own judgement as to when it is safe to enter the junction. Junction visibility splays are composed of two elements;

- The X distance is the distance along the minor arm from which visibility is measured. It is normally measured from the continuation of the line of the nearside edge of the major arm, including all hard strips or shoulders. Priority junctions in urban areas should be designed as Stop junctions, and a maximum X distance of 2.4 metres should be used
- The Y distance is the distance a driver exiting from the minor road can see to the left and right along the major arm. It is normally measured from the nearside kerb or edge

of roadway where no kerb is provided. The Y distance along the visibility splay should correspond to the SSD for the design speed of the major arm.

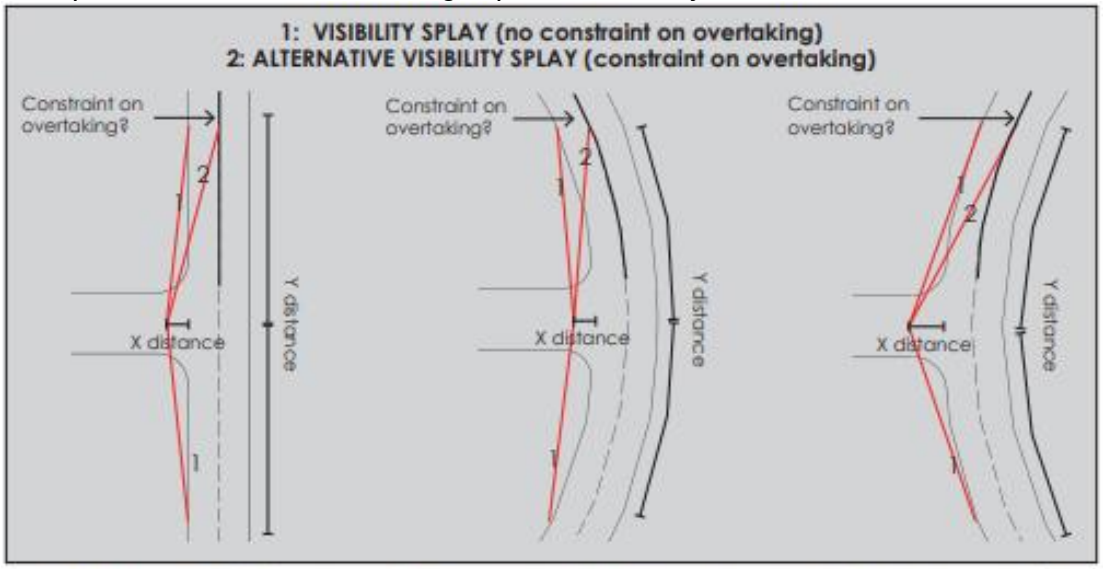


Figure 4.63: Forward visibility splays refer to an X and Y value. The X value allows drivers to observe traffic on the intersected arm. The Y value allows the driver of a vehicle to stop safely should an object enter its path, and is based on the SSD value.

In general, junction visibility splays should be kept clear of obstructions, however, objects that would not be large enough to wholly obscure a vehicle, pedestrian or cyclist may be acceptable providing their impact on the overall visibility envelope is not significant.

Slim objects such as signs, public lighting columns and street trees may be provided, but designers should be aware of their cumulative impact.Street furniture, such as seats and bicycle stands may also be acceptable, subject to being sufficiently spaced. Splays should generally be kept free of on-street parking, but flexibility can be shown on lower speed streets with regard to minor encroachments. Pedestrian guardrails can cause severe obstruction of visibility envelopes, and the use of guardrails should be avoided.

7.2.3 Traffic Calming

Section 3.4.2 More frequent minor junctions with fewer vehicle movements calm traffic and are easier for pedestrians and cyclists to navigate. Where vehicle movement priorities are low, such as on Local streets, lower speed limits should be applied (30km/h).

Section 4.4.47 discusses the use of horizontal and vertical deflections. Horizontal or vertical deflections are changes that occur within the alignment of the carriageway to slow vehicles by requiring drivers to slow and navigate obstacles.

Horizontal deflections are particularly effective when considered at the network level and used in combination with restrictions in forward visibility.

Raised tables, or platforms, may be placed strategically throughout a network to promote lower design speeds, slow turning vehicles at junctions and enable pedestrians to cross the street at grade. Key locations where these should be considered include:

- On longer straights where there is more than 70m between junctions.
- At equal priority junctions.
- At entrance treatments where Local streets meet Arterial and Link street.
- At pedestrian crossings.
- To reinforce a change between design speeds

7.2.4 On Street Parking

In relation to on-street parking, section 4.4.9 states that *"Perpendicular or angled spaces may be provided in lower speed environments such as Local streets."* The following key principles must be taken into consideration when designing on-street parking.

- Perpendicular parking should generally be restricted to one side of the street to encourage a greater sense of enclosure and ensure that parking does not dominate the streetscape.
- Where on-street parking is provided adjacent to cycle paths/lanes a verge should be provided to allow additional space for opening doors.
- The standard length of a space should be 6m (parallel spaces).
- The standard depth of a perpendicular space should be 4.8m (not including a minimum 0.3m overhang.
- The depth of angular parking should be 4.2m for 60º angle parking and 3.6m for 45º angle parking.

Figure 5.7: The range of skill needed for input into a multidisciplinary design team. Skill sets have been ranked to indicate where resources should be prioritised and where additional input may be desirable.

7.2.5 Multidisciplinary Design Processes

Section 5.3 states that the formation of a multi-disciplinary team is critical for the assessment of any project. Whilst the formal assessment and consent process for different design projects may vary, it is essential that they have multi-disciplinary input so that they can be fully assessed against the broad range of principles, approaches and standards contained within this Manual, particularly where any conflicts of place and movement may arise. To assist this process, it is recommended that multi-disciplinary professional teams within planning authorities work together as a cohesive unit.

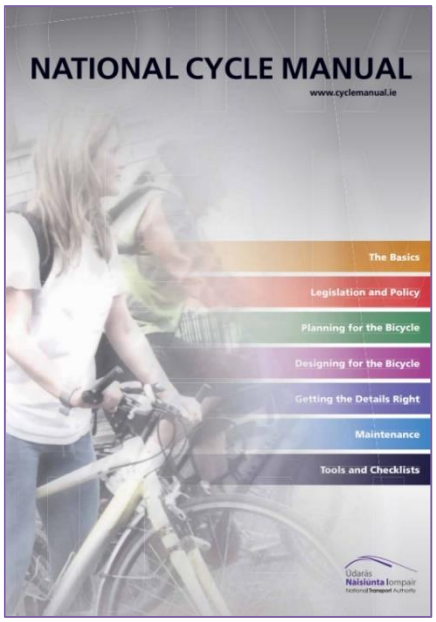
It is also recommended that designers undertake pre-planning meetings where a design is to be submitted to a local authority. Both the design team and the local authority should ensure that this occurs within a multidisciplinary environment to ensure that a broad range of issues are considered.

Section 5.5 highlights the relevance of undertaking a Road Safety Audit process.

7.3 National Cycle Manual Key Design Requirements and Principles

The national cycle manual was published by the National Transport Authority to establish the principles that should be followed when designing cycle networks.

The content within this sub-section highlights the principles that were deemed relevant to the design of the proposed development.



7.3.1 Principles of Sustainable Safety

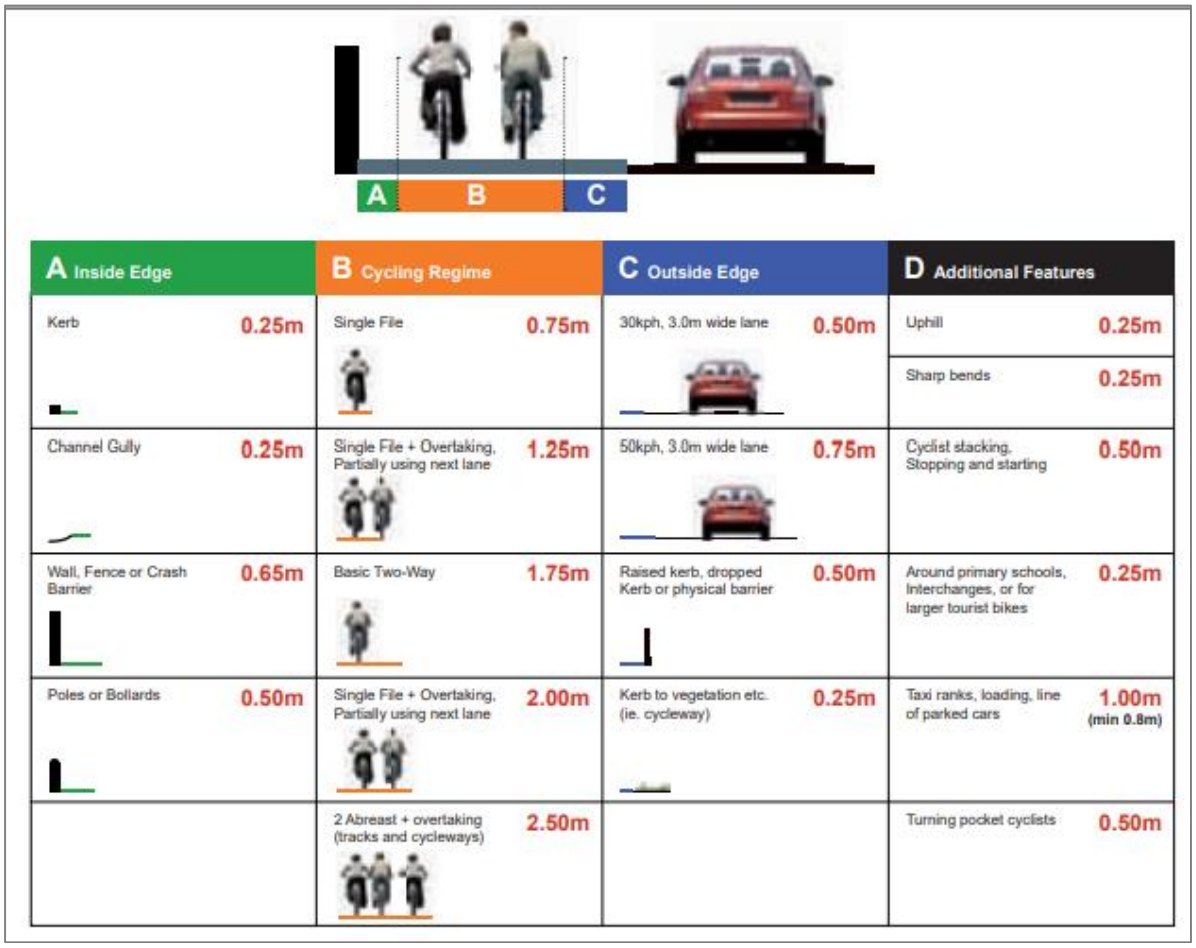
Cycle infrastructure should be design following the principles described below:

- Functionality: The functions are either movement or place related. It is important therefore that the designer understands and accommodates the functions applicable to the particular scheme.
- Homogeneity: The principle of Homogeneity is that reducing the relative speed, mass and directional differences of different road users sharing the same space increases safety. This has a beneficial impact on the level and severity of accidents that might otherwise occur.
- Legibility: The principle of Legibility is that a road environment that all road users can read and understand is safer. A legible design will be self-evident, self-explanatory, and self-enforcing. Legibility is equally necessary in both mixed and segregated cycling environments, and is not therefore simply about lane markings and streaming traffic.
- Forgivingness: The principle of Forgivingness (Passive Safety) is that environments that contribute to benign outcomes of accidents are safe
- Self-Awareness: The principle of Self-Awareness is that where road users are aware of their own abilities and limitations to negotiate a road environment, the environment is safe.

7.3.2 Width

The designed width of a cycle facility is comprised of the effective width, i.e., the space that is ñusableò by cyclists, as well as the clearances that will be required in different circumstances.

The Figure below, illustrates the required width for cycle lanes.



7.3.3 Shared Facilities

Where shared facilities cannot be avoided, there are a number of considerations as follows that will help both cyclists and pedestrians to be aware of the others presence.

- Pedestrian should always have priority, reinforced by signage
- Cyclists should consider themselves as ócycling on the footpathô
- Segregate pedestrians and cyclists vertically and/or horizontally
- Delineation markings should not be used as they give cyclists an incorrect sense of a dedicated cycle space
- Sufficient width of footpath and cycle track will help both modes to travel in comfort
- Sufficient width to facilitate evasive action and/or avoidance of potential conflict
- Shared facilities next to vehicular traffic should have a minimum combined width 3.0m
- Cycling alignment and speed reduction measures should be considered

Mixed or shared streets are suitable in low traffic single lane environments where cyclists and pedestrians take precedence over vehicular traffic. The key feature from a cycling perspective is that cyclists ñtake the laneòin line with vehicles. Where such streets are less than 5.5m in width, there should be no central lane marking, thereby ensuring all road users in either direction yield to each other. For widths between 5.5 and 7.0m, a central lane marking should be provided to separate opposing traffic.

7.3.4 Bicycle Parking

The availability of appropriate bicycle parking facilities at either end of a trip will heavily influence the decision to travel by bicycle in the first instance. The absence of such facilities, and the consequent risk of vandalism or theft, has been shown to undermine the investment in the overall network infrastructure.

On-street parking should be the central ñpublicòelement in any bicycle parking strategy. On-street bicycle parking is highly visible and:

- promotes a strong pro-cycling message
- provides cyclists with kerb-free access to cycle parking
- does not compromise or affect pedestrians if properly installed
- can be installed easily, and at low cost, as drainage and alignment issues will have been catered for in designing the adjacent carriageway
- has minimal add-on costs other than perhaps some protection from adjacent vehicular movements (e.g., bollards)
- can be provided without difficulty at the end of parallel vehicular parking bays, to define and maximise effective use of kerbside space

All bicycle parking facilities should be capable of performing the basic functions of

- supporting the bicycle from falling over
- protecting it against theft
- allowing the cyclist room to position/ lock / unlock the bike

Consideration should also be given to

- lighting
- protection against the weather
- ease of access
- requirements at public transport

Bike Stands

All racks, bicycle stands, and clamps should provide enough support to prevent any type of bicycle from falling over. This usually requires support for the frame and/or forks. The Sheffield Stand (U-bar) will achieve this. Units that are designed to grab the front wheel only are not generally recommended for public cycle parking.

It must be easy for cyclists to lock the bicycle frame to the rack or stand. For additional peace of mind, many cyclists will seek to secure individual parts of the bike, such as the frame, wheels, trailer etc. This is done using a long bicycle lock that is woven through the various components and around the rack itself.

Exposure to rain can damage bicycles and result in increased maintenance costs. This is particularly important for longer term parking at homes, schools, workplaces and at public transport stations. On-street racks and stands may be covered, if this can be incorporated into the streetscape appropriately

In general, frame-supporting stands are more appropriate for small parking clusters of up to up to 10 or 15 stands. A well-designed parking facility should provide 2.5m between the rows to allow cyclists room to manoeuvre when parking and collecting their bicycles.

7.4 Proposed Development Design and Compliance

Table 7.1, below, sets out the development design compliance with the key design principles discussed in preceding sections.

Guidance Document	Design Principle	Development Proposal
DMURS	To encourage more sustainable travel patterns and safer streets, designers must place pedestrians at the top of the user hierarchy. Designing for cyclists must also be given a high priority.	The proposal has been designed prioritising pedestrian and cyclistsô movements by -The provision appropiate level of segregation from vehicular traffic. -Provision of pedestrian/cyclists uninterrupted conectivity from/to all areas of the development. -Intergration of traffic calming measures to ensure low speeds and pedestrians/cyclists safety.
DMURS	Priority should be given to the needs of walking, cycling and public transport, and the need for car-borne trips should be minimised.	The proposed development includes the provision of spaces that will facilittate a wide range of services and amenities, including retail, office hub, medical centre, education and creche. As such, there are multiple opportunities to satisfy typical daily needs of the developmentôs residents, such as education, leisure, and shopping without the need to drive.
DMURS	The segregation of motor vehicles from vulnerable road users (e.g. pedestrians and cyclists)	Segregated Cyclists and Pedestrian facilities will be available in all areas of the development the development.

Guidance Document	Design Principle	Development Proposal
DMURS	Minimum footway widths are based on the space needed for two wheelchairs to pass each other (1.8m).	Footpaths width of 2.0 metres wide and over has been included in the design.
DMURS	The footway should be maintained at a consistent width between junctions and should not be narrowed to accommodate turning vehicles	Consistent footpath width is provided in and around the development.
DMURS	Designers should also ensure that the design of vehicle crossovers clearly indicate that pedestrians and cyclists have priority over vehicles.	Raised tables and/or zebra crossings are available at all pedestrian crossings included in the design.
DMURS	Zebra crossings provide pedestrian priority and may be used where formal crossing facilities are desirable.	A Zebra Crossings are proposed in the areas estimated to have a higher flow of pedestrians, such as in the vicinity of the school. Drawings 16_053_003 illustrates the location of these zebra crossings inside the development.
DMURS	Provide pedestrian crossing facilities at junctions and on each arm of the junction.	Pedestrian crossings will be provided on each arm of the proposed junction with the R121 following the Layout proposed by Bus Connects.
DMURS	Within Centres and on Arterial streets, all crossings should generally be a minimum of 4m wide.	All crossings proposed with the development are minimum 4 metres wide.
DMURS	Provide regular mid-block crossings in areas of higher pedestrian activity, such as Centres, where the distance between junctions is greater than 120m	mid-block crossings have been provided where the distance between junctions is greater than 120m.
DMURS	Allow pedestrians to cross the street in a single, direct movement	Single movements crossings have been provided for all crossings inside the development.
DMURS	A verge should be provided where cycle tracks are located adjacent to parking spaces.	A verge has been provided for all cycle tracks insider the development adjacent to parking spaces.
DMURS	A verge (minimum of 0.3m) should be provided in areas of perpendicular parking where vehicles may overhang the footway	A verge (minimum of 0.3m) has been provided in areas of perpendicular parking where vehicles may overhang the footway.
DMURS	the network should be structured to draw people towards Focal Points such as	A series of pocket parks, plaza areas, and green spaces have been integrated within the development, serving as focal

Guidance Document	Design Principle	Development Proposal
	Landmarks, Gateways and other civic buildings and spaces.	points for pedestrians/cyclistsô orientation.
DMURS	layouts where all streets lead to other streets, limiting the use of cul-de-sacs that provide no through access	Most streets inside the development tight into another street. Where Cul-de-Sacs were unavoidable, appropriate turning points have been provided
DMURS	Speed limits in excess of 50km/h should not be applied on streets where pedestrians are active due to their impact on place and pedestrian safety	Appropriate traffic calming measures such as ramps, on-street parking, and landscape have been included in the design to ensure that the proposed development cater for a low-speed environment (30km/hr).
DMURS		
DMURS	Where design speeds are low and movements by larger vehicles are infrequent, such as on Local streets, a maximum corner radii of 1-3m should be applied	All junction in the internal road network have been designed with a corner radii of 3 metres.
DMURS	The standard carriageway width on Local streets should be between 5-5.5m	Carriage widths of 5.0-5.5 metres have been provided for all internal roads.
DMURS	In general, junction visibility splays should be kept clear of obstructions, however, objects that would not be large enough to wholly obscure a vehicle, pedestrian or cyclist may be acceptable providing their impact on the overall visibility envelope is not significant.	Visibility splays at all junctions inside the development and at access points into Baberstown Lane South have been kept clear of obstructions. All junctions inside the development have been designed with a Visibility splay of at least 40 metres.
DMURS	Raised tables, or platforms, may be placed strategically throughout a network to promote lower design speeds, slow turning vehicles at junctions and enable pedestrians to cross the street at grade.	Raised Tables have been included in the design at the following locations: -On longer straights where there is more than 70m between junctions. -At all equal priority junctions -At all pedestrian crossings
DMURS	Perpendicular parking should generally be restricted to one side of the street to encourage a greater sense of enclosure and ensure that parking does not dominate the streetscape.	Where perpendicular parking is available, it has been provided only in one side of the street.
DMURS	The standard length of a parallel space should be 6m. The standard depth of a perpendicular space should be 4.8m (not including a minimum 0.3m overhang	Parallel spaces are 6.0 metres long.

Guidance Document	Design Principle	Development Proposal
		Depth of a perpendicular space has been designed to be 4.8m in addition to 0.3 overhang.
DMURS	Design input should ideally be sought from a range of skill sets to ensure that a holistic design approach is implemented. Required: Engineering, Town Planning, Urban Design. Desirable: Architecture, Landscape, Architecture	A multi-Disciplinary team, including all the skills listed by DMURS, has participated in the proposed development design process.
DMURS	Several stages of consultation may be undertaken by designers depending on the type and scale of a project. It is recommended that designers undertake consultation as early as possible. It is also recommended that designers undertake pre-planning meetings where a design is to be submitted to a local authority	Several Pre-Planning meeting and consultations were undertaken with Fingal County Council and An Bord Pleanála throughout the design process.
National Cycle Manual	An effectice cycle lane width of minimum 0.75 for a single file is required.	Cycle tracks proposed inside the development are 1.75 metres wide. Where the cycle tracks run behind car parking spaces there is a 0.5 metres buffer zone between the edge of the car parking spaces and the cycle track.
National Cycle Manual	Shared facilities next to vehicular traffic should have a minimum combined width 3.0m	All shared paths are between 3-4 metres wide.
National Cycle Manual	All racks, bicycle stands, and clamps should provide enough support to prevent any type of bicycle from falling over. This usually requires support for the frame and/or forks. They should also ensure protection it against theft, and allowing the cyclist room to position/ lock / unlock the bike	Sheffield stands are proposed in all public cycle parking. The public cycle parking has been provided in areas of passive surveillance.
National Cycle Manual	Exposure to rain can damage bicycles and result in increased maintenance costs. This is particularly important for longer term parking at homes, schools, workplaces and at public transport stations. On-street racks and stands may be covered, if this can be incorporated into the streetscape appropriately	All street parking provided in the vicinity of Hansfield Train Station will be covered.

Guidance Document	Design Principle	Development Proposal
National Cycle Manual	In general, frame-supporting stands are more appropriate for small parking clusters of up to 10 or 15 stands. A well-designed parking facility should provide 2.5m between the rows to allow cyclists room to manoeuvre when parking and collecting their bicycles.	Clusters of no more than 15 cycle parking stands have been provided around the development. Enough room of at least 2.5 metres have been allowed between stands to ensure comfortable manoeuvre when parking and collecting the bicycles.

Table 7.2 *DMURS Key Principles and Development Proposal*

7.5 Road Safety Audit

A Stage 1 Road Safety Audit of the design was undertaken by PMCE on 21st June 2022. The Report outlining the findings have been included within the Planning pack. The findings of the Road Safety Audit have been addressed on the drawings and accepted in the audit feedback sheet.

8 Road Network Future Traffic Flows

8.1 Future Road Network Assumptions

As noted in section 5.1, the following road schemes are planned in the vicinity of the development site:

- **Ongar-Barnhill Road scheme**, which is included in the Barnhill LAP and is to be delivered by FCC as part of their Section 48 programme. This Road link is expected to be Tender in Q3/4 2022 and to be completed by Q2/3 2024. This road is required in order to provide for a coherent sustainable movement and transport strategy and to maximise development capacity within the Barnhill LAP lands.
- **Kellystown Link Road**, this road is not required for the delivery of the proposed development, however it has been included to be able to take into account the traffic generation associated with Kellystown LAP (to establish a worst case scenario for traffic flows in local network). Pre-draft phase was initiated by Fingal County Council in mid-2019, and this road scheme has been presented to elected councillorswhich is included in the draft Kellystown LAP.

Figure 9.1 below, sets out the location of these roads in relation to the proposed development site.

