

13. MATERIAL ASSETS

Material Assets are defined in the ‘Advice Notes for Preparing Environmental Impact Statements’ (EPA, Draft 2015) as “resources that are valued and that are intrinsic to specific places” and in the ‘Guidelines on the Information to be contained in Environmental Impact Assessment Reports’ (EPA, Draft 2017) “as “built services and infrastructure. Traffic is included because in effect traffic consumes roads infrastructure.’ They may be either of human or natural origin. The cultural assets of Archaeology and Cultural Heritage are addressed in Chapter 12 of this Environmental Impact Assessment Report (EIAR). Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are addressed in Chapter 7: Land, Soils and Geology, Chapter 8: Hydrology and Hydrogeology, and Chapter 9: Air and Climate. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5: Population and Human Health.

This chapter of the EIAR addresses the likely significant effects of the proposed development on transportation infrastructure (Section 13.1 Traffic and Transport) and on Water and Other Services (Section 13.2), which are economic assets of human origin. This chapter of the EIAR has been prepared in accordance with the requirements of the EIA legislation and guidance outlined in Chapter 1: Introduction.

13.1 Traffic and Transport

13.1.1 Introduction

This Section of the EIAR reviews the current receiving environment in terms of existing road traffic characteristics and quantifies the associated baseline scenario whilst undertaking an assessment of the proposed development to identify its likely effects on the local traffic environment. This Traffic Chapter is based on and summarises the findings of the Traffic and Transport Assessment (TTA), contained under separate cover as part of the overall planning application. Full details of all traffic and transport related elements are contained within the TTA.

13.1.2 Statement of Authority

Chris Fay, BEng PGradDipEng, CEng MIEI, is a Chartered Engineer specialising in urban road design and transportation planning with 13 years’ experience in this field. He holds a Bachelor of Engineering in Civil Engineering and a Post Graduate Diploma in Highway Engineering. Throughout his career he has provided strategic and technical roads and transportation advice on numerous, residential, commercial and mixed-use developments of varying scale and complexity. Most recently he has successfully led on the traffic, transport and travel planning assessments of Charlestown Shopping Centre, Woodbrook SHD and Fassaroe, Mixed Use Development.

13.1.3 Assessment Methodology

This chapter has been prepared in accordance with the ‘EIA Directive’ as amended by Directive 2014/52/EU and the guidance listed in Section 1.4.1 of Chapter 1: Introduction, where relevant. Further, the assessment methodology for the TTA is consistent with the Transport Infrastructure Ireland’s (TII) Traffic and Transport Assessments Guidelines as follows:

- **Baseline Transportation Review:** Undertaking of a desktop review of current planning policies and objectives, existing public transport services, walking and cycling network and existing and roads infrastructure. This also included a review of relevant committed developments adjacent the proposed development site.

- **Baseline Traffic Flow Review:** Undertake site visits to review current traffic conditions and to make observations on same. Identify key junctions where traffic count survey information is required.
- **Future Transport Infrastructure Review:** Undertake review of current transport policies, plans and strategy to identify future short, medium and long terms transport proposals which may have a material impact on the travel behaviour associated with the proposed development.
- **Development Proposals Review:** Review the proposed development in terms of provision for access by walking, cycling, public transport and car.
- **Transport Characteristics Review:** Undertake an assessment of the likely modal share, trip generation, assignment and distribution having regard to existing and potential future traffic patterns on the local road network.
- **Identification of Local Road Network Proposals:** Identify proposed junction works on the local road network in terms of new junctions, improvements for pedestrians, cyclists and traffic at existing junctions.
- **Assessment of Road Traffic Impact:** Undertake an assessment of the key junctions during the base year, opening year, opening year plus five and opening year plus fifteen assessment years for both 'without development' and 'with development' scenarios in order to determine future operation and any necessary mitigation measures required

13.1.4 Receiving Environment

13.1.4.1 Site Location

The location of the site is shown in Figure 13.1 below. The proposed site area is approximately 5.38 hectares in size. The site is located along the L1321 north of Bearna Village Centre. It is bordered by the existing housing development to the west and agricultural lands to the east, north and south. Access to the site will be provided through the existing residential development access junction and access road.