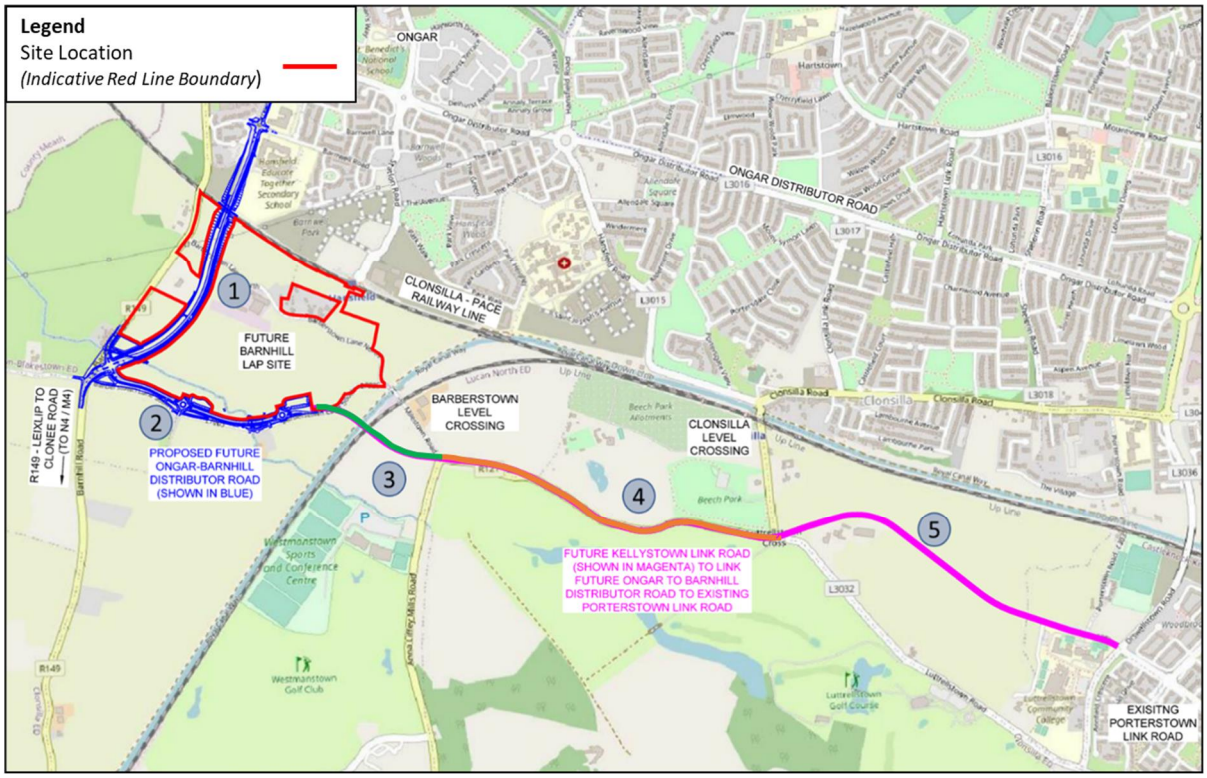


Figure 9.1: *Future Road Network (Indicative Red Line Boundary)*

8.2 Assessment Years and Scenario

8.2.1 Assessment Years

The following assessment year has been taken into consideration in the analysis:

- 2019: Baseline Year

- 2025: Developmentôs Year of Opening (YoO)
- 2030: Future Year, YoO+5
- 2040: Horizon Year YoO+15, in line with the National Transport Authority 2040 planning sheet and East Regional Model.

8.2.2 Assessment Scenarios

A ôDo-Minimumô scenario and a ôDo-Somethingô scenario have been assessed to understand the proposed developmentôs impact to the local road network. These scenarios can be described as follow:

- Do-Minimum: This scenario will establish the performance of the road network with background traffic conditions and without the proposed development. The Blanchardstown Local Area Model have served as basis for this scenario. This scenario takes into consideration include all future planned road network discussed in section 2.4, all improvements to the public transport infrastructure proposed as part of BusConnect, Dart + West, and the Cycle Network Plan (see section 5), and the traffic associated with the Hansfield SDZ, and Kellystown LAP lands.
- Post Development/Do-Something: The with-development or ôdo-somethingô scenario represents traffic conditions following completion of the proposed development, i.e., do-minimum plus additional traffic generated by the proposed development.

8.3 Estimated Traffic Flows

Based in the road network assumptions discussed in preceding sections of this Chapter and the traffic generation estimated for the proposed development (see section 6.20), the traffic estimated in the network for both scenarios, do-minimum and do-something, has been estimated.

The remainder of this Chapter presents the periods traffic flows estimated for all major links road on the area in the vicinity of the development for all assessment years.

8.3.1 2025 Traffic Flows

Do Minimum

Figure 8.2, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2025 without the proposed development in place.

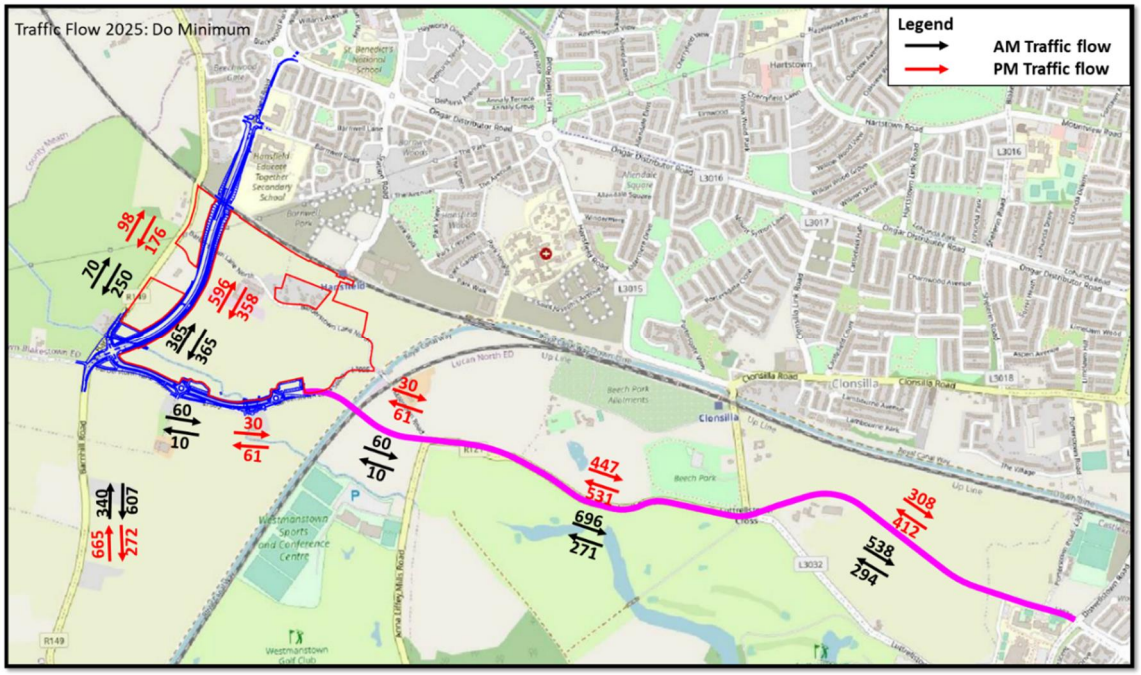


Figure 8.2: *Traffic flow, year 2025, Do Minimum scenario (Indicative Red Line Boundary)*

Post Development/Do-Something

Figure 8.3, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2025 with the proposed development in place.

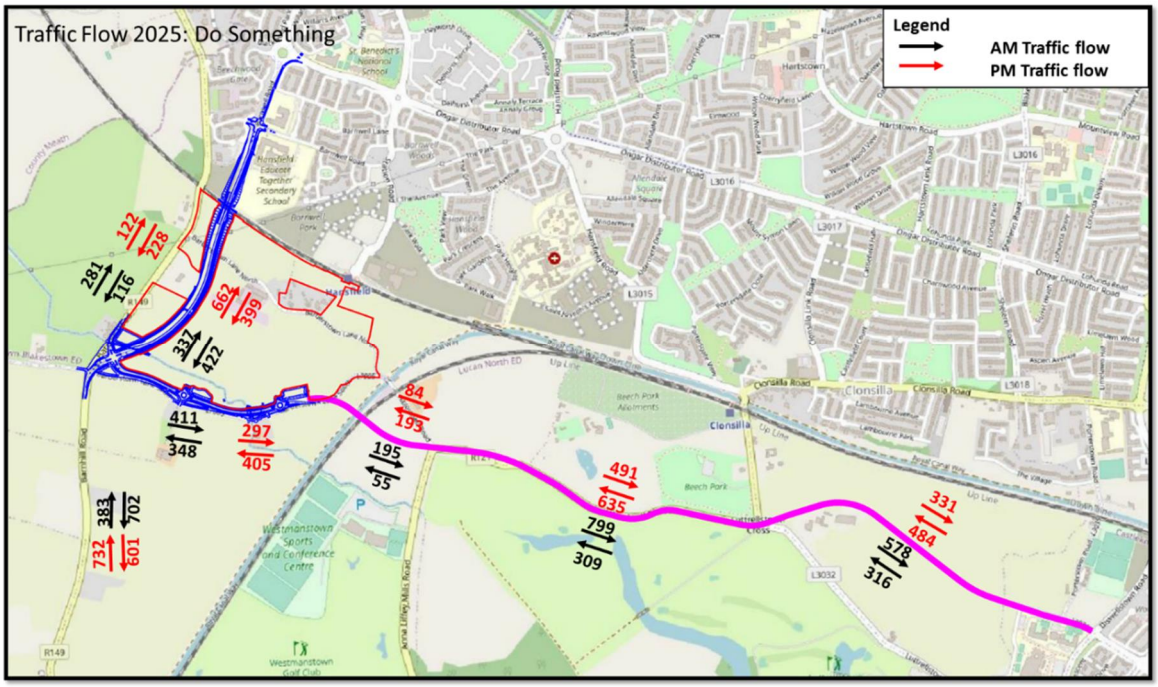


Figure 8.3: *Traffic flow, year 2025, Do Something scenario (Indicative Red Line Boundary)*

As shown above, with the development in place the main increased in traffic is expected to happen along Barberstown Lane South and the R121.

8.3.2 2030 Traffic Flows

Do Minimum

Figure 8.4, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2030 without the proposed development in place.

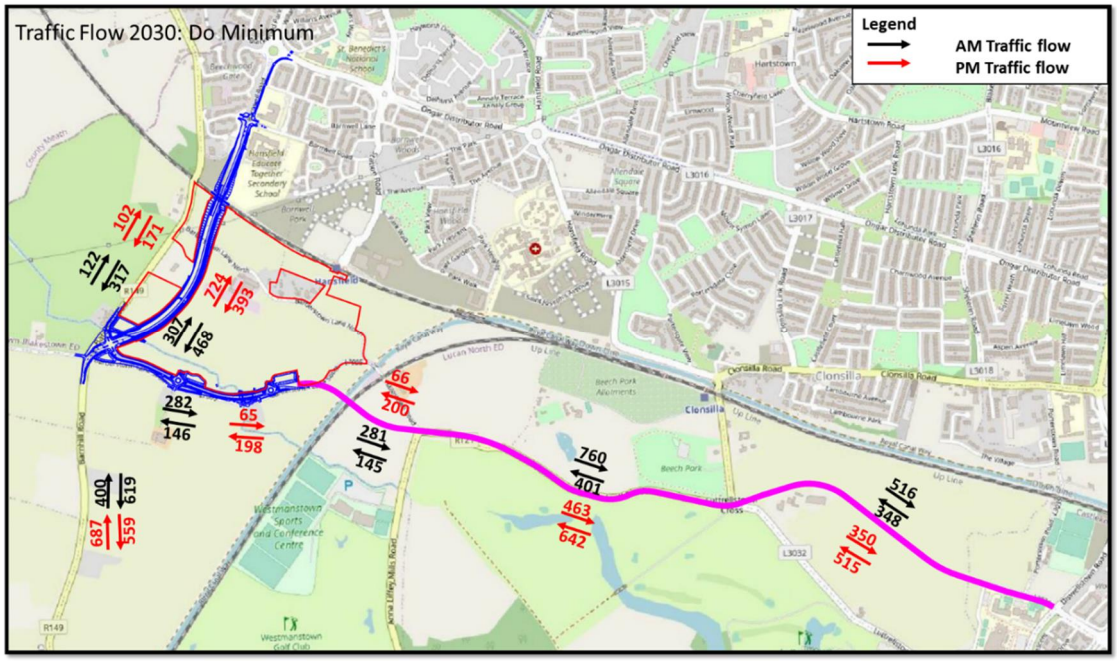


Figure 8.4: *Traffic flow, year 2030, Do Minimum scenario (Indicative Red Line Boundary)*

Post Development/Do-Something

Figure 8.5, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2030 with the proposed development in place.

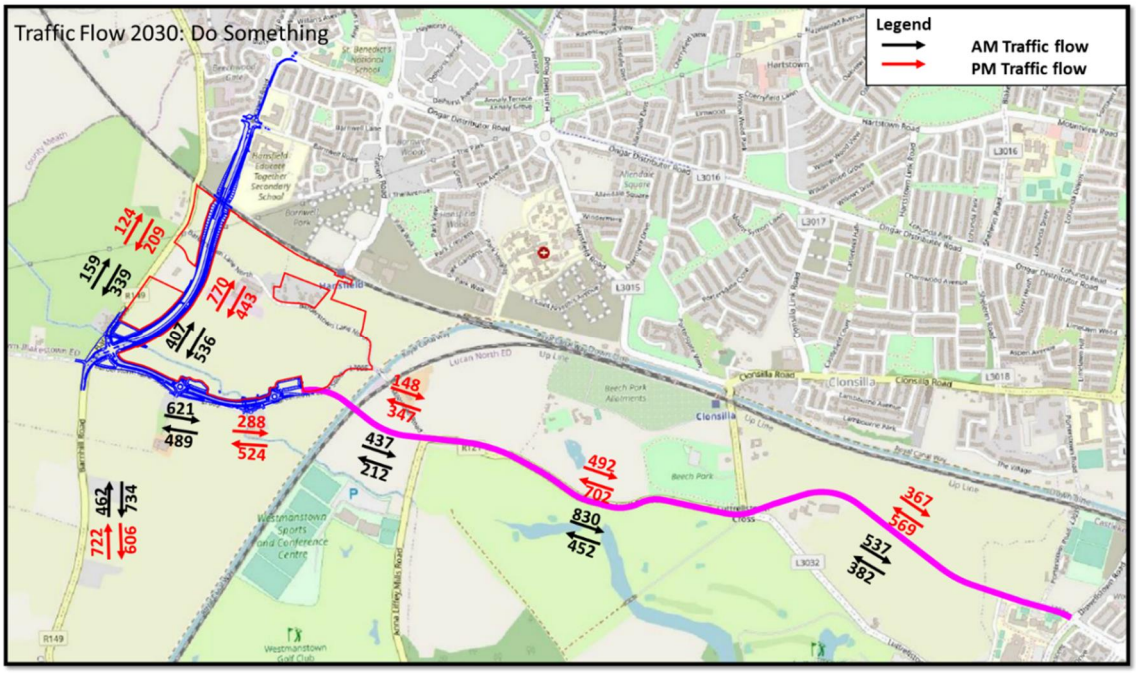


Figure 8.5: *Traffic flow, year 2030, Do Something scenario (Indicative Red Line Boundary)*

8.3.3 2040 Traffic Flows

Do Minimum

Figure 8.6, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2040 without the proposed development in place.

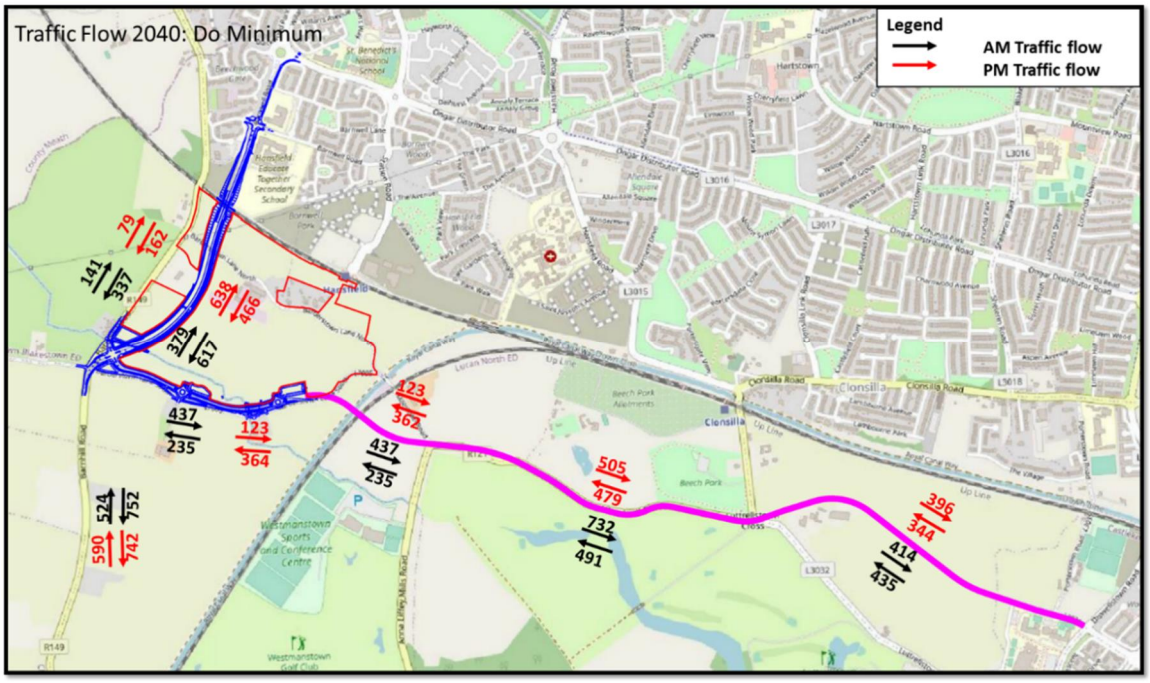


Figure 8.6: *Traffic flow, year 2040, Do Minimum scenario (Indicative Red Line Boundary)*

Post Development/Do-Something

Figure 8.7, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2040 with the proposed development in place.

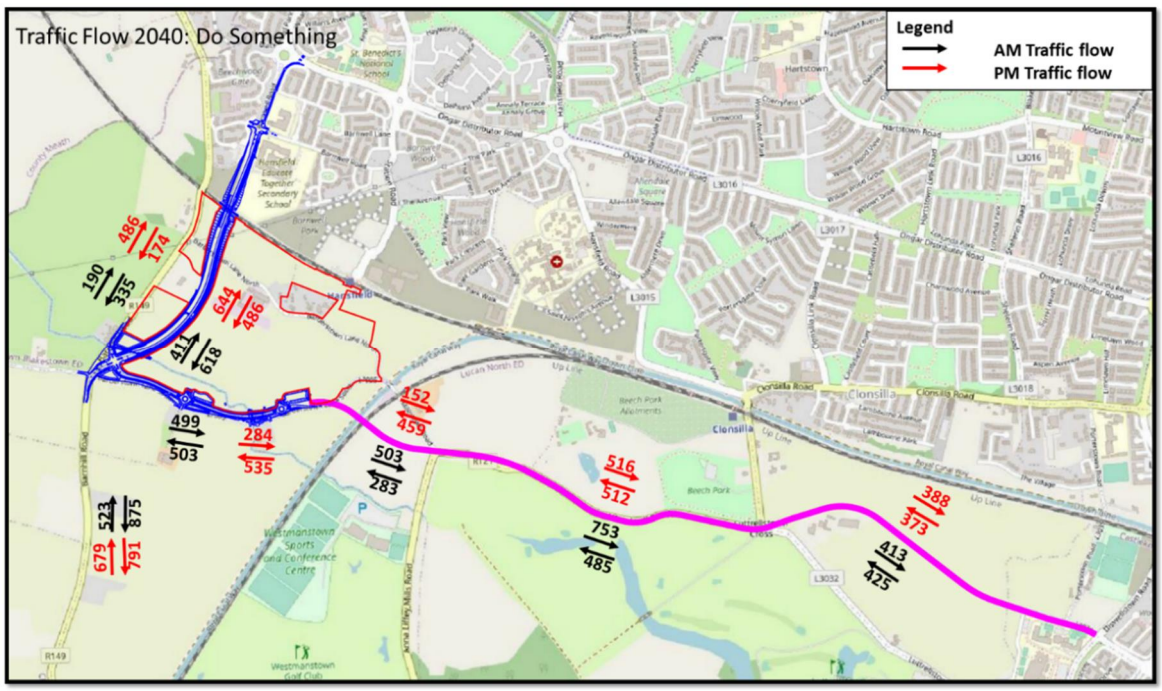


Figure 8.7: *Traffic flow, year 2040, Do Something scenario (Indicative Red Line Boundary)*

9 Proposed development Traffic Impact

9.1 Assessment Junctions

In order to estimate the development's traffic impact in the local network, it has been deemed relevant to undertake detailed traffic modelling of the following critical junctions:

- Junction 1 (J1): Barnwell Road/ Ongar Distributor Road/ Littlepace Distributor Road junction, known as the Barnwell roundabout.
- Junction 2 (J2): Ongar Barnhill NS Link Rd/ R149 Barberstown Lane South Junction.
- Junction 3 (J3): Baberstown Lane South/ Barnhill Development South Access A Junction.
- Junction 4 (J4): Baberstown Lane South/ Barnhill Development South Access B Junction.
- Junction 5 (J5): Milestown Road/ Anna Liffey Mills Road/ Woodwall Road Junction.

The location of these junctions in relation to the proposed development site is shown in Figure 9.1, which follows.

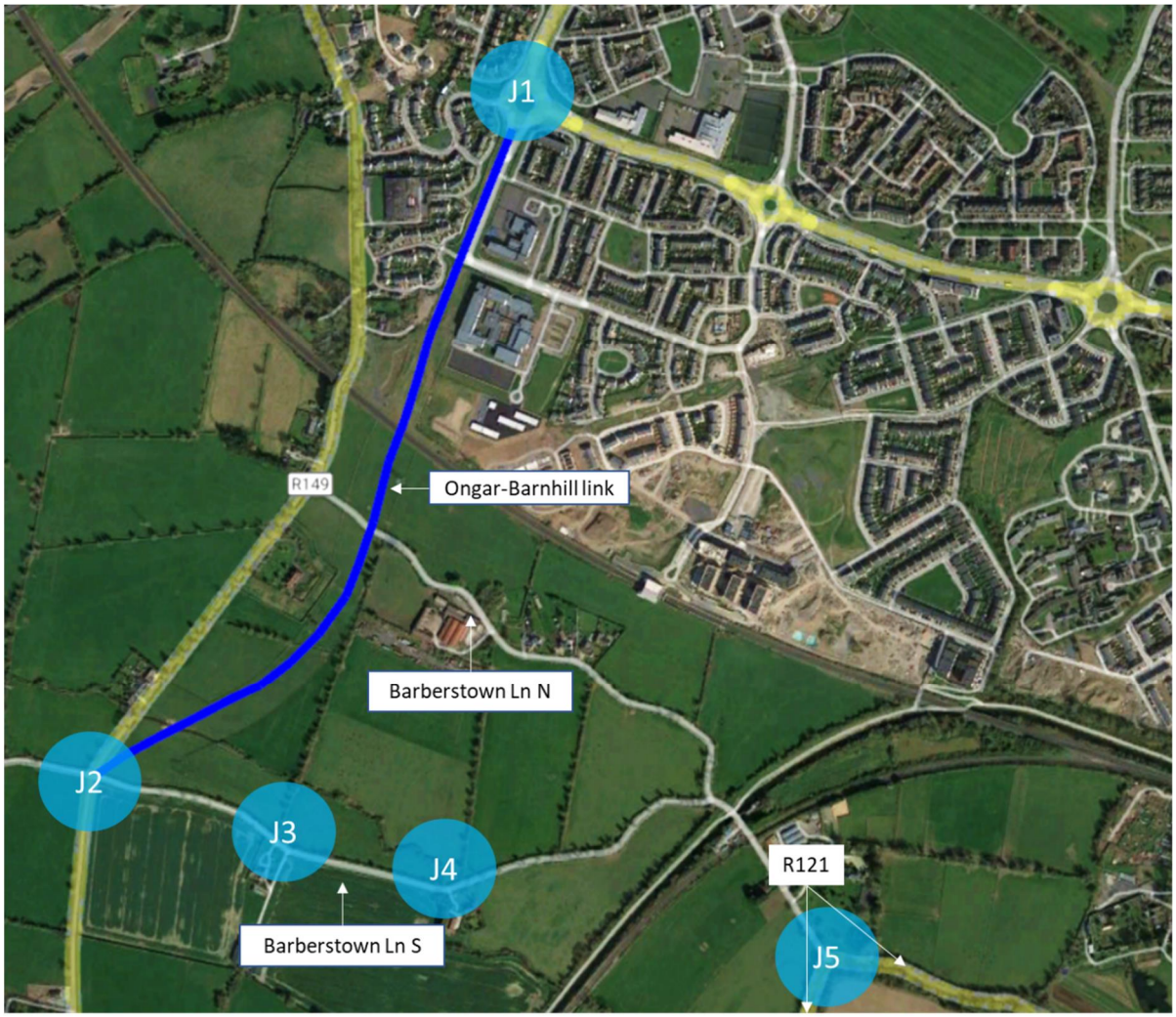


***Figure 9.1**: Junctions Modelled*

9.2 Barberstown Lane South Upgrades

Prior to the delivery of the proposed development, Barberstown Lane South will be upgraded. Junctions 3 and 4 currently do not exist, however, once the development is in place they will

serve as access points from Barberstown Lane South. Two roundabouts will be delivered in the location of these junctions, which forms part of the upgrades proposed for Barberstown Lane South to be Delivered by Fingal County Council.

The development proposed development will provide the access arms to the Barnhill Site. All other works associate with the roundabout will be delivered by Fingal County Council. The layouts assessed for all junctions are presented within the remainder of this chapter.

9.3 Assessment Years and Time Periods, and Assessment Scenarios

Details on the assessment years, time periods and assessment scenarios have been presented in section 2 of this Report.

9.4 Traffic Modelling Software and Outputs

9.4.1 Traffic Modelling Software

Different modelling software have been used to assess the junctionsô performance. The industry standard ARCADY traffic modelling software have been used for predicting the capacities, queues, and delays at the roundabout junctions 1, 3,4, and 5. ARCADY is a modelling software dedicated for analysing the capabilities of priority-controlled roundabout. The models analyse the junctions in relation to their geometry and traffic flows and calculate the Ration of Flow to Capacity (RFC).

PICADY was used for the assessment of the exiting layout of junction 5 in the year 2025. This road has been assumed to be upgraded to a roundabout by the year 2030.

The industry standard LinSig traffic modelling software has been used to assess the signalised junction 2. LinSig is a modelling software dedicated for analysing isolated signal-controlled junctions and small junction networks. The models analyse the junctions in relation to their geometry and traffic flows and calculate the Practical Reserve Capacity (PRC).

9.4.2 Traffic Modelling Outputs

ARCADY/PYCADY

The following outputs were obtained from the ARCADY models:

- Queue Length: The values are the total number of queueing vehicles on the arm in PCUs.
- Junction Delay: This is the total delay experienced by a quantity of traffic at a particular junction in a given time period.
- Ration of Flow to Capacity (RFC): The RFC provides a basis for judging the acceptability of junction designs and typically an RFC of less than 0.85 is considered to indicate satisfactory performance.
- Level of Service (LOS): The LOS shows the unsignalised, and equivalent signalised, level of service values for the time segment, based on the Average Delay per Arriving Vehicle. The transportation LOS system uses the letters A through F, with the definitions below being typical: A = Free flow; B = Reasonably free flow; C = Stable flow; D = Approaching unstable flow; E = Unstable flow; F = Forced or breakdown flow.

LinSig

The following outputs were obtained from the LinSig models:

- Degree of Saturation: this output presents the ratio of demand flow to the maximum flow which can be passed through an junction from a particular approach i.e. number of vehicles that could cross the stop line in an hour on a particular lane. A lane with a

degree of Saturation greater than 90% is considered to be approaching its theoretical capacity.

- Maximum Queue Length: queue lengths at junctions are measured in Passenger Car Units (PCU), which represents a standard vehicle length including a buffer length to the front and back. For the purposes of this assessment, a PCU length of 5.75 metres has been assumed.
- Delay: the delay is based on the estimated average delay per vehicle among all traffic passing through the junction. The delay per vehicle provides an insight into operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience, and safety. Average delays greater than 80 seconds per vehicle is considered generally considered to be excessive for signalised intersections.
- Practical Reserve Capacity (PRC): is the amount by which traffic demand can grow before Practical Capacity is reached. A PRC close to 0% suggest that the junction is operating at capacity. A negative PRC indicates the junction is operating over its practical capacity.

9.4.3 Assessment Junctions Turning Movements

The diagrams illustrating the turning movements estimated for each junction and utilised as input for the in the different assessment scenarios and modelling years and have been included in Appendix B of this Report.

9.5 Junction 1 Assessment

9.5.1 Assessment Layout

The assessment of the Barnwell Roundabout (Junction 1) was conducted taking in consideration the existing layouts of the junction. Figure 9.2 illustrates the existing layout of this junction.

Figure 9.2 *Existing Barnwell Roundabout Junction Layout (Junction 1)*

9.5.2 Do- Minimum Traffic Modelling Results

AM PEAK

Table 9.1, below, presents the traffic modelling results obtained for junction no.1 without the proposed development in place during the AM PEAK.

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Littlepace Distributor Road	0.11	0.50	A	1.61
	Ongar Distributor Road	0.14	0.50	A	
	Barnwell Road	0.14	0.50	A	
	Beechwood Gate	0.01	0.50	A	
Year of Opening +5 2030	Littlepace Distributor Road	0.13	0.05	A	1.90
	Ongar Distributor Road	0.30	1.60	A	
	Barnwell Road	0.22	1.00	A	
	Beechwood Gate	0.01	0.50	A	
Year of Opening + 15 2040	Littlepace Distributor Road	0.19	1.63	A	1.91
	Ongar Distributor Road	0.25	2.07	A	
	Barnwell Road	0.23	1.99	A	
	Beechwood Gate	0.01	3.02	A	

Table 9.1 *Junction 1 Do-Minimum AM Peak Traffic Modelling Results*

As shown in Table 9.1, without the proposed development in place junction no. 1 will operated at satisfactory levels in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.30 on the Ongar Distributor Road in 2030.

PM PEAK

Table 9.2, below, presents the traffic modelling results obtained for junction no.1 without the proposed development in place during the PM PEAK.

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Littlepace Distributor Road	0.19	0.50	A	2.21
	Ongar Distributor Road	0.24	1.30	A	
	Barnwell Road	0.42	2.60	A	
	Beechwood Gate	0.03	0.50	A	
Year of Opening +5 2030	Littlepace Distributor Road	0.12	0.50	A	2.62
	Ongar Distributor Road	0.34	2.40	A	
	Barnwell Road	0.51	1.50	A	
	Beechwood Gate	0.03	0.50	A	
Year of Opening + 15 2040	Littlepace Distributor Road	0.17	0.50	A	2.26
	Ongar Distributor Road	0.26	1.40	A	

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
	Barnwell Road	0.44	2.10	A	
	Beechwood Gate	0.03	0.50	A	

Table 9.2 *Junction 1 Do-Minimum PM Peak Traffic Modelling Results*

As shown in Table 9.2, without the proposed development in place junction no. 1 will operated at satisfactory levels in all assessment years. Similar to the AM Peak, the maximum Ratio of Flow to Capacity was recorded on the Ongar Distributor Road in 2030, which resulted to be 0.51.

Overall, the performance of the junction is worst in the PM peak, when compared to the AM peak; However, the maximum RFC obtained for the junction is well below the 0.85 cutline for performance satisfaction. LOS should remain as A for all scenarios assessed in the do minimum.

9.5.3 Post-Development/Do- Something Traffic Modelling Results

AM PEAK

Table 9.3 (overleaf) presents the traffic modelling results obtained for junction no.1 with the proposed development in place during the AM PEAK.

Assessment Year	Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Littlepace Distributor Road	0.14	0.5	A	1.70
	Ongar Distributor Road	0.17	0.5	A	
	Barnwell Road	0.20	0.5	A	
	Beechwood Gate	0.01	0.5	A	
Year of Opening +5 2030	Littlepace Distributor Road	0.17	0.5	A	1.86
	Ongar Distributor Road	0.23	1.2	A	
	Barnwell Road	0.26	1.4	A	
	Beechwood Gate	0.01	0.5	A	
Year of Opening + 15 2040	Littlepace Distributor Road	0.20	0.5	A	1.94
	Ongar Distributor Road	0.26	1.3	A	
	Barnwell Road	0.25	1.4	A	
	Beechwood Gate	0.01	0.5	A	

Table 9.3 *Junction 1 Do-Something AM Peak Traffic Modelling Results*

As shown in Table 9.3, with the proposed development in place junction no. 1 will continue to operate at satisfactory levels in all assessment years. The LOS is expected to remain as A for all assessment years.

PM PEAK

Table 9.4, below, presents the traffic modelling results obtained for junction no.1 with the proposed development in place during the PM PEAK.

Assessment Year	Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Littlepace Distributor Road	0.21	0.70	A	2.30
	Ongar Distributor Road	0.25	1.40	A	
	Barnwell Road	0.45	1.90	A	
	Beechwood Gate	0.03	0.50	A	
Year of Opening +5 2030	Littlepace Distributor Road	0.25	1.30	A	2.71
	Ongar Distributor Road	0.30	1.50	A	
	Barnwell Road	0.55	1.60	A	
	Beechwood Gate	0.03	0.50	A	
Year of Opening + 15 2040	Littlepace Distributor Road	0.17	0.50	A	2.21
	Ongar Distributor Road	0.26	1.40	A	
	Barnwell Road	0.42	2.50	A	
	Beechwood Gate	0.03	0.50	A	

Table 9.4 *Junction 1 Do-Something PM Peak Traffic Modelling Results*

As shown in Table 9.4, with the proposed development in place junction no. 1 will operate at satisfactory levels in all assessment years. The maximum Ratio of Flow to Capacity was recorded on the Barnwell Road in 2030 as 0.55.

9.6 Junction 2 Assessment

9.6.1 Assessment Layouts

As requested by Fingal County Council, the assessment of the Ongar Barnhill NS Link Rd/ R149 Barberstown Lane South Junction (Junction 2) was conducted taking in consideration two layouts, as described below:

- Layout 1: 3 no. approach lanes in the Ongar Barnhill NS Link; one accommodating right turns, one accommodating straight through movements, and one accommodating straightthrough/left turns movements.
- Layout 2: Only 2 no. approach lanes in the Ongar Barnhill NS Link, one accommodating right turns and one accommodating straight/ left
  The layouts considered are presented in Figure 9.3 and 9.4, which follows.

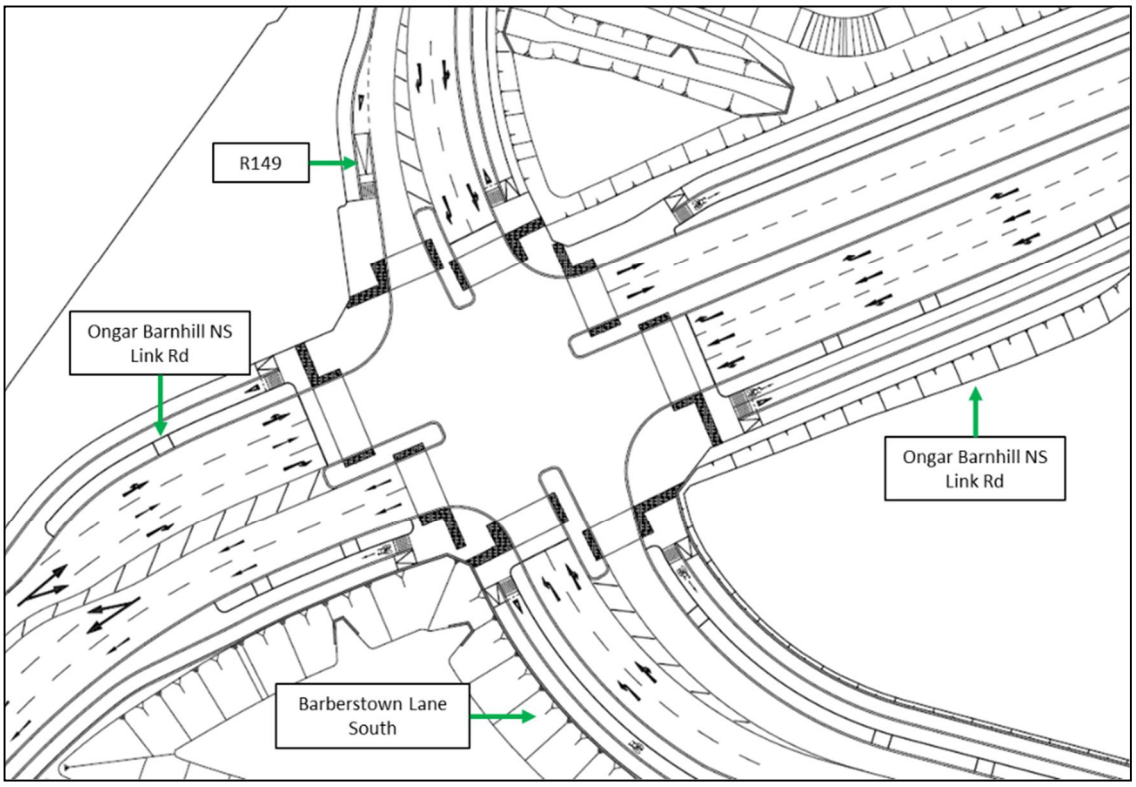


Figure 9.3 *Proposed Ongar Barnhill NS Link Rd - R149 Barberstown Lane Junction (Layout 1)*

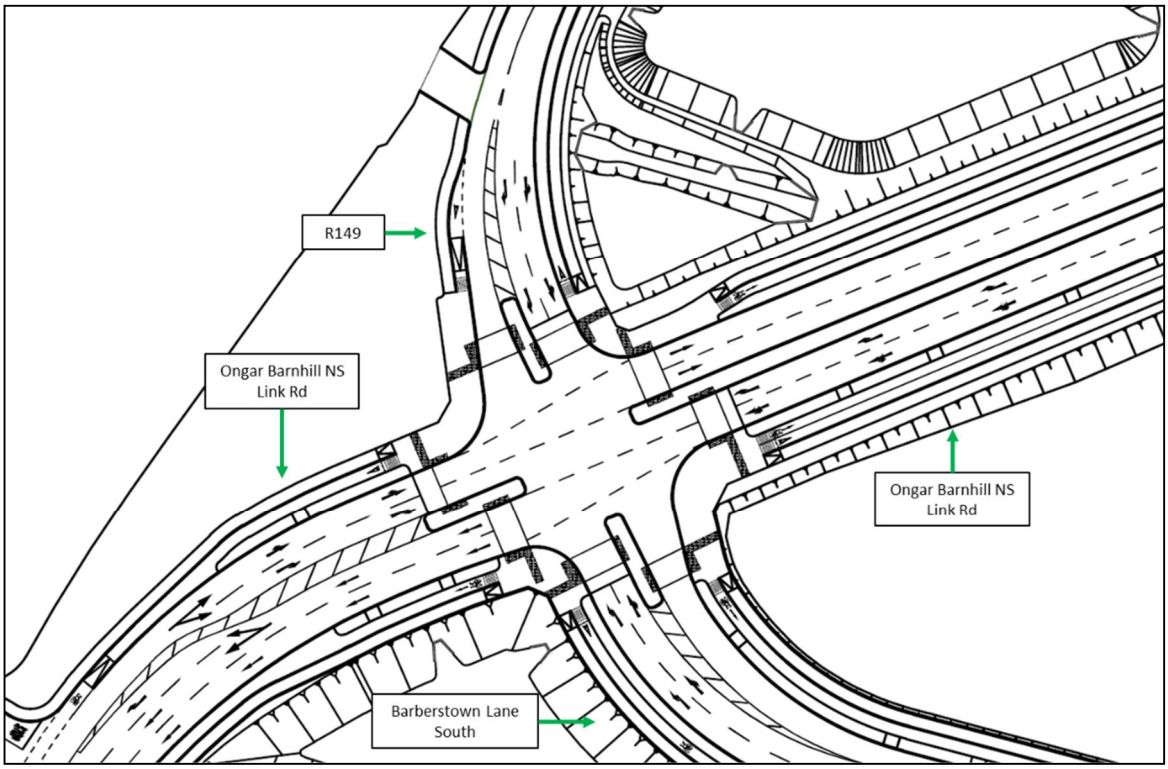


Figure 9.4 *Proposed Ongar Barnhill NS Link Rd - R149 Barberstown Lane Junction (Layout 2)*

9.6.2 Do- Minimum Traffic Modelling Results

AM PEAK Layout 1

Table 9.5, below, presents the AM PEAK traffic modelling results obtained for junction no. 2 with layout no. 1 and without the proposed development in place.

Assessment Year	Layout 1 Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	48.20%	6.1	14.4	86.90%
	Barberstown Lane South	30.90%	1.5		
	Ongar-Barnhill Link Rd (South)	40.40%	5.2		
	R149	48.10%	6.8		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	64.00%	8.7	21.1	40.70%
	Barberstown Lane South	60.60%	4.4		
	Ongar-Barnhill Link Rd (South)	59.30%	5.4		
	R149	62.40%	8.0		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	75.10%	12.4	28.5	17.70%
	Barberstown Lane South	76.50%	8.4		
	Ongar-Barnhill Link Rd (South)	74.70%	8.4		
	R149	75.40%	9.9		

Table 9.5: *Junction 2 Layout 1 Do-Minimum AM Peak Traffic Modelling Results*

As shown in Table 9.5, Junction no. 2 will operate at satisfactory level for all years during AM peak in the scenario where the proposed development is not in place. The lowest Practical Reserve Capacity is observed in the year 2040 which is 17.70 %, remaining well above the junction 0% cut-off value. The highest saturation level is observed in Barberstown Lane South in the same year 2040 as 76.5%.

AM PEAK Layout 2

Table 9.6, below, presents the AM PEAK traffic modelling results obtained for junction no. 2 with layout no. 2 and without the proposed development in place.

Assessment Year	Layout 2 Minimum AM Peak (08:00-09:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	68.40%	11.9	14.9	31.50%
	Barberstown Lane South	30.90%	1.5		
	Ongar-Barnhill Link Rd (South)	55.90%	9.1		

Assessment Year	Layout 2 Minimum AM Peak (08:00-09:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
	R149	68.20%	8.2		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	85.10%	17.3	25.1	5.70%
	Barberstown Lane South	78.80%	5.4		
	Ongar-Barnhill Link Rd (South)	74.10%	9.3		
	R149	84.30%	2.3		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	99.00%	33	51.9	-10.10%
	Barberstown Lane South	96.90%	13.9		
	Ongar-Barnhill Link Rd (South)	96.30%	13.7		
	R149	99.10%	17.1		

Table 9.6: *Junction 2 Layout 2 Do-Minimum AM Peak Traffic Modelling Results*

Table 9.6 shows that layout 2 of junction 2 performs below the satisfactory level for the years 2030 and 2040 during AM peak, in the do minimum scenario. Year 2040 is the worst performing year with Practical Reserve Capacity as -10.10%, and degree of saturation as 99.1% in R149 arm. These values are outside the acceptable range of PRC and degree of saturation.

PM PEAK LAYOUT 1

Table 9.7, below, presents the PM PEAK traffic modelling results obtained for junction no. 2 with layout no. 1 and without the proposed development in place.

Assessment Year	Layout 1 Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	31.00%	5.1	16.0	65.20%
	Barberstown Lane South	43.80%	2.0		
	Ongar-Barnhill Link Rd (South)	54.50%	10.0		
	R149	54.50%	5.7		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	41.60%	6.2	22.0	34.90%
	Barberstown Lane South	66.20%	6.4		
	Ongar-Barnhill Link Rd (South)	66.70%	11.4		
	R149	64.60%	6.0		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	53.10%	7.8	23.5	48.60%
	Barberstown Lane South	60.20%	6.3		

Assessment Year	Layout 1 Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
	Ongar-Barnhill Link Rd (South)	58.50%	9.1		
	R149	60.60%	5.3		

Table 9.7: *Junction 2 Layout 1 Do-Minimum PM Peak Traffic Modelling Results*

As seen in Table 9.7, layout 1 of Junction 2 operates at satisfactory levels during PM peak. The worst performance is observed in the year 2030 with PRC value of 34.90%; the highest degree of saturation was recorded to be 66.7% in Ongar-Barnhill Link Road (South). The values are still within the acceptable range.

PM PEAK Layout 2

Table 9.8, below, presents the PM PEAK traffic modelling results obtained for junction no. 2 with layout no. 2 and without the proposed development in place.

Assessment Year	Layout 2 Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	43.80%	9.8	21.8	-1.60%
	Barberstown Lane South	91.50%	2		
	Ongar-Barnhill Link Rd (South)	85.60%	24.9		
	R149	85.60%	8.1		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	59.60%	11.5	38.8	-10.30%
	Barberstown Lane South	99.20%	11.9		
	Ongar-Barnhill Link Rd (South)	97.60%	30.8		
	R149	96.90%	10.7		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	76.70%	15.6	28.8	4.90%
	Barberstown Lane South	84.20%	8.3		
	Ongar-Barnhill Link Rd (South)	85.80%	19.4		
	R149	85.80%	7.3		

Table 9.8: *Junction 2 Layout 2 Do-Minimum PM Peak Traffic Modelling Results*

Table 9.8 shows that layout 2 of junction 2 performs below the satisfactory level for all the years during PM peak in the do minimum scenario. Year 2030 is the worst performing year with Practical Reserve Capacity as -10.30%, and degree of saturation as 99.2% in Barberstown Lane South arm. These values are outside the acceptable range of PRC >10 % and degree of saturation < 85%.

Overall, Layout 1 of Junction 2 performs better than Layout 2 in do minimum scenario where the development is not in place. Layout 1's performance is satisfactory in all cases assessed, whereas Layout 2 performs less than satisfactory in almost all cases.

9.6.3 Post-Development/ Do- Something Traffic Modelling Results

AM PEAK Layout 1

Table 9.9, below, presents the AM PEAK traffic modelling results obtained for junction no. 2 with layout no. 1 and with the proposed development in place.

Assessment Year	Layout 1 Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	63.20%	7.9	22.5	37.00%
	Barberstown Lane South	64.60%	5.9		
	Ongar-Barnhill Link Rd (South)	62.70%	5.1		
	R149	65.70%	8.1		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	84.80%	12.0	35.8	3.50%
	Barberstown Lane South	83.30%	10.5		
	Ongar-Barnhill Link Rd (South)	86.90%	7.7		
	R149	83.90%	10		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	81.80%	13.4	34.6	9.40%
	Barberstown Lane South	81.40%	12.1		
	Ongar-Barnhill Link Rd (South)	80.70%	9.3		
	R149	82.30%	11.0		

Table 9.9: *Junction 2 Layout 1 Do-Something AM Peak Traffic Modelling Results*

As shown in Table 9.9, the junction performance the junction operates within acceptable levels in the years 2025 and 2040. For the year 2030, the PRC reduces to 3.5%, approaching its practical reserve capacity. The maximum degree of saturation recorded for this scenario was 86.90% in the Ongar-Barnhill Link Road (South) Arm.

AM PEAK Layout 2

Table 9.10, below, presents the AM PEAK traffic modelling results obtained for junction no. 2 with layout no. 2 and with the proposed development in place.

Assessment Year	Layout 2 Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	83.70%	15.6	26.8	6.60%
	Barberstown Lane South	84.40%	7.6		
	Ongar-Barnhill Link Rd (South)	78.40%	8.9		
	R149	82.10%	9.6		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	111.60%	51.8	95.2	-24.00%
	Barberstown Lane South	109.30%	24.4		
	Ongar-Barnhill Link Rd (South)	104.30%	13.2		
	R149	104.90%	19.3		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	104.90%	45.9	86.6	-16.60%
	Barberstown Lane South	104.90%	25.0		
	Ongar-Barnhill Link Rd (South)	103.00%	17.8		
	R149	104.70%	21.5		

Table 9.10: *Junction 2 Layout 2 Do-Something AM Peak Traffic Modelling Results*

As shown in Table 9.10, the performance indicators obtained for this scenario are below the satisfactory level for all the years during AM peak in the do something scenario. Year 2030 is the worst performing year with Practical Reserve Capacity as low as -24.00%, and degree of saturation as 111.60% in Ongar-Barnhill Link Road (North) arm. These values are outside the acceptable range of PRC >10 % and degree of saturation < 85%.

PM PEAK Layout 1

Table 9.11, below, presents the PM PEAK traffic modelling results obtained for junction no. 2 with layout no. 1 and with the proposed development in place.