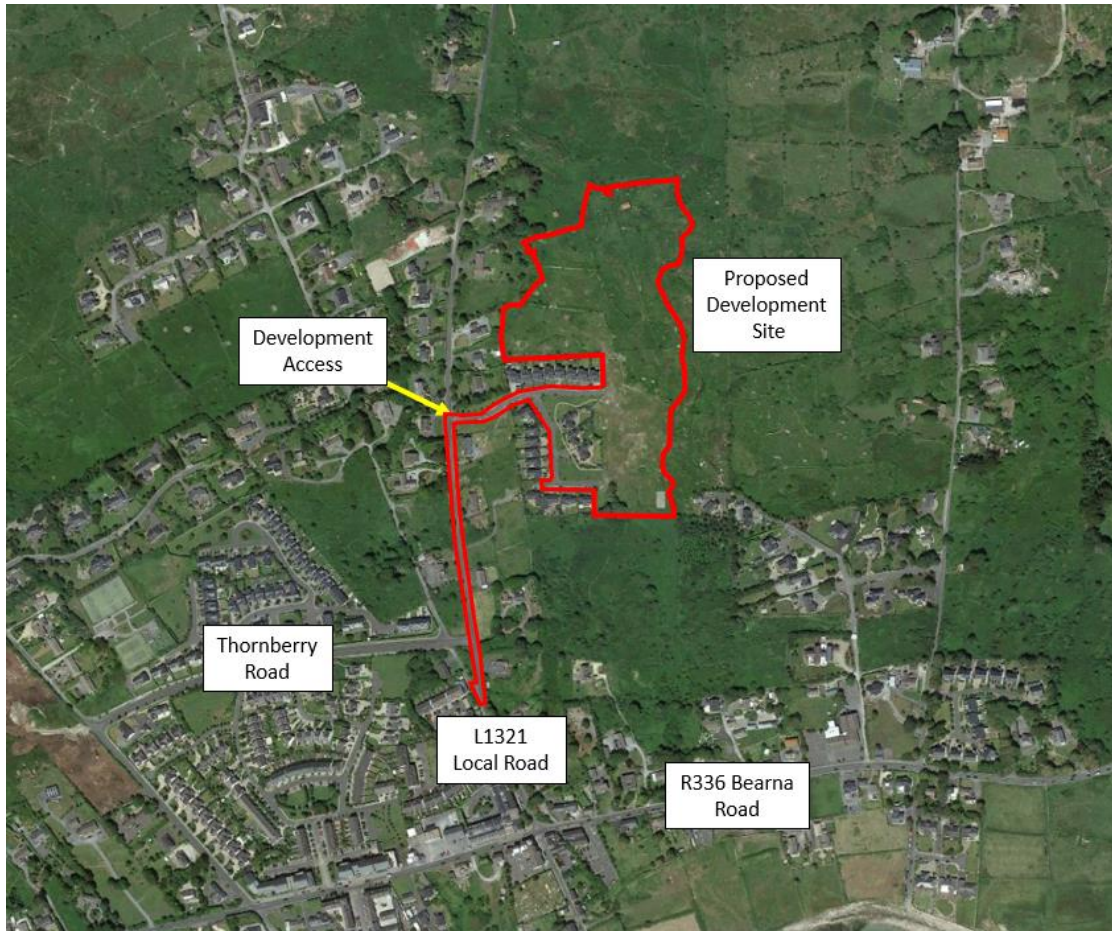


Figure 13-1 Site Location

13.1.4.2 Public Transport

There are several bus services that operate within vicinity of the proposed development site.

This section outlines the specific operational details associated with each service. Bus stops located within 800m from the proposed development along the R336 Bearna Road 200m east of the Bearna Road / L1321 Local Road Junction.