Assessment Year	Layout 1 Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	56.10%	7.1	26.8	38.40%
	Barberstown Lane South	63.70%	6.4		
	Ongar-Barnhill Link Rd (South)	64.40%	10.5		
	R149	65.00%	6.1		

Assessment Year	Layout 1 Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	59.90%	8.0	29.5	20.40%
	Barberstown Lane South	74.00%	9.4		
	Ongar-Barnhill Link Rd (South)	74.80%	11.9		
	R149	74.00%	6.7		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	71.20%	9.3	28.6	26.50%
	Barberstown Lane South	69.90%	7.6		
	Ongar-Barnhill Link Rd (South)	68.60%	8.5		
	R149	68.20%	5.6		

Table 9.11: *Junction 2 Layout 1 Do-Something PM Peak Traffic Modelling Results*

As seen in Table 9.11, layout 1 of Junction 2 operates at satisfactory level during PM peak as well. The worst performance is observed in the year 2030 with PRC value of 20.40% and degree of saturation being highest (74.80%) in Ongar-Barnhill Link Road (South). The values remain within the acceptable range of PRC>10% and degree of saturation <85%.

PM PEAK Layout 2

Table 9.12, below, presents the PM PEAK traffic modelling results obtained for junction no. 2 with layout no. 2 and with the proposed development in place.

Assessment Year	Layout 2 Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	73.40%	13.3	38.2	-5.80%
	Barberstown Lane South	93.00%	9.9		
	Ongar-Barnhill Link Rd (South)	95.20%	26.5		
	R149	90.00%	8.8		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	79.80%	15.4	72.7	-19.60%
	Barberstown Lane South	104.50%	20.2		
	Ongar-Barnhill Link Rd (South)	107.60%	50.6		
	R149	98.70%	11.5		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	92.40%	20.5	39.8	-2.70%
	Barberstown Lane South	90.60%	10.5		
	Ongar-Barnhill Link Rd (South)	91.50%	18.9		
	R149	85.20%	7.2		

Table 9.12: *Junction 2 Layout 2 Do-Something PM Peak Traffic Modelling Results*

Table 9.12 shows that layout 2 of junction 2 performs below the satisfactory level for all the years during PM peak in the do something scenario. Year 2030 is the worst performing year with Practical Reserve Capacity as low as -19.60%, and degree of saturation as 107.60% in Ongar-Barnhill Link Road (South) arm. These values are outside the acceptable range of PRC >10 % and degree of saturation < 85%.

Similar to the do-minimum scenario, Layout 1 of junction 2 performs better than Layout 2. Layout 2ôs performance is below satisfactory during all peaks and all years, whereas Layout 1 remains within acceptable performance ranges. This could be attributed to the development of the new Barnhill site which would significantly increase the traffic flow through junction 2.

The results presented above show that all development traffic can be accommodated with Layout no. 1 in place without deteriorating the performance of the junction below acceptable levels.

9.7 Junction 3 Assessment

9.7.1 Assessment Layout

The assessment of the Barberstown Lane South/Barnhill Development South Access A (Junction 3) was conducted taking in consideration the most up-to-date junction layout to be implemented as part of the upgrades proposed for the Barberstown Lane South. These changes will be carried out by Fingal County Council prior to the development construction. Figure 9.5 below illustrates the proposed layout of this junction.

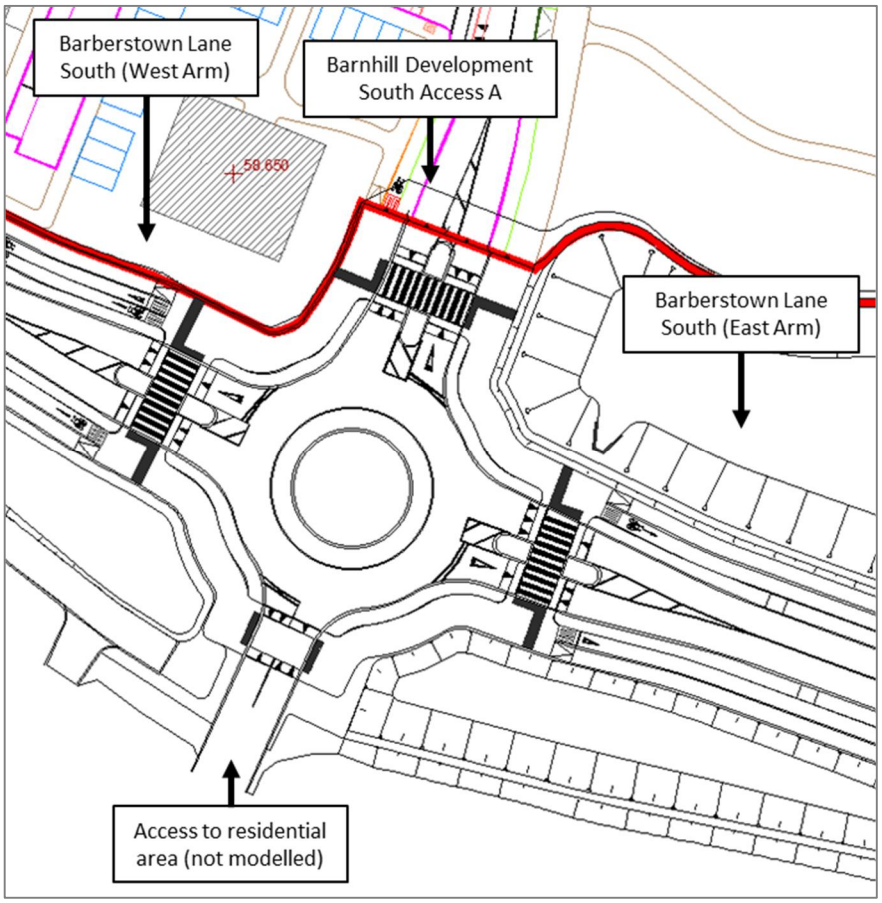


Figure 9.5: *Proposed Barberstown Lane South/Barnhill Development Access A Junction Layout*

9.7.2 Do- Minimum Traffic Modelling Results

AM PEAK

Table 9.13 presents the traffic modelling results obtained for junction no.3 without the proposed development in place during the AM Peak.

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	-	-	-	2.9
	Barberstown Lane (East Arm)	0.01	0.6	A	
	Barberstown Lane (West Arm)	0.05	0.5	A	
Year of Opening +5 2030	Development Access	-	-	-	3.35
	Barberstown Lane (East Arm)	0.11	0.5	A	
	Barberstown Lane (West Arm)	0.23	1.3	A	
Year of Opening + 15 2040	Development Access	-	-	-	3.94
	Barberstown Lane (East Arm)	0.18	0.5	A	
	Barberstown Lane (West Arm)	0.37	2.7	A	

Table 9.13: *Junction 3 Do Minimum AM Peak Traffic Modelling Results*

As shown in Table 9.13, without the proposed development in place, junction no. 3 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.37 on Barberstown Lane (West Arm) for the year 2040.

PM PEAK

Table 9.14, below, presents the traffic modelling results obtained for junction no.3 without the proposed development in place during the PM Peak.

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	-	-	-	2.71
	Barberstown Lane (East Arm)	0.05	0.5	A	
	Barberstown Lane (West Arm)	0.03	0.5	A	
Year of Opening +5 2030	Development Access	-	-	-	2.93
	Barberstown Lane (East Arm)	0.15	0.5	A	
	Barberstown Lane (West Arm)	0.05	0.5	A	

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening + 15 2040	Development Access	-	-	-	3.34
	Barberstown Lane (East Arm)	0.27	1.2	A	
	Barberstown Lane (West Arm)	0.1	0.5	A	

Table 9.14: *Junction 3 Do Minimum PM Peak Traffic Modelling Results*

As shown in Table 9.14, without the proposed development in place, junction no. 3 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.27 on Barberstown Lane (East Arm) for the year 2040.

Overall, the junction performance is better during AM peak than PM peak. However, even the worst recorded RFC is below the threshold of 0.85.

9.7.3 Post-Development/ Do- Something Traffic Modelling Results

AM PEAK

Table 9.15, below, presents the traffic modelling results obtained for junction no.3 with the proposed development in place during the AM PEAK.

Assessment Year	Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	0.19	0.7	A	3.21
	Barberstown Lane (East Arm)	0.14	0.5	A	
	Barberstown Lane (West Arm)	0.11	0.5	A	
Year of Opening +5 2030	Development Access	0.21	1.1	A	3.82
	Barberstown Lane (East Arm)	0.25	1.4	A	
	Barberstown Lane (West Arm)	0.3	1.8	A	
Year of Opening + 15 2040	Development Access	0.15	0.5	A	3.62
	Barberstown Lane (East Arm)	0.29	1.6	A	
	Barberstown Lane (West Arm)	0.2	0.9	A	

Table 9.15: *Junction 3 Do Something AM Peak Traffic Modelling Results*

With the proposed development in place, junction no. 3 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.30 on Barberstown Lane (West Arm) for the year 2030.

PM PEAK

Table 9.16 presents the traffic modelling results obtained for junction no.3 with the proposed development in place during the PM PEAK

Assessment Year	Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	0.11	0.5	A	3.15
	Barberstown Lane (East Arm)	0.18	0.5	A	
	Barberstown Lane (West Arm)	0.12	0.5	A	
Year of Opening +5 2030	Development Access	0.11	0.5	A	3.39
	Barberstown Lane (East Arm)	0.27	1.5	A	
	Barberstown Lane (West Arm)	0.12	0.5	A	
Year of Opening + 15 2040	Development Access	0.05	0.5	A	3.63
	Barberstown Lane (East Arm)	0.34	2.4	A	
	Barberstown Lane (West Arm)	0.15	0.5	A	

Table 9.16: *Junction 3 Do Something PM Peak Traffic Modelling Results*

As shown in Table 9.16, with the proposed development in place, junction no. 3 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.34 on Barberstown Lane (East Arm) for the year 2030.

When all the scenarios for Junction 3 are compared, it can be said that the junction performance is overall satisfactory. Junction performance is better during the AM peak than PM peak in this scenario. The least satisfactory performance is also below the cutline for the satisfactory performance, which is 0.85 RFC.

9.8 Junction 4 Assessment

9.8.1 Assessment Layout

The assessment of the Barberstown Lane South/Barnhill Development Access B (Junction 3) was conducted taking in consideration the most up-to-date junction layout to be implemented as part of the upgrades proposed for the Barbertown Lane South. This changes

will be carried out by Fingal County Council prior to the development construction. Figure 9.6 illustrates the proposed layout of this junction.

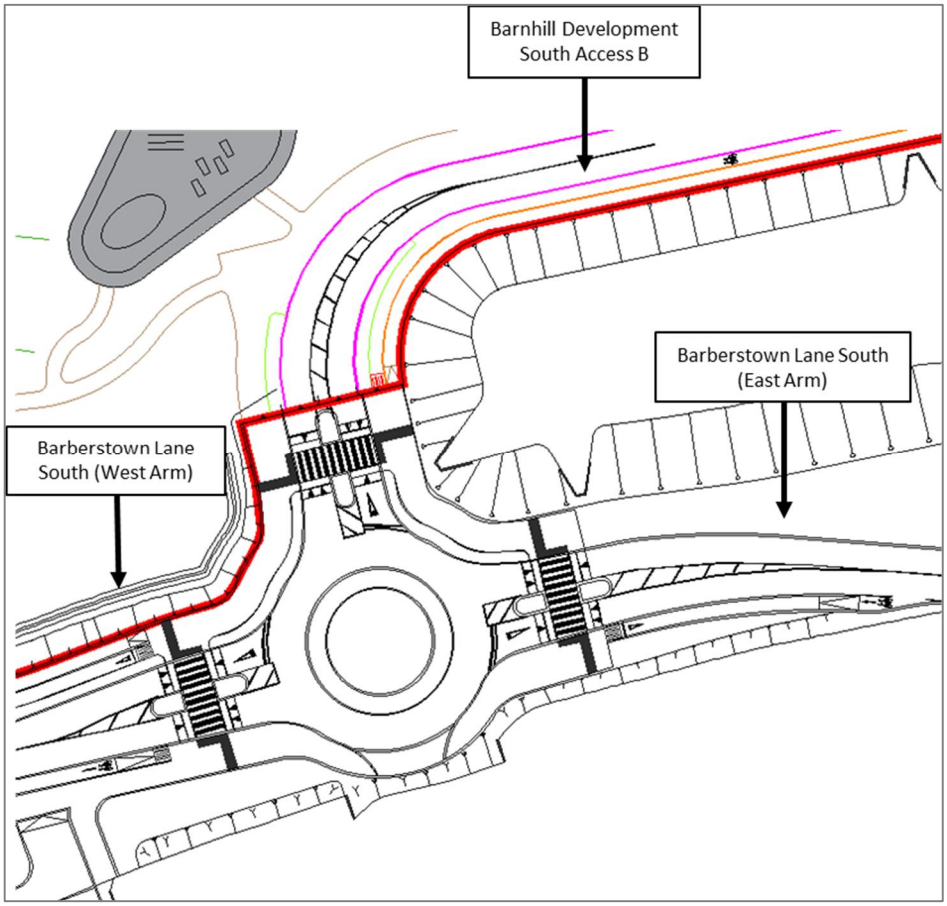


Figure 9.6: *Proposed Barberstown Lane South/Barnhill Development Access B Junction Layout*

9.8.2 Do- Minimum Traffic Modelling Results

AM PEAK

Table 9.17, below, presents the traffic modelling results obtained for junction no.4 without the proposed development in place during the AM PEAK.

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	-	-	-	2.96
	Barberstown Lane (East Arm)	0.01	0.6	A	
	Barberstown Lane (West Arm)	0.05	0.5	A	
Year of Opening +5 2030	Development Access	-	-	-	3.44
	Barberstown Lane (East Arm)	0.11	0.5	A	
	Barberstown Lane (West Arm)	0.24	1.3	A	
	Development Access	-	-	-	4.06

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening + 15 2040	Barberstown Lane (East Arm)	0.18	0.5	A	
	Barberstown Lane (West Arm)	0.37	2.7	A	

Table 9.17: *Junction 4 Do Minimum AM Peak Traffic Modelling Results*

As shown in Table 9.17, without the proposed development in place, junction no. 4 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.37 on Barberstown Lane (West Arm) for the year 2040.

PM PEAK

Table 9.18, below, presents the traffic modelling results obtained for junction no.4 without the proposed development in place during the PM PEAK.

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	-	-	-	2.77
	Barberstown Lane (East Arm)	0.05	0.50	A	
	Barberstown Lane (West Arm)	0.03	0.50	A	
Year of Opening +5 2030	Development Access	-	-	-	3.01
	Barberstown Lane (East Arm)	0.15	0.50	A	
	Barberstown Lane (West Arm)	0.05	0.50	A	
Year of Opening + 15 2040	Development Access	-	-	-	3.45
	Barberstown Lane (East Arm)	0.28	1.40	A	
	Barberstown Lane (West Arm)	0.10	0.50	A	

Table 9.18: *Junction 4 Do Minimum PM Peak Traffic Modelling Results*

As shown in Table 9.18, without the proposed development in place, junction no. 4 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.28 on Barberstown Lane (East Arm) for the year 2040.

Overall, junction performance is better during PM peak than AM peak.

9.8.3 Post Development/ Do- Something Traffic Modelling Results

AM PEAK

Table 9.19, below, presents the traffic modelling results obtained for junction no.4 with the proposed development in place during the AM PEAK.

Assessment Year	Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	0.2	1.0	A	3.45
	Barberstown Lane (East Arm)	0.03	0.5	A	
	Barberstown Lane (West Arm)	0.18	0.5	A	
Year of Opening +5 2030	Development Access	0.22	1.2	A	4.2
	Barberstown Lane (East Arm)	0.14	0.5	A	
	Barberstown Lane (West Arm)	0.39	2.6	A	
Year of Opening + 15 2040	Development Access	0.15	0.5	A	3.64
	Barberstown Lane (East Arm)	0.21	1.1	A	
	Barberstown Lane (West Arm)	0.24	1.4	A	

Table 9.19: *Junction 4 Do Something AM Peak Traffic Modelling Results*

As shown in Table 9.14, with the proposed development in place, junction no. 4 will operate at a satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.39 on Barberstown Lane (West Arm) for the year 2030.

PM PEAK

Table 9.20, below, presents the traffic modelling results obtained for junction no.4 with the proposed development in place during the PM PEAK

Assessment Year	Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	0.11	0.50	A	3.17
	Barberstown Lane (East Arm)	0.10	0.50	A	
	Barberstown Lane (West Arm)	0.14	0.50	A	
Year of Opening +5 2030	Development Access	0.11	0.50	A	3.36
	Barberstown Lane (East Arm)	0.20	1.00	A	
	Barberstown Lane (West Arm)	0.16	0.50	A	
Year of Opening + 15 2040	Development Access	0.05	0.50	A	3.64
	Barberstown Lane (East Arm)	0.32	2.00	A	
	Barberstown Lane (West Arm)	0.16	0.50	A	

Table 9.20: *Junction 4 Do Something PM Peak Traffic Modelling Results*

As shown in Table 9.20, with the proposed development in place, junction no. 4 will operate at a satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.32 on Barberstown Lane (East Arm) for the year 2040.

Overall, with the proposed development in place junction 4 will continue to operate at satisfactory levels in all assessment years. Junction performance is better during PM peak than AM peak in all the scenarios. The least satisfactory performance is observed for the scenario when development is in place on Barberstown Lane (West Arm), with RFC 0.39 in the year 2030 during the AM peak, which is still well below the threshold for satisfactory performance (0.85 RFC).

9.9 Junction 5 Assessment

9.9.1 Assessment Layout

The assessment of the Milestown Road/Anna Liffey Mills Road/Woodwall Road Junction (Junction 5) was conducted taking in consideration the most up to date layout with the proposed upgrades to Barberstown Lane South. The upgraded layout is a roundabout which is planned to be opened in the year 2040. For the assessment years 2025 and 2030, the existing layout, which is a priority-controlled junction, has been modelled. These improvements should be delivered by Fingal County Council under the Kellystown Road Link Scheme. Figure 9.7 below illustrates the existing layout assessed for 2025 and 2030.

Figure 9.7: *Existing Milestown Road/Anna Liffey Mills Road/Woodwall Road Junction Layout (Junction 5)*

Figure 9.8 illustrates the proposed layout of Junction 5 which has been assessed for 2040. In the proposed layout, Barberstown Lane South is extended from West to East, along junction no. 5 and Milestown Road is turned into a cul-de-sac just providing access to the properties currently located along this stretch of road. The junctions have been designed as a roundabout, and Woodwall Road will be referred to as Barberstwon Lane (East Arm).

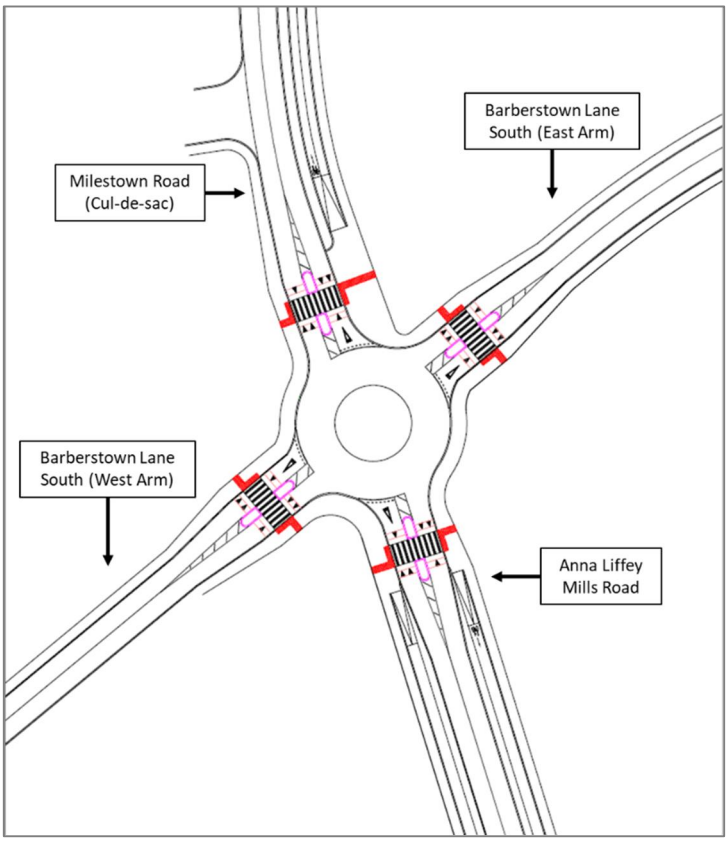


Figure 9.9: *Proposed Milestown Road/Anna Liffey Mills Road/Woodwall Road Junction Layout (Junction 5)*

Due to the low traffic activity estimated for Milestown Road once the level crossing is closed and the roundabout is in place, this arm of the junction has not been taken in consideration for the assessment.

9.9.2 Do- Minimum Traffic Modelling Results

AM PEAK

Table 9.22, below, presents the traffic modelling results obtained for junction no.5 without the proposed development in place during the AM PEAK.

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Milestown Road	0.10	0.1	A	0.78
	Woodwall Road	0.19	1.1	A	
	Anna Liffey Hills Road	0.01	0.1	A	
Year of Opening +5 2030	Milestown Road	0.37	2.8	A	6.57
	Woodwall Road	0.38	2.7	A	
	Anna Liffey Hills Road	0.55	1.5	A	
	Barberstown Lane (West Arm)	0.5	2.4	A	6.27

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening + 15 2040	Barberstown Lane (East Arm)	0.46	2.0	A	
	Anna Liffey Hills Road	0.39	2.7	A	

Table 9.22: *Junction 5 Do Minimum AM Peak Traffic Modelling Results*

As shown in Table 9.22, without the proposed development in place, junction no. 5 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.59 on Anna Liffey Hills Road for the year of opening which is 2025.

PM PEAK

Table 9.23, below, presents the traffic modelling results obtained for junction no.5 without the proposed development in place during the PM PEAK.

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Milestown Road	0.10	0.1	A	0.94
	Woodwall Road	0.11	0.5	B	
	Anna Liffey Hills Road	0.16	1.2	A	
Year of Opening +5 2030	Milestown Road	0.08	0.5	A	7.03
	Woodwall Road	0.60	1.8	A	
	Anna Liffey Hills Road	0.48	2.1	A	
Year of Opening + 15 2040	Barberstown Lane (West Arm)	0.15	0.5	A	6.25
	Barberstown Lane (East Arm)	0.45	2.2	A	
	Anna Liffey Hills Road	0.53	1.8	A	

Table 9.23: *Junction 5 Do Minimum PM Peak Traffic Modelling Results*

As shown in Table 9.23, without the proposed development in place, junction no. 5 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.53 on Anna Liffey Hills Road for the year 2040.

Overall, junction performance is better during PM peak than AM peak. The worst performing arm has RFC below the threshold of satisfactory performance which is 0.85.

9.9.3 Post Development/ Do- Something Traffic Modelling Results

AM PEAK

Table 9.24, below, presents the traffic modelling results obtained for junction no.5 with the proposed development in place during the AM PEAK.

Assessment Year	Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Milestown Road	0.10	0.2	A	3.9
	Woodwall Road	0.57	5.4	C	
	Anna Liffey Hills Road	0.02	0.5	A	
Year of Opening +5 2030	Milestown Road	0.55	2.8	A	7.36
	Woodwall Road	0.44	2.4	A	
	Anna Liffey Hills Road	0.53	1.7	A	
Year of Opening + 15 2040	Barberstown Lane (West Arm)	0.56	1.9	A	6.64
	Barberstown Lane (East Arm)	0.46	2.1	A	
	Anna Liffey Hills Road	0.39	2.7	A	

Table 9.24: *Junction 5 Do Something AM Peak Traffic Modelling Results*

As shown in Table 9.24, with the proposed development in place, junction no. 5 will continue to operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.61 on Anna Liffey Hills Road for the year 2025.

PM PEAK

Table 9.25, below, presents the traffic modelling results obtained for junction no.3 with the proposed development in place during the PM PEAK

Assessment Year	Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Milestown Road	0.10	0.2	A	2.08
	Woodwall Road	0.32	1.2	C	
	Anna Liffey Hills Road	0.25	1.2	A	
Year of Opening +5 2030	Milestown Road	0.17	0.5	A	8.17
	Woodwall Road	0.66	3.8	A	
	Anna Liffey Hills Road	0.54	1.8	A	
Year of Opening + 15 2040	Barberstown Lane (West Arm)	0.18	0.5	A	6.95
	Barberstown Lane (East Arm)	0.48	1.8	A	
	Anna Liffey Hills Road	0.58	1.8	A	

Table 9.25: *Junction 5 Do Something PM Peak Traffic Modelling Results*

As shown in Table 9.25, with the proposed development in place, junction no. 5 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.66 on Barberstown Lane (East Arm) for the year 2030.

When all the scenarios are compared for Junction 5, it can be said that the junction performance is overall satisfactory. Junction performance is better during the AM peak than PM peak for this scenario. The least satisfactory arm also has RFC well below the threshold for satisfactory performance, which is 0.85.

Based on the modelling results obtained for all junctions, it can be concluded that the local road network will operate within capacity and at satisfactory levels during peak hours for all

assessment years with the proposed development in place. Therefore, the impact of the proposed development is considered ***long-term, neutral, and imperceptible***.

Full Reports containing the traffic modelling results for each junction can be made available upon request.

9.10 Pakenham Bridge and Barberstown Level Crossing Traffic

As discussed in section 2.4, the Pakenham Bridge and Barberstown Level Crossing have been assumed to accommodate traffic for the assessment years 2025 and 2030. Once the level crossing is closed (As part of the Dart Expansion Programme) and the Barberstown Lane South is upgraded (Road section 3 in Figure 2.3), these facilities will no longer cater for any traffic. This has been assumed to be in place by 2040.

Table 9.26, below, presents the level of traffic estimated to transit through the Pakenham Bridge and Barberstown Level Crossing during each assessment year.

Approach	2019		2025				2030				2040			
	AM	PM	Do Min		Do Something		Do Min		Do Something		Do Min		Do Something	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Westbound	24	51	10	61	55	193	145	199	212	347	0	0	0	0
Eastbound	133	38	60	30	195	84	281	66	437	148	0	0	0	0
Two-Way	158	89	70	92	250	277	427	265	649	495	0	0	0	0

Table 9.26: *Estimated Traffic Levels at Pakenham Bridge and Barberstown Level Crossing*

As shown on Figure 4.4 (See section **Error! Reference source not found.**), the Coolmine Level Crossing at present successfully accommodates traffic volumes in the same range of the ones estimated for the Barberstown Crossing with the development in place. Given that the level crossings are similar in nature, the Barberstown Level Crossing will be able to accommodate the estimated traffic volumes with the development in place.

The Pakenham Bridge and the Barberstown level crossing has the capacity to cater for the traffic volumes presented in Table 5.37, taking account of level crossing closure times and width constraint of Pakenham bridge.

At present, Millerstown Road (east of the level crossing) has capacity to accommodate a queue of around 30 cars. Alternative routes exist via the Ongar Distributor Road or the Anna Liffey Mills Road.

A drawing illustrating the staging for the extension of Barberstown Lane South (Road Section 3 in Figure 2.3) in relation to the proposed development has been included in CSEA Drawing Pack, no. 16_053_034.

These Drawings set out the road connection arrangements for each scenario

- when the Ongar Barnhill Scheme is built,
- when the Barnhill SHD is constructed,
- During construction of the DART + west bridge with access to Pakenham Bridge and level crossing through the SHD road network. The developer has committed in writing to FCC to facilitate this phase as part of the land transfer for Ongar Barnhill Scheme.

- Final scenario when Dart + bridge is complete and level crossing is closed, public road access to Pakenham bridge and adjoining properties via SHD road network.

9.11 Predicted Impacts of The Development

9.11.1 Construction Stage Impact

The potential impacts resulting from construction works for the proposed development are outlined in Table 9.27, below. It should be noted that these impacts would be ***short-term, negative,*** and ***not significant,*** and are not expected to result in significant residual impact.

Activities	Potential Impact	Significance of Effects	Duration of Effects
Transportation of site machinery and materials	• Noise/disturbance to other properties in the area. • Dust raised by construction traffic. • Dirt and mud dragged onto the road by construction traffic.	**Moderate**	**Temporary**

Table 9.27 *Potential Impacts during Construction Stage.*

Given the short-term nature of the peak construction phase, the overall impact of the construction phase involving the development is not estimated to be significant and shall not affect the performance of the junctions under study. Further details if the impacts associated with the proposed development at construction stage can be found in the Outline Construction and Environmental Management Plan (CEMP) submitted with the Planning Pack.

9.11.2 Operational Impacts

As discussed in preceding sections, the traffic modelling undertaken demonstrated that the junction sunder study will continue to operate successfully with the proposed development in place.

Based on the modelling results obtained for all junctions, it can be concluded that the local road network will operate within capacity and at satisfactory levels during peak hours for all assessment years with the proposed development in place. Therefore, the potential traffic impact associated with the development was found to be ***long-term***, ***neutral and imperceptible***.

The proposal has been designed to be a walking/cycling friendly scheme, very well served by public transport and with plenty of amenities available at a short walk distance. A Mobility Strategy has been created for the development, submitted as a separate document, to promote active travel and to minimising the potential car trips in the local area

9.11.3 Cumulative Impacts

The assessment undertaken has taken in consideration the traffic associated with all major schemes to be delivered in the vicinity of the site. This also has taken into account all road network and public transport modifications in the local area. All junctions will continue to operate successfully with all these schemes and the proposed development in place.

Therefore, the potential cumulative traffic impact associated with the development was found to be ***long-term***, ***neutral, and imperceptible***.

9.12 Mitigation Measures

During the construction phase of the development, the following measures will be put in place to reduce the impact on the surrounding environment:

- The contractor will be required to provide wheel cleaning facilities, and regular cleaning site access will be carried out.
- Temporary car parking facilities for the construction workforce will be provided within the site and the surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads.
- Monitoring and control of construction traffic will be ongoing during construction works.
- Construction traffic routes shall be use strategically by construction vehicles to minimise traffic impact to surrounding properties.

Further details of the mitigation measures to be put in place at construction stage can be found in the Outline CEMP submitted with the Planning Pack.

10 Conclusion

CSEA has been commissioned to prepare a Traffic and Transport Assessment (TTA) for a proposed mixed-use development at a site located in the Barnhill, Clonsilla, Dublin 15.

The proposed development will consist of the demolition of the existing vacant industrial buildings and the construction of 1,243 residential units, approximately 3,174 m2 of commercial and community facilities, and ancillary development. The commercial and community development will include:

- Creche of 942 m2 with capacity for approximately 210 children.
- Medical centre (GP / Dental practice) of approximately 344 m2 with 8 no. consulting rooms.
- Convenience retail unit of 370 m2
- Five independent retail / retail service units ranging in size from 57 m2 to 127 m2 sqm, with capacity to amalgamate some of the units, if required.
- A Café of 158 m2
- A Community Space of 359 m2. This multi-use space will be able to accommodate a range of activities, including for example multi-denominational worship, fitness classes, community meetings etc.
- An Office Hub of 501 m2. The office hub is designed to provide hot-desk and office support facilities to facilitate hybrid working.
- Provision of an access Plaza to Hansfield Train Station, including provision for a commuting bike storage area.
- Providing for pedestrianisation / cycle way along Barberstown Lane North (L-7010-0), with vehicle use restricted to local access only.
- Land set aside for a primary school to accommodate a minimum of 16 classrooms, to be delivered by the department of education.

A total of 1,593 no. car parking spaces are proposed with the development, including 55 no. disabled spaces and 154 no. electric charging spaces. Cycle parking includes the provision 3,337 spaces.

The assessment approach underpinning this TTA is consistent with Transport Infrastructure Ireland's *Traffic and Transport Assessment Guidelines (May 2014).* The proposed development has been designed in accordance with guidance set out within the *Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities, 2018, the Design Manual for Urban Roads and Streets (DMURS), and Fingal County Council Development Plan 2017-2023.*

The Blanchardstown Local Area Model was used a a baseline to assess the development traffic impacts. Traffic survey data, collected in February 2019 was then used to calibrate and validate the 2019 base LAM to ensure that they provide an accurate representation of the worse case scenario for traffic flow within the study area.

The road assignment within the Blanchardstown LAM is undertaken using the SATURN suite of modelling software. It allocates road users to routes between their desired origin and destination taking cognisance of aspects such as capacity constraints and traffic congestion

The choice data contained within East Regional Model and the Greater Dublin Area (GDA) Strategy was utilised as a base for developing the LAM, with additional network and zonal detail included to provide an enhanced representation of the road network, and route choice,

in the study area. The road network was reviewed to ensure that it provides a robust and accurate representation of existing conditions.

Traffic models of critical junctions in the network have been developed to assess the developmentôs impacts to the operation of local road network. The industry standard ARCADY and LinSig traffic modelling software have been used for predicting the capacities, queues, and delays of these junctions.

The road network was modelled at both the AM and PM peak hour for a Do-Minimum and Do-Something. The developmentôs impacts were assessed for the Year of Opening (YoO) which has been assumed to be 2025, Future Year 2030 (YO+5) and Horizon development 2040 (YoO+15).

The modelling results show that the road network will continue to operate successfully with the development in place in all assessment scenarios at both the AM and PM peak.

On that basis, the traffic impact of the proposed development can be described as ***long-term, neutral,*** and ***imperceptible.*** The assessment has demonstrated that the proposed development will have a no material impact on the operation of the local road network.

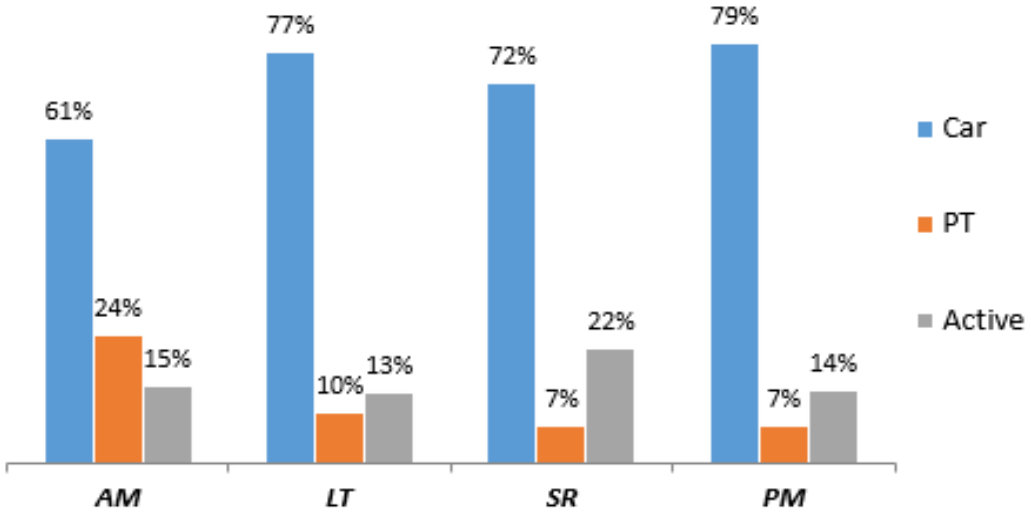
During construction stage the impact of the proposed development is expected to be ***short-term, negative,*** and ***not significant***.

Appendices

Appendix A: ERM and the GDA Mode Share

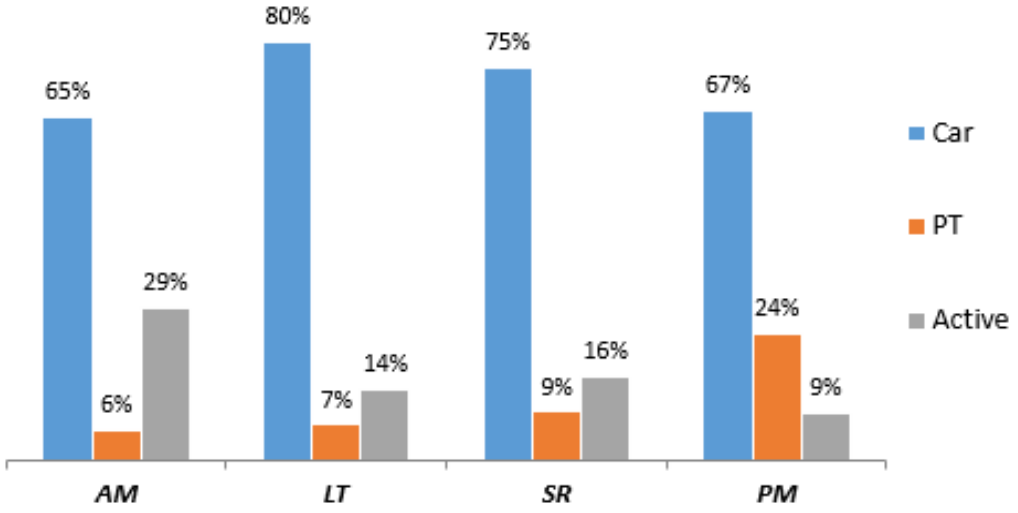
Barnhill Mode Share - 2025

Origin Mode Share



Time Period	Car	PT	Walk	Cycle	Total
AM	1,330.87	519.03	276.33	40.91	2,167.14
LT	641.17	78.76	95.05	13.44	828.42
SR	933.15	90.23	250.17	30.58	1,304.13
PM	841.20	73.10	128.96	17.49	1,060.74

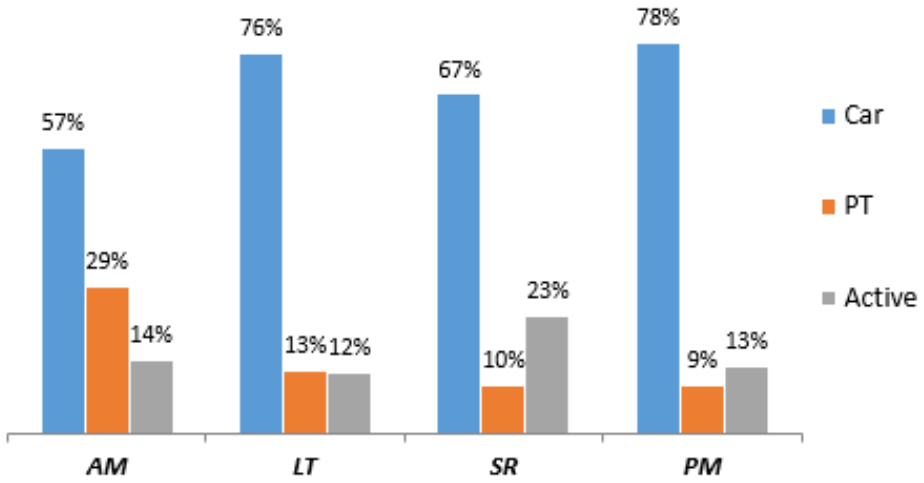
Destination Mode Share



Time Period	Car	PT	Walk	Cycle	Total
AM	910.21	77.67	361.55	41.18	1,390.61
LT	522.98	43.80	79.03	9.50	655.31
SR	923.41	112.85	174.52	21.91	1,232.69
PM	1,125.93	409.07	122.38	25.20	1,682.59

Barnhill Mode Share - 2030

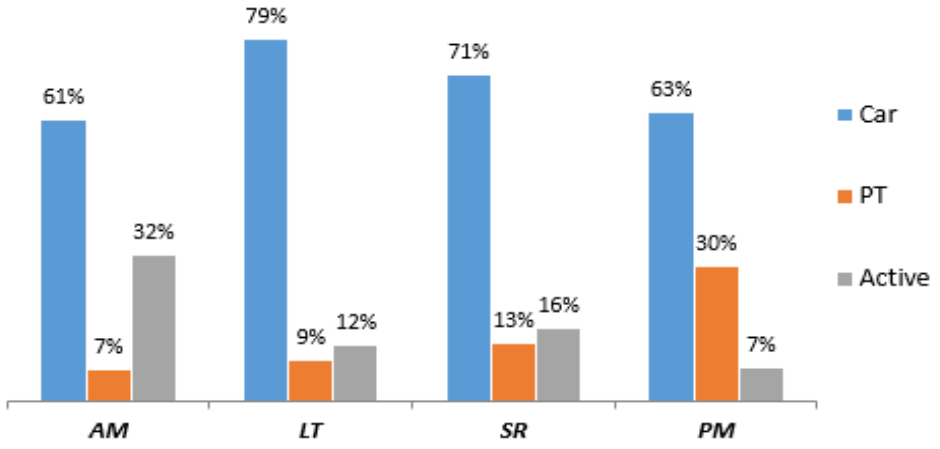
Origin Mode Share



Demand

Time Period	*Car*	*PT*	*Walk*	*Cycle*	*Total*
AM	1,244.98	636.19	280.63	35.99	2,197.79
LT	643.06	106.84	89.78	10.76	850.44
SR	884.60	125.79	273.84	29.24	1,313.47
PM	823.61	99.23	124.76	14.70	1,062.30

Destination Mode Share

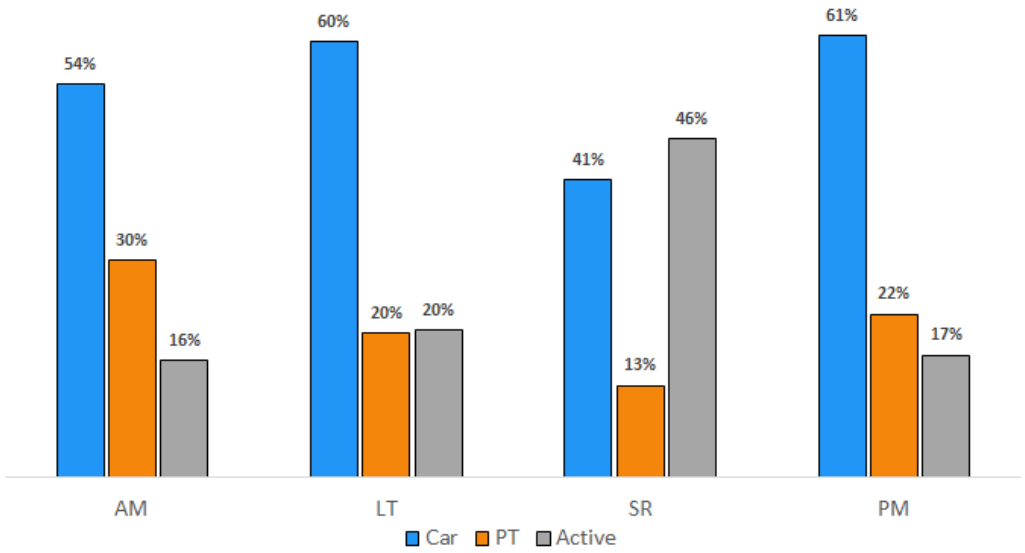


Demand

Time Period	*Car*	*PT*	*Walk*	*Cycle*	*Total*
AM	862.68	96.10	405.22	42.50	1,406.50
LT	560.23	63.24	77.30	8.36	709.13
SR	901.47	160.23	183.67	20.34	1,265.70
PM	1,085.31	509.72	108.08	19.12	1,722.24

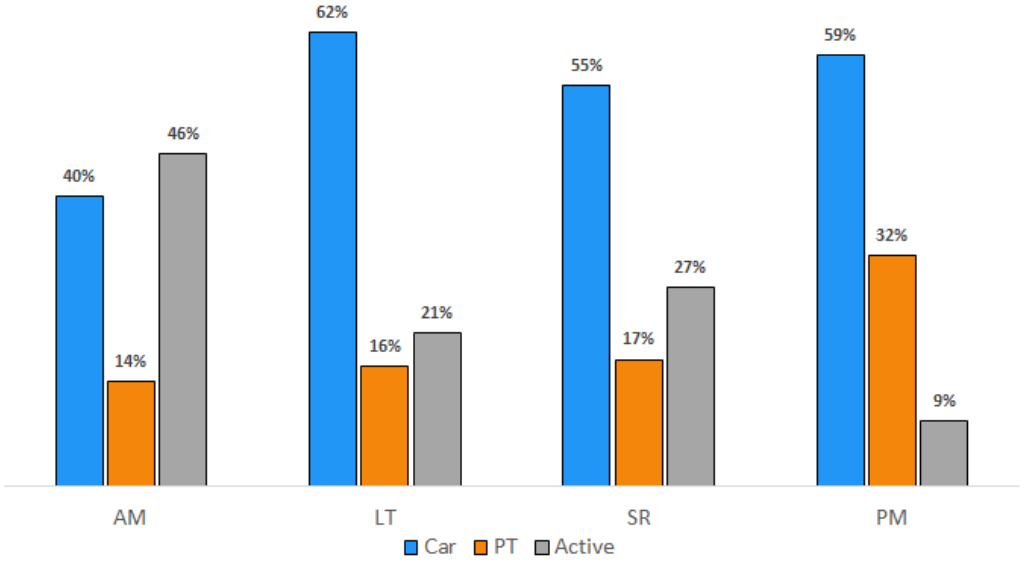
Barnhill Mode Share - 2040

Origin Mode Share



Time Period	Car	PT	Walk	Cycle	Total
AM	1,052.01	580.42	289.00	22.36	1,943.79
LT	478.98	157.84	150.46	11.21	798.49
SR	477.49	147.28	523.20	19.15	1,167.12
PM	571.12	210.75	141.82	16.02	939.71

Destination Mode Share

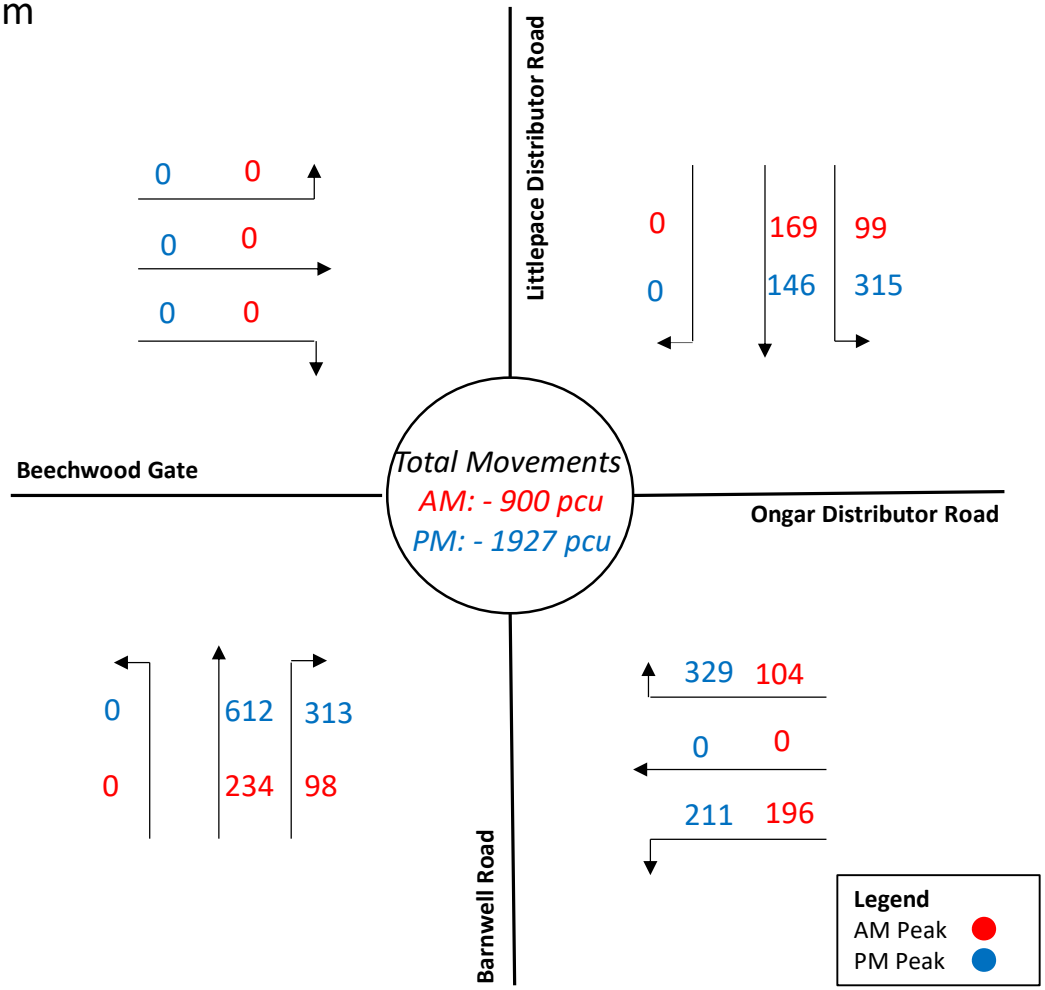


Time Period	Car	PT	Walk	Cycle	Total
AM	500.00	180.61	550.43	23.21	1,254.25
LT	454.56	119.65	144.22	9.57	728.00
SR	563.64	177.75	266.47	13.24	1,021.10
PM	971.20	520.26	126.66	18.88	1,637.00

Appendix B: Traffic Turning Proportions Diagrams at Assessment Junctions

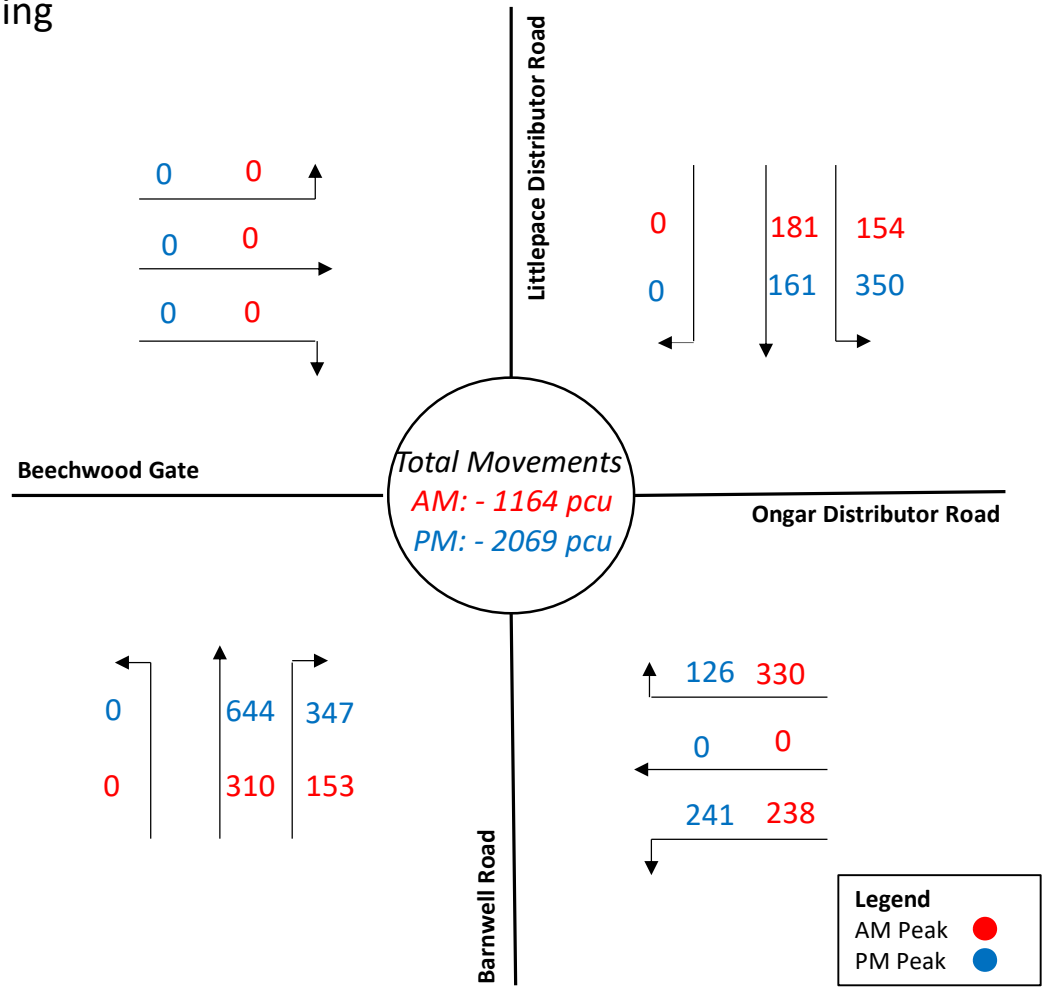
2025 Flows- Junction 1

Scenario: Do Minimum



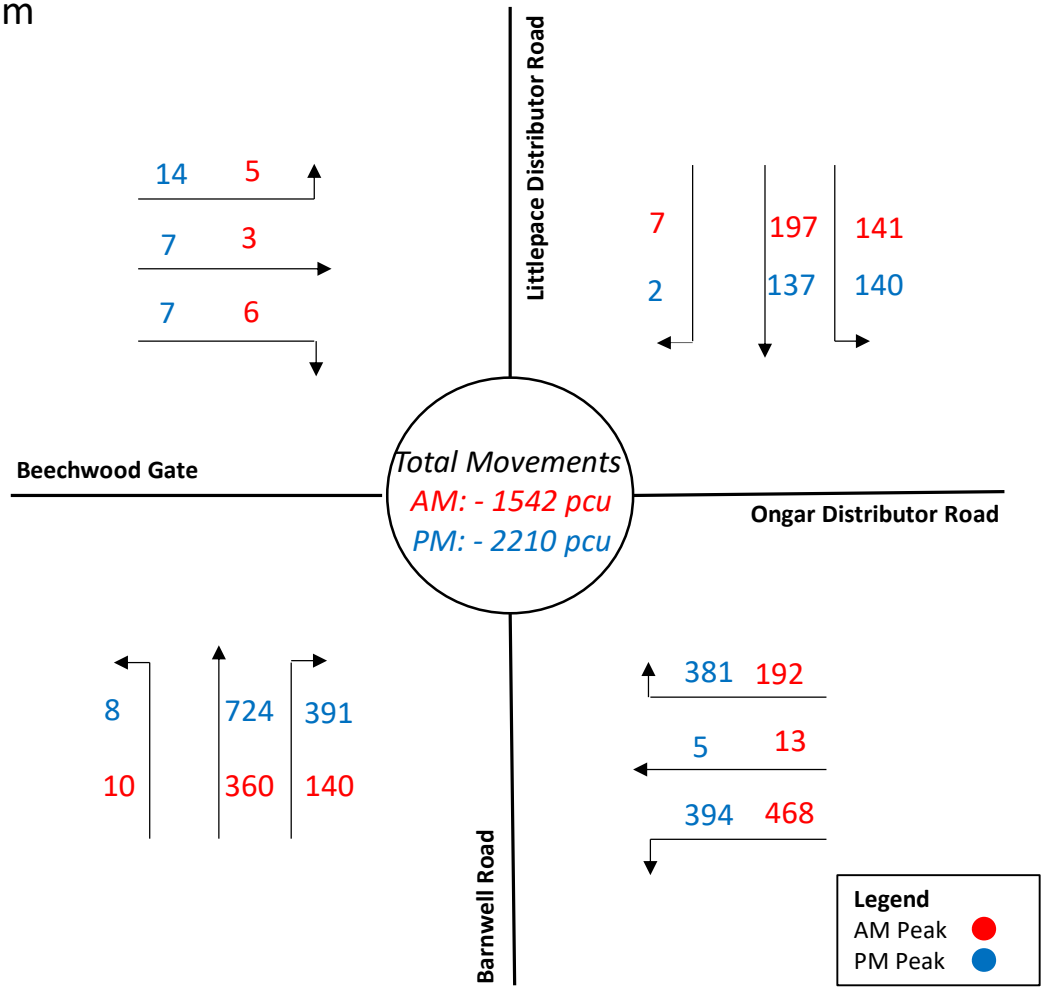
2025 Flows- Junction 1

Scenario: Do Something

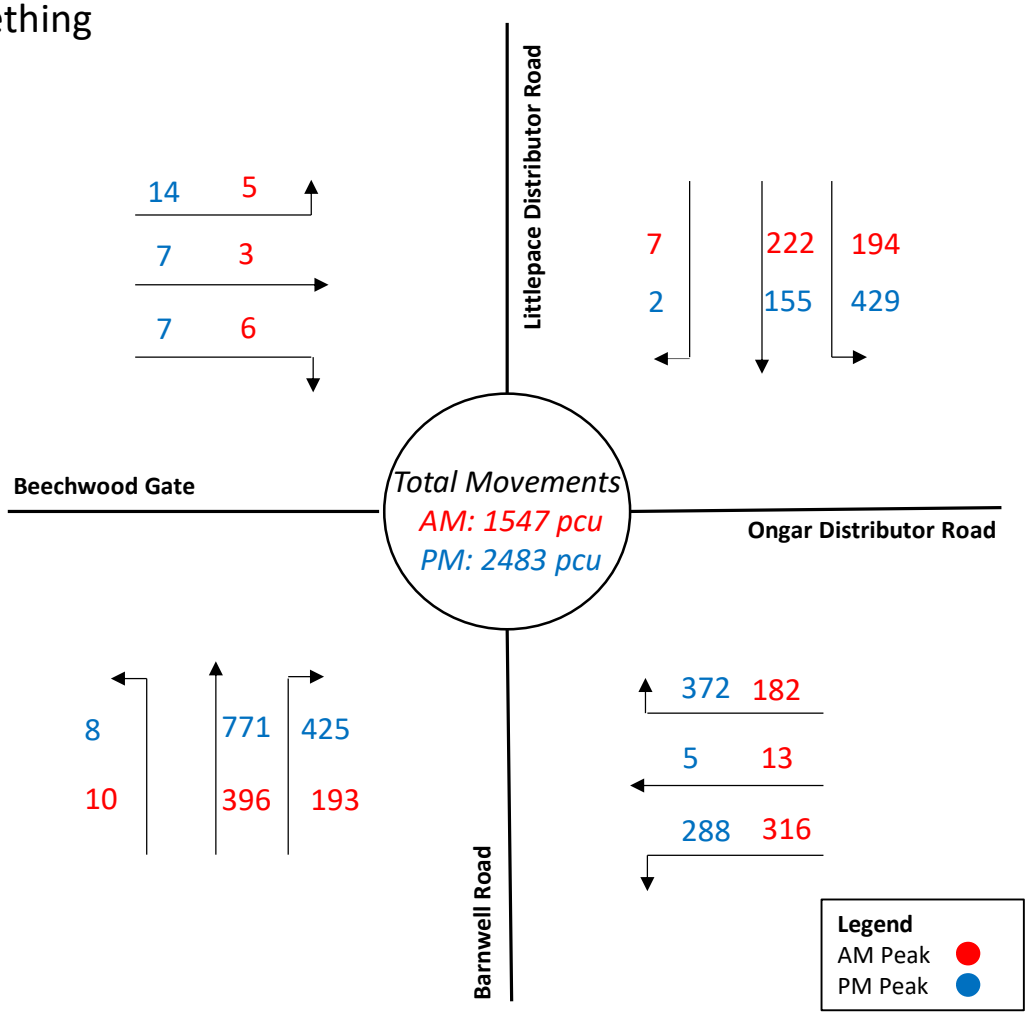


2030 Flows- Junction 1

Scenario: Do Minimum

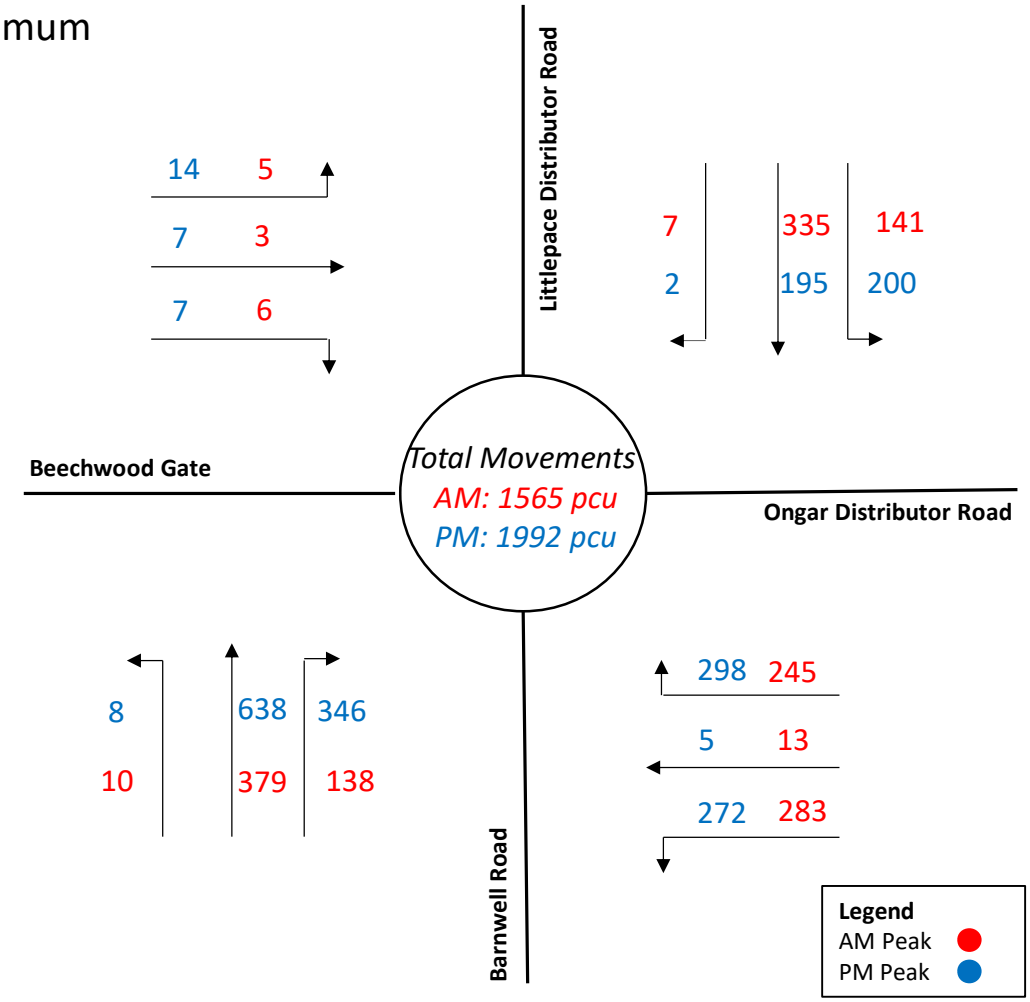


2030 Flows- Junction 1
Scenario: Do Something



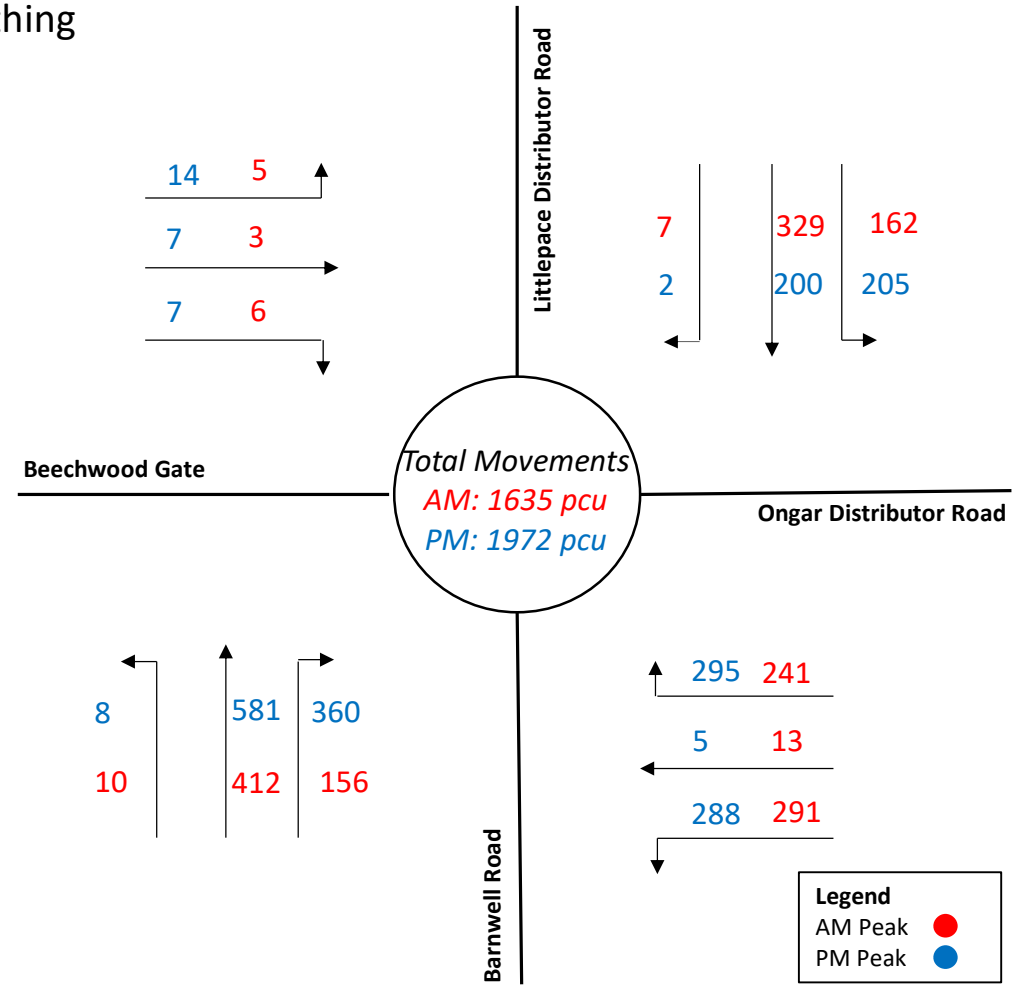
2040 Flows- Junction 1

Scenario: Do Minimum



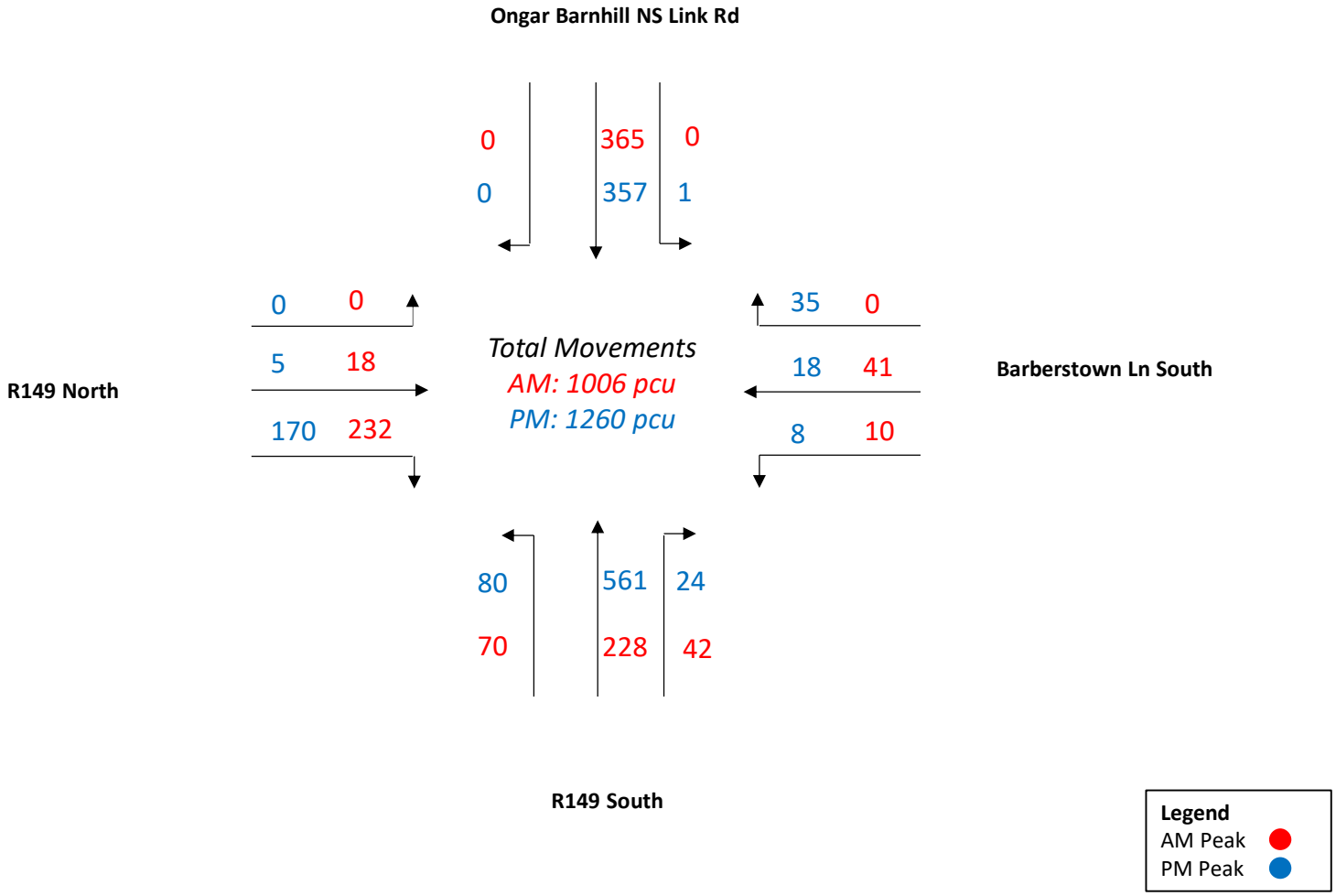
2040 Flows- Junction 1

Scenario: Do Something



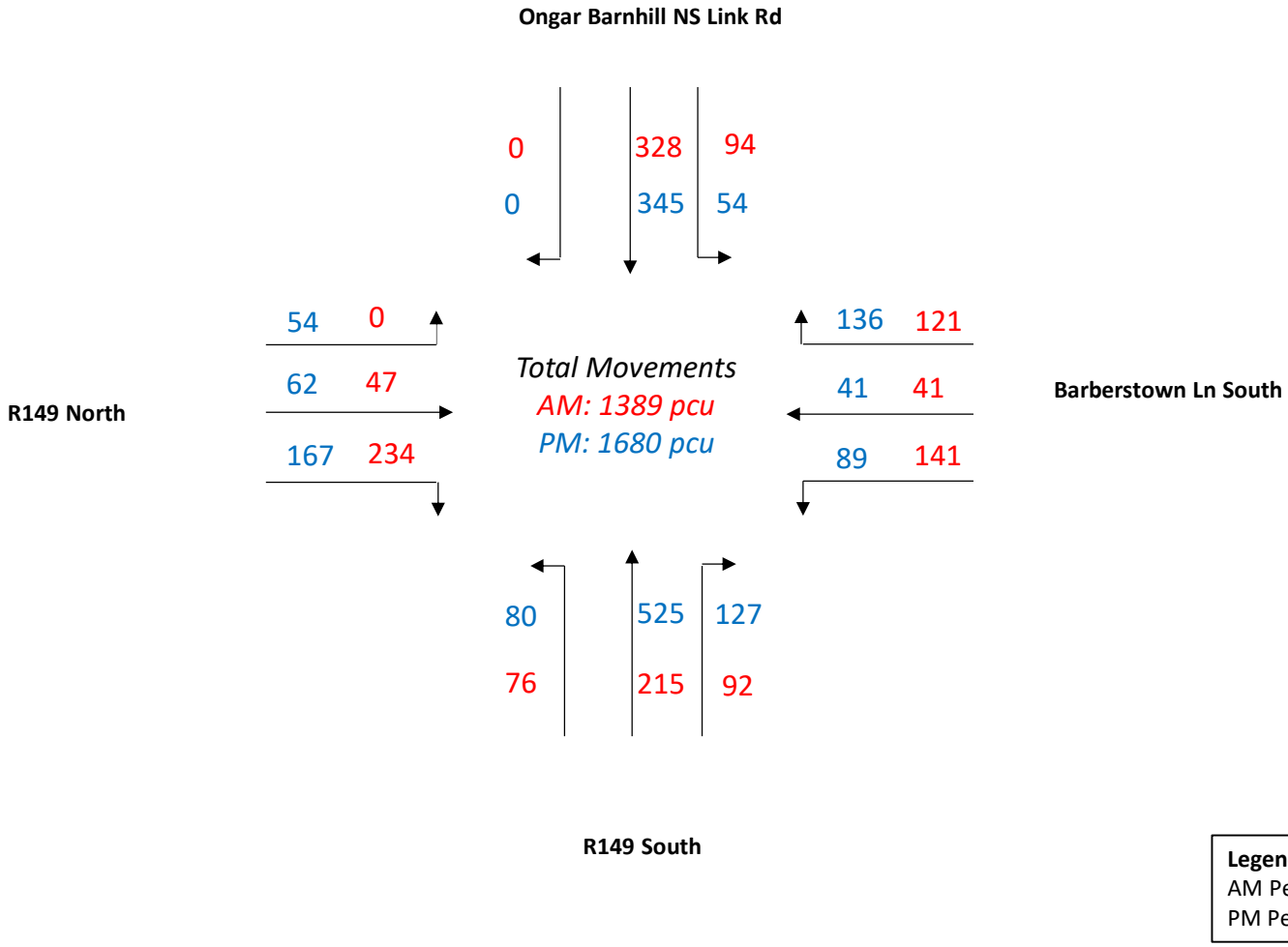
2025 Flows- Junction 2

Scenario: Do Minimum



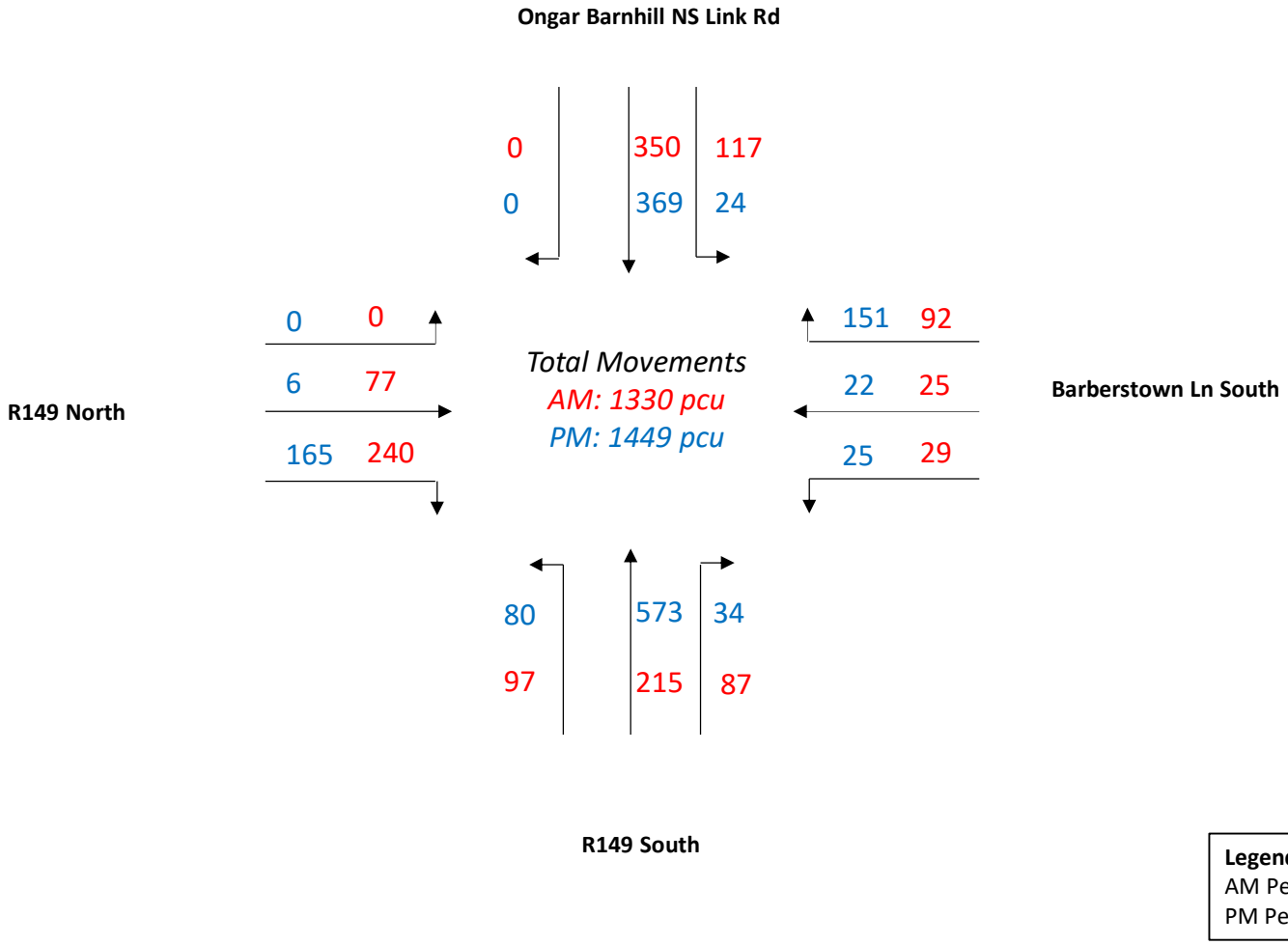
2025 Flows- Junction 2

Scenario: Do Something



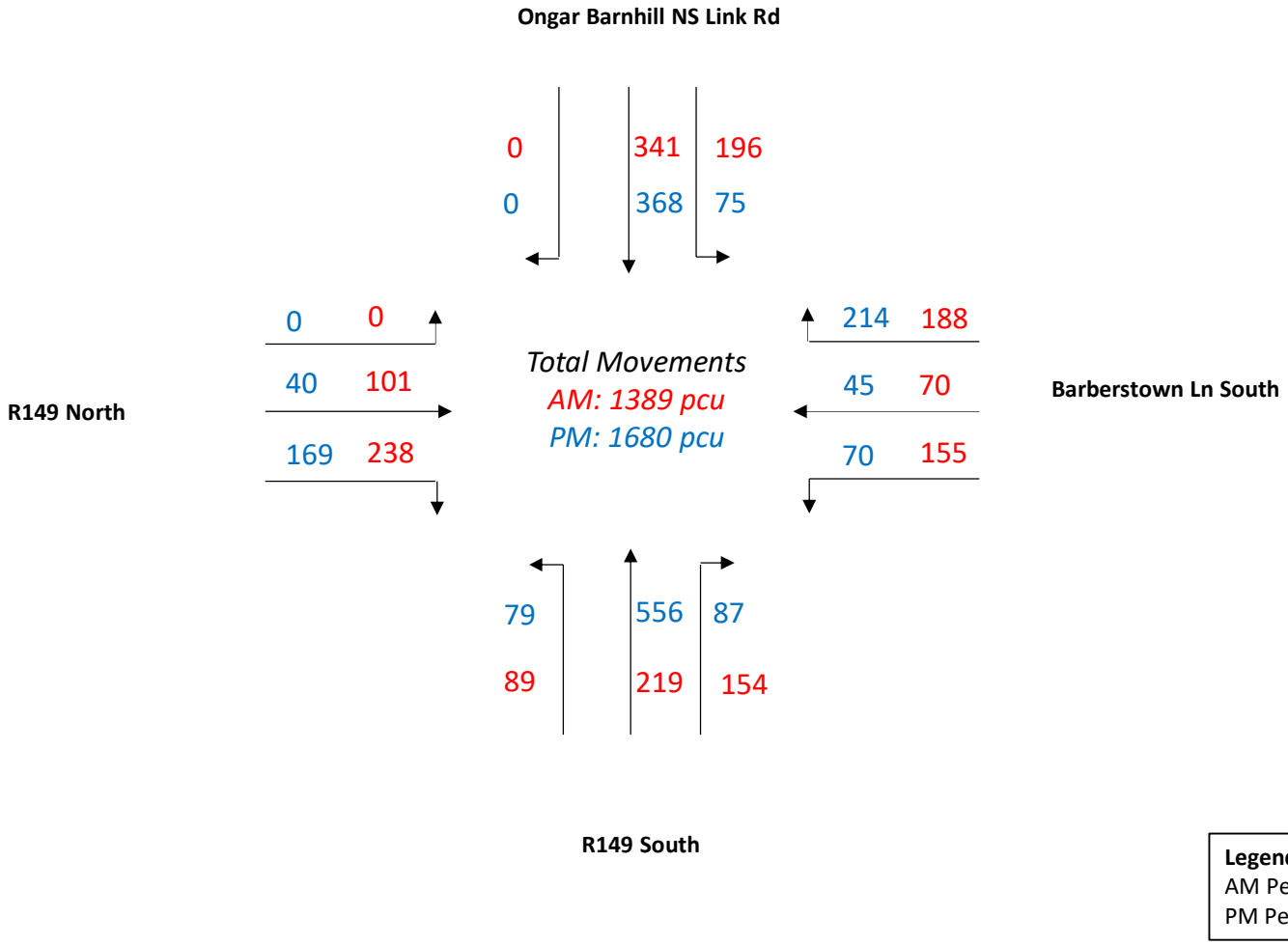
2030 Flows- Junction 2

Scenario: Do Minimum



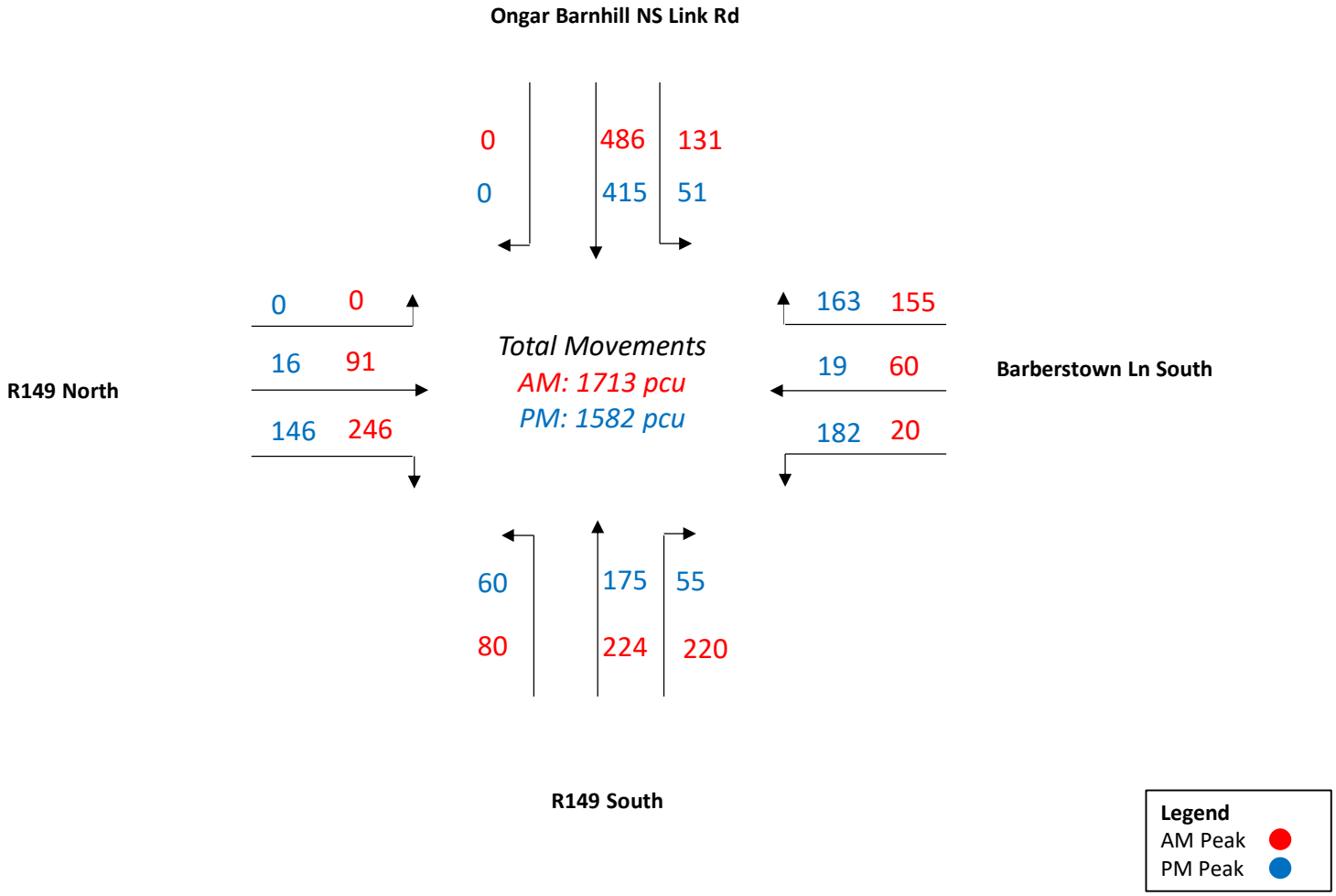
2030 Flows- Junction 2

Scenario: Do Something



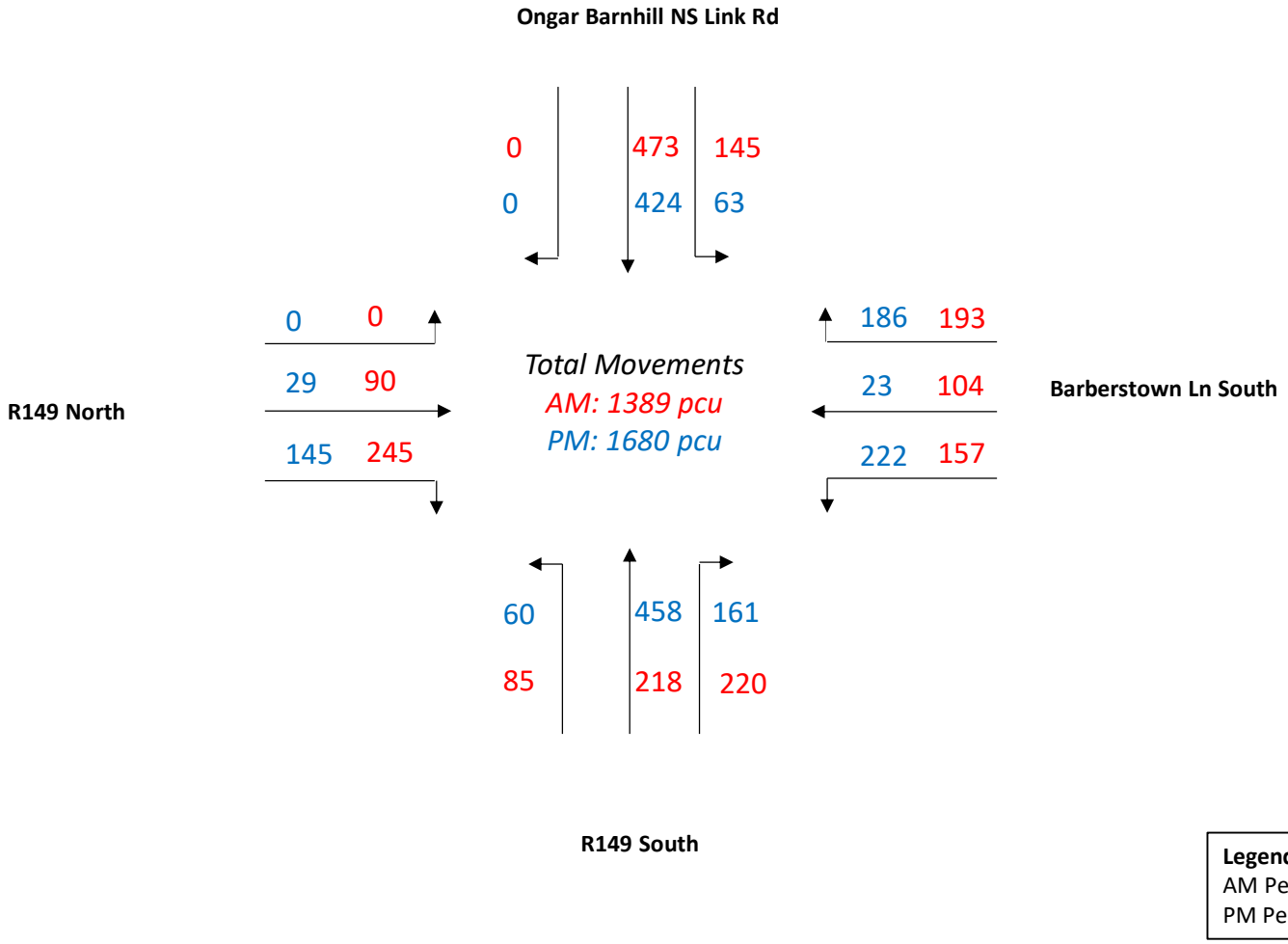
2040 Flows- Junction 2

Scenario: Do Minimum

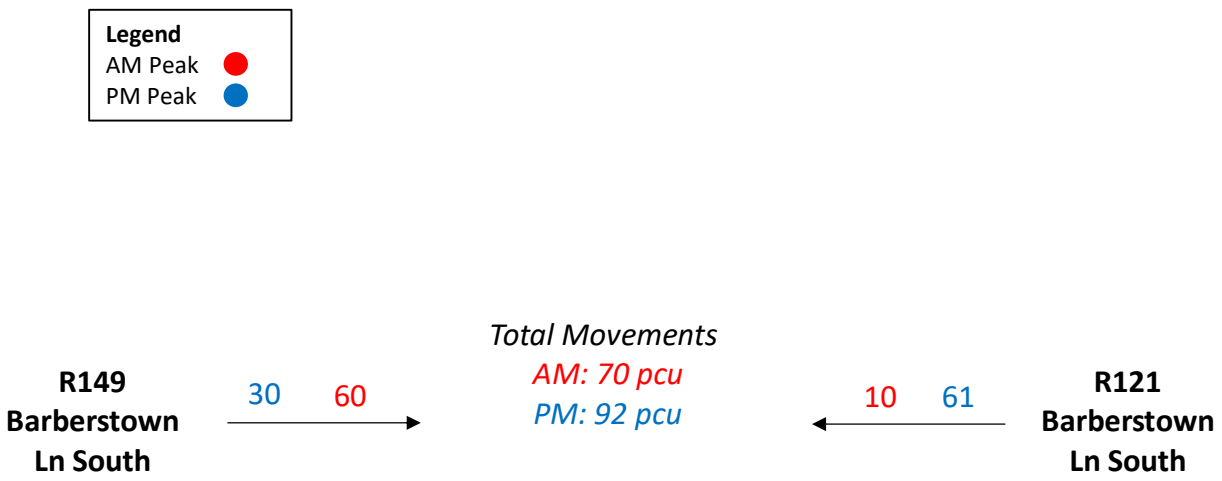


2040 Flows- Junction 2

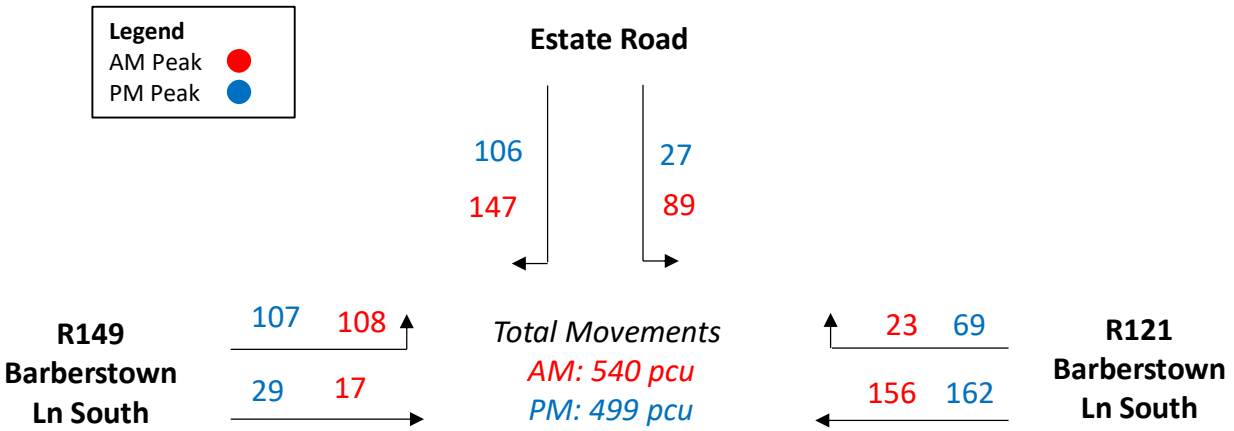
Scenario: Do Something



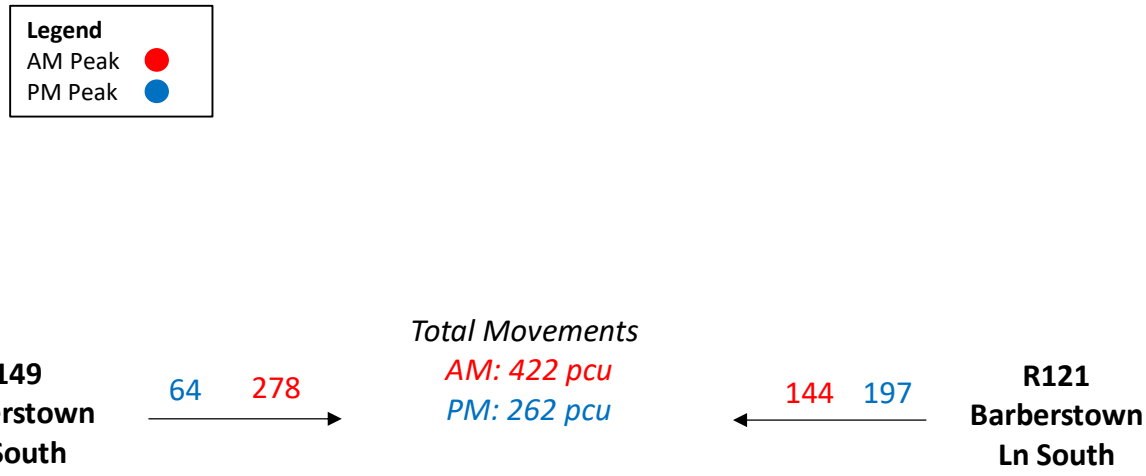
2025 Flows- Straight-through Traffic Barberstown Lane South
Do Minimum



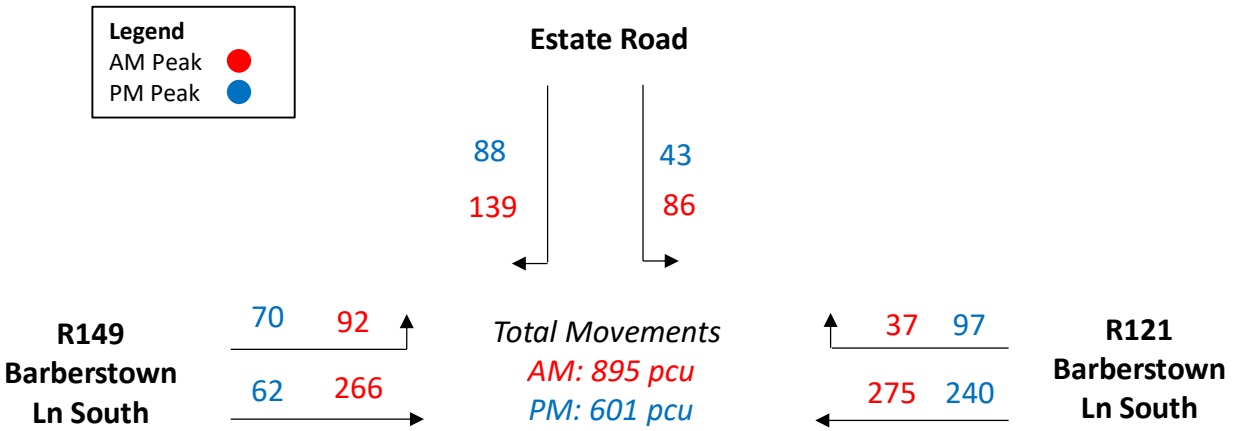
2025 Flows- Junction 3
Do Something



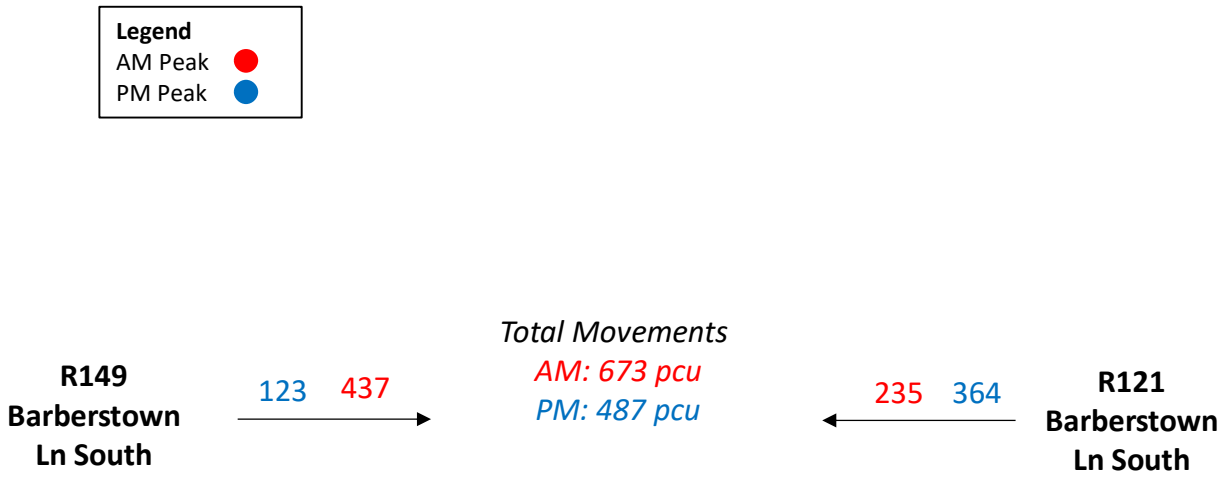
2030 Flows- Straight-through Traffic Barberstown Lane South
Do Minimum



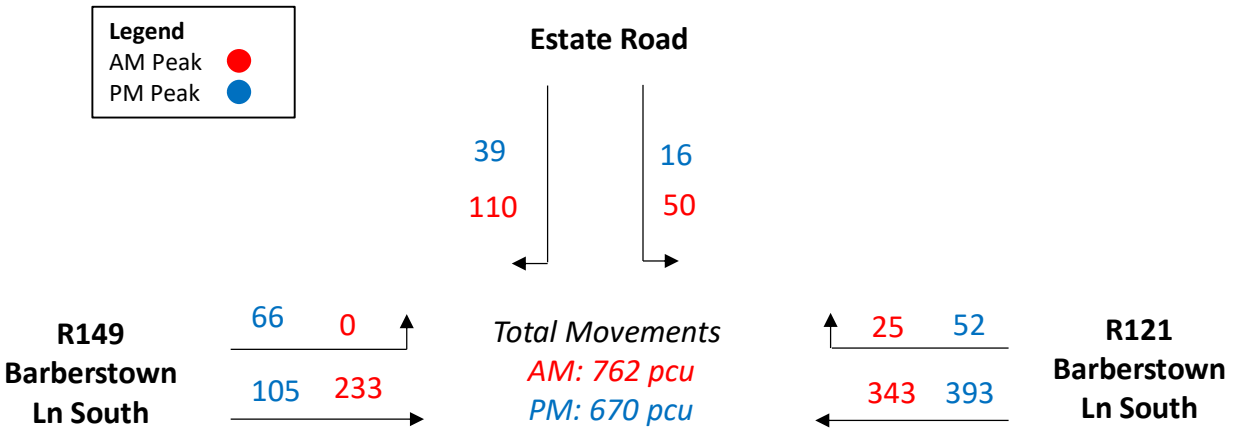
2030 Flows- Junction 3
Do Something



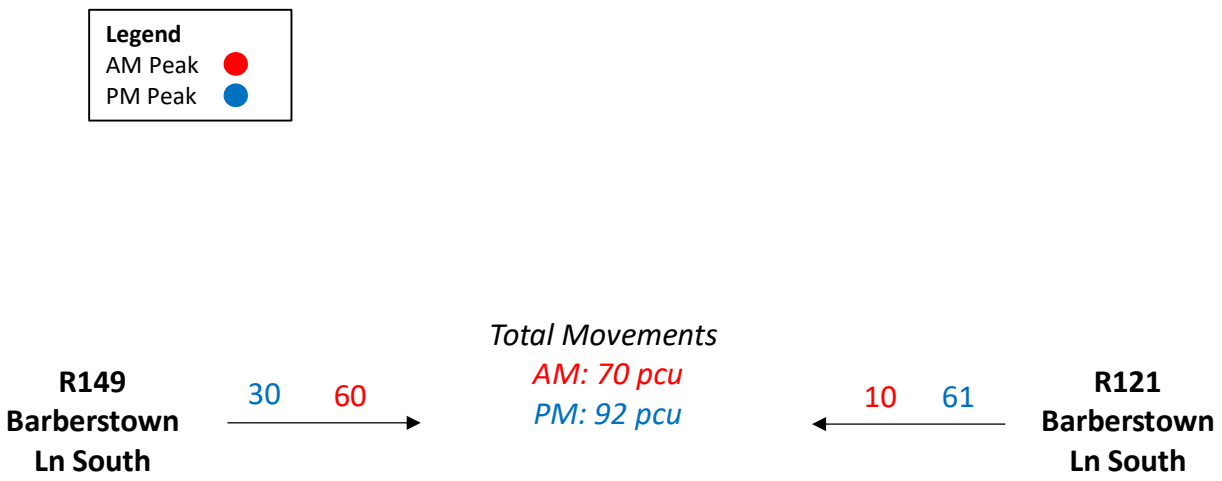
2040 Flows- Straight-through Traffic Barberstown Lane South
Do Minimum



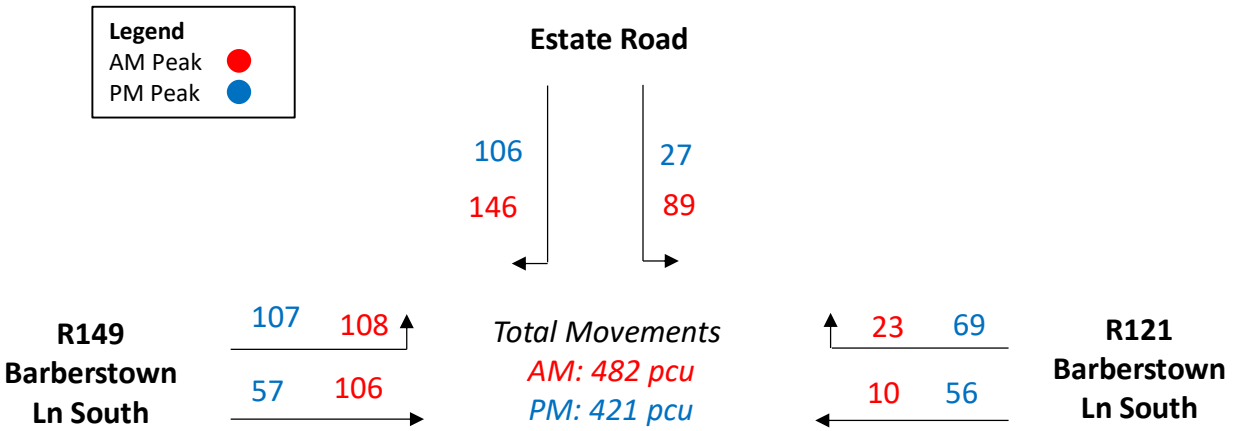
2040 Flows- Junction 3
Do Something



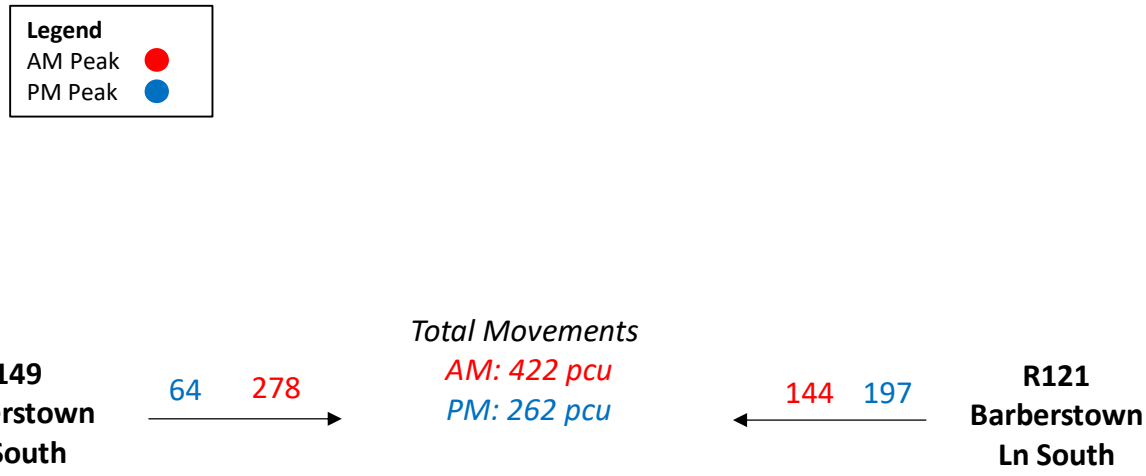
2025 Flows- Straight-through Traffic Barberstown Lane South
Do Minimum



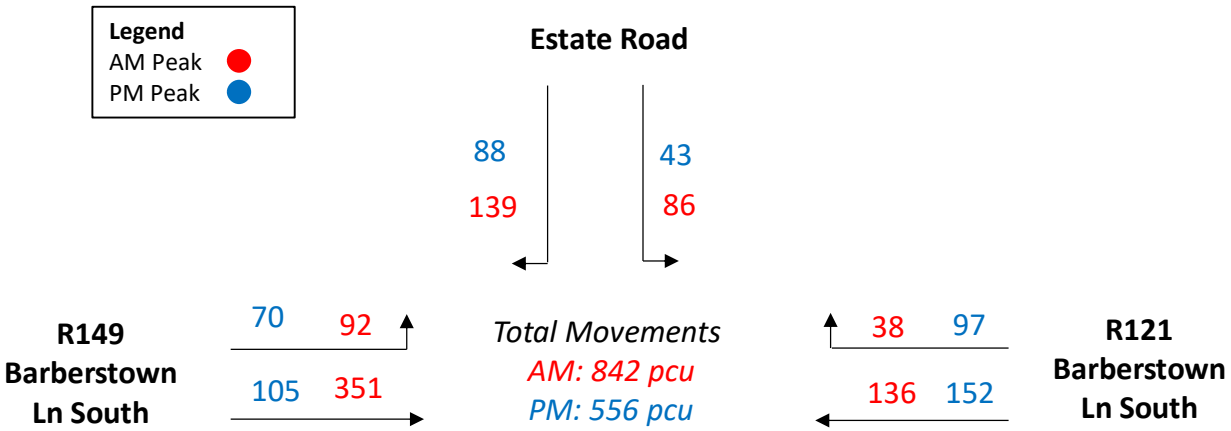
2025 Flows- Junction 4
Do Something



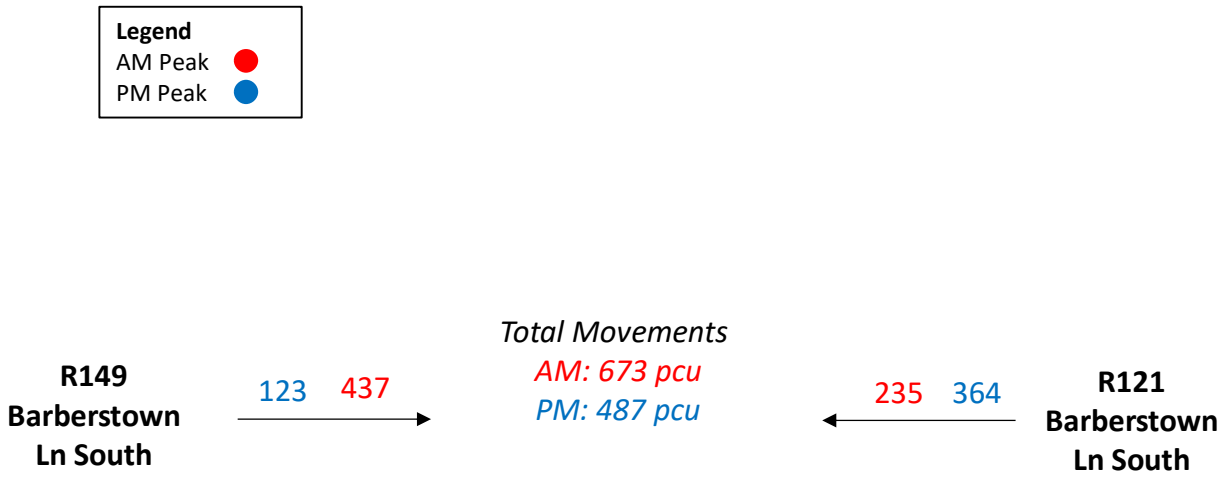
2030 Flows- Straight-through Traffic Barberstown Lane South
Do Minimum



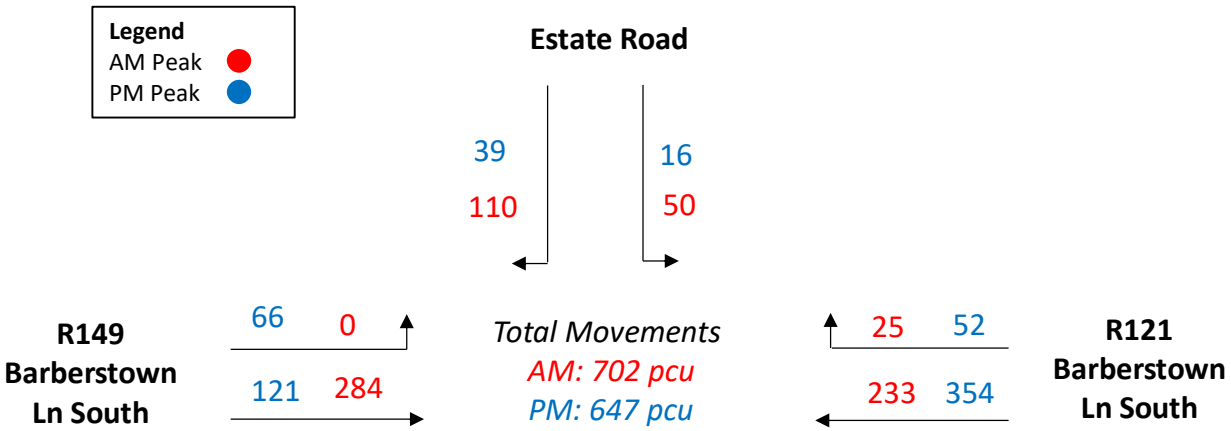
2030 Flows- Junction 4
Do Something



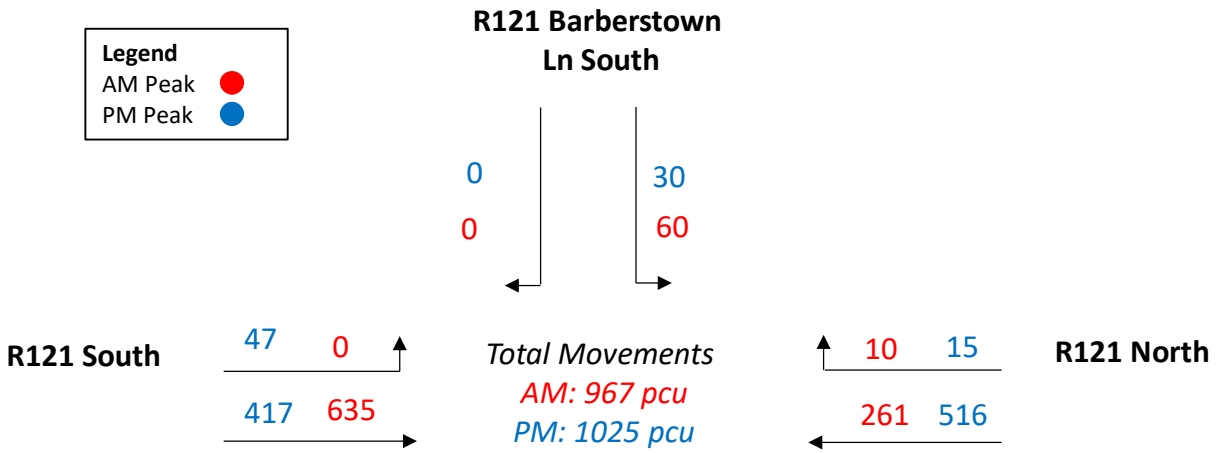
2040 Flows- Straight-through Traffic Barberstown Lane South
Do Minimum



2040 Flows- Junction 4
Do Something



2025 Flows- Junction 5
Do Minimum



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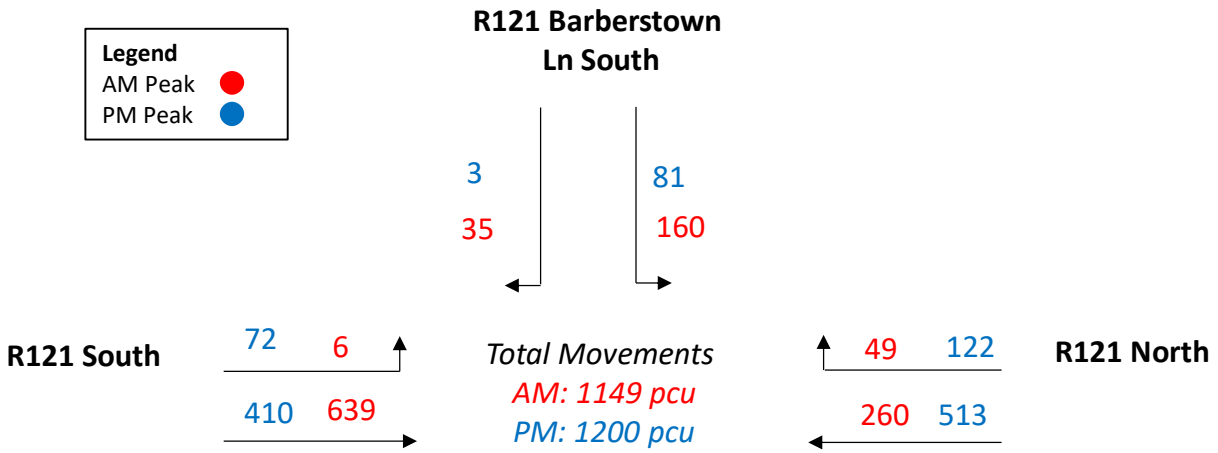

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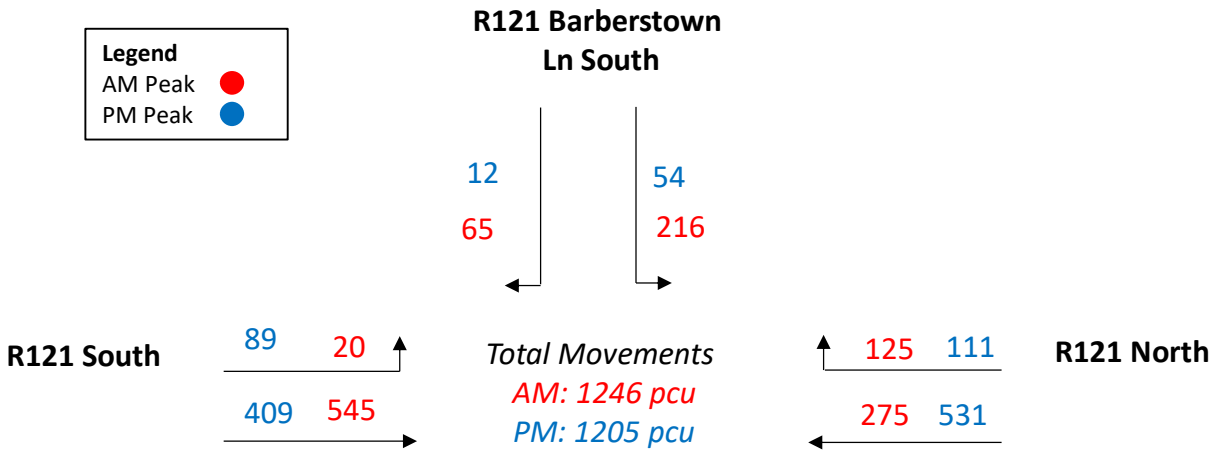

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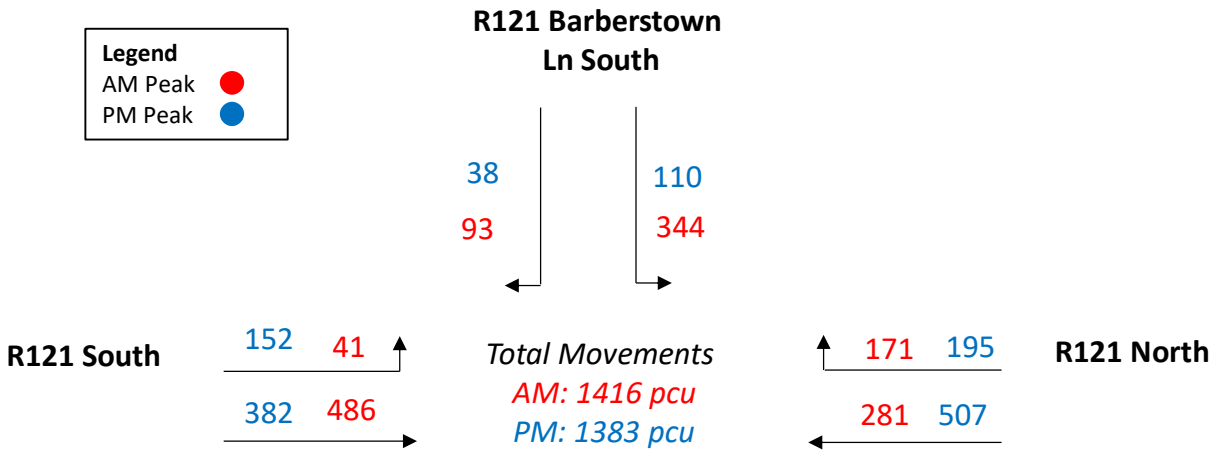

2040 Flows- Junction 5
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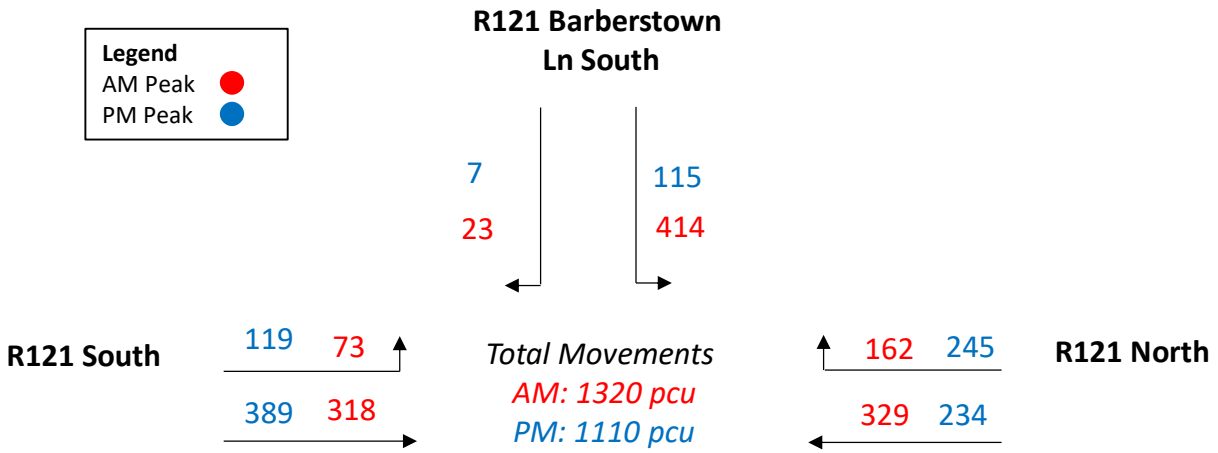
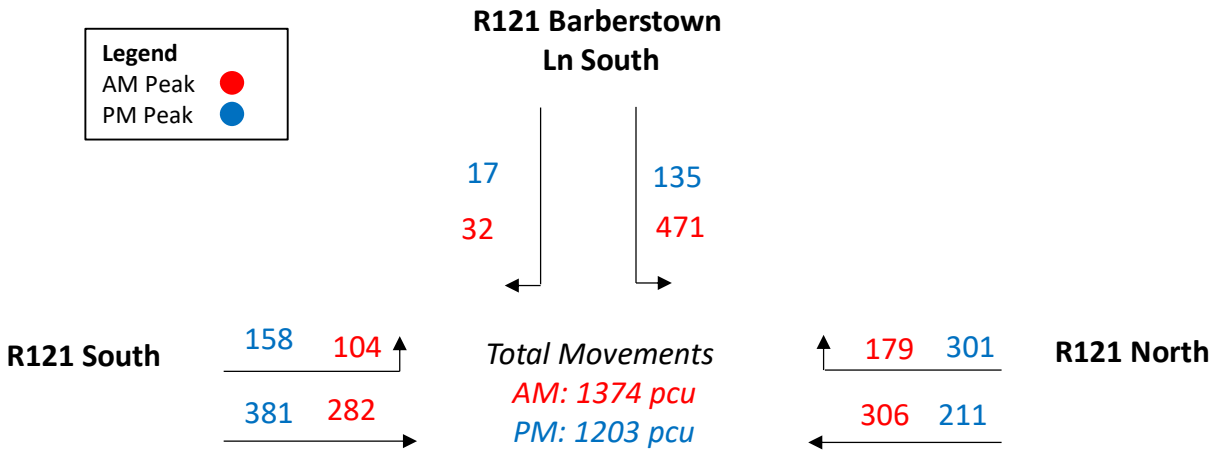


2040 Flows- Junction 5
Do Something



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