Table 13-1 Local Bus Services

Route	Direction	Start	Destination	
City Direct Route 414	City Inbound	Bearna (Post Office) 08:00 12:30	Eyre Square North 08:25 12:55	
	City Outbound	Eyre Square North 08:45 12:45	Bearna Road 09:14 13:14	
Bus Eireann Route 424	City Inbound	Bearna (Garys Cycles) 08:00 08:30 09:00 10:00 11:30 14:30 16:00 17:30 20:30	Galway (Bus Station) 08:40 08:50 09:20 10:20 11:50 14:50 16:20 17:50 20:50	
		City Outbound	Galway (Bus Station) 07:30 08:20 11:30 14:30 15:30 16:30 17:00 18:00	Bearna (Garys Cycles) 07:50 08:40 11:50 13:20 14:50 15:50 17:20 18:20

13.1.4.3 Local Road Network

The local road network in vicinity of the proposed development site is generally made up of single carriageway roads and streets. Junctions are predominantly priority controlled with the exception a traffic signal junction on the R336 Bearna Road which provides access on route to the proposed development site. A summary of the local road network is provided below.

13.1.4.4 Cnoc Fraoigh Road

Cnoc Fraoigh Road serves as the access road to the existing development which lies to the west of the proposed development site. The approximate width of the road is 6.0m with 1.8m pedestrian footpaths on both sides. The road provides the development with access to the L1321 Local Road via a priority T-Junction. The pedestrian footpaths connect with the existing footpath to the south and there is no pedestrian infrastructure to the north.

13.1.4.5 Bearna Road (R336)

Throughout Bearna village centre, the R336 Bearna Road has an approximate width of 6.0m. Along the approaches to and within the village centre there are footpaths provided on both sides of the road. These footpaths are generally of adequate width and provide access to numerous local services and amenities. There are several uncontrolled crossings along the roads length as it intersects with side roads. Controlled crossings are provided at the Bearna Road / Pier Road / L1321 Local Road traffic signal junction. A mid-block traffic signal-controlled crossing is located in vicinity of the Supervalu. On street parking, of the order of 20 no. spaces, is provided along the northern side of the road adjacent to the retail buildings associated with the Creagán residential development. The urban speed limit is 50km/h.

13.1.4.6 Local Road (L1321)

The proposed development is located approximately 480m north of Bearna village centre with direct access from Cnoc Fraoigh Rd that links it with Bearna Road (R336) via the L1321. Access to the proposed development is to be facilitated via the existing Cnoc Fraoigh residential development off the L1321 Local Road. This road has a width ranging from 5.5m to 6.0m. A footpath of adequate width is located along the western side of the road. This extends along the road for only 180m and terminates just prior to the Thornberry Road (Bearna Inner Relief Road).

Uncontrolled crossings are provided where the path intersect with side roads. There is some on street parking, provision for 3 no. spaces, along the western side of the road in vicinity of the village centre. The existing access to the existing adjacent residential development intersects with this local road in the form of a priority-controlled junction and will facilitate access to the proposed development. The urban speed limit is 50 km/h.

13.1.4.7 Thornberry Road (Bearna Inner Relief Road)

The Bearna Inner Relief Road is proposed to act as a new village street located to the north of the current village centre. Currently, a 400m section of this relief road has been built, known as Thornberry Road. This extends from the L1321 Local Road to the L5387 Local Road. This road is approximately 8.0m wide with a 1.0m verge and a 1.8m wide footpath on both sides of the road. Uncontrolled crossings are provided at side road intersections. The relief road intersects with the L1321 Local Road in the form of a priority junction. This junction is located approximately 230m from the village centre and 250m from the existing access to the existing residential development adjacent the proposed development. The urban speed limit is 50 km/h

13.1.4.8 Collision History

There have been no collisions in vicinity of the existing access to the existing adjacent residential development of Cnoc Fraoigh and the proposed development, or along the L1321 Local Road, over the recorded period from 2005 to 2016. 15 no. collisions have taken place along the R336 Bearna Road. 13 of these are minor in severity and two were classified as serious. Pedestrian collisions were recorded for both serious and minor incidents. The collision history in the context of the proposed development is shown in Figure 13-2.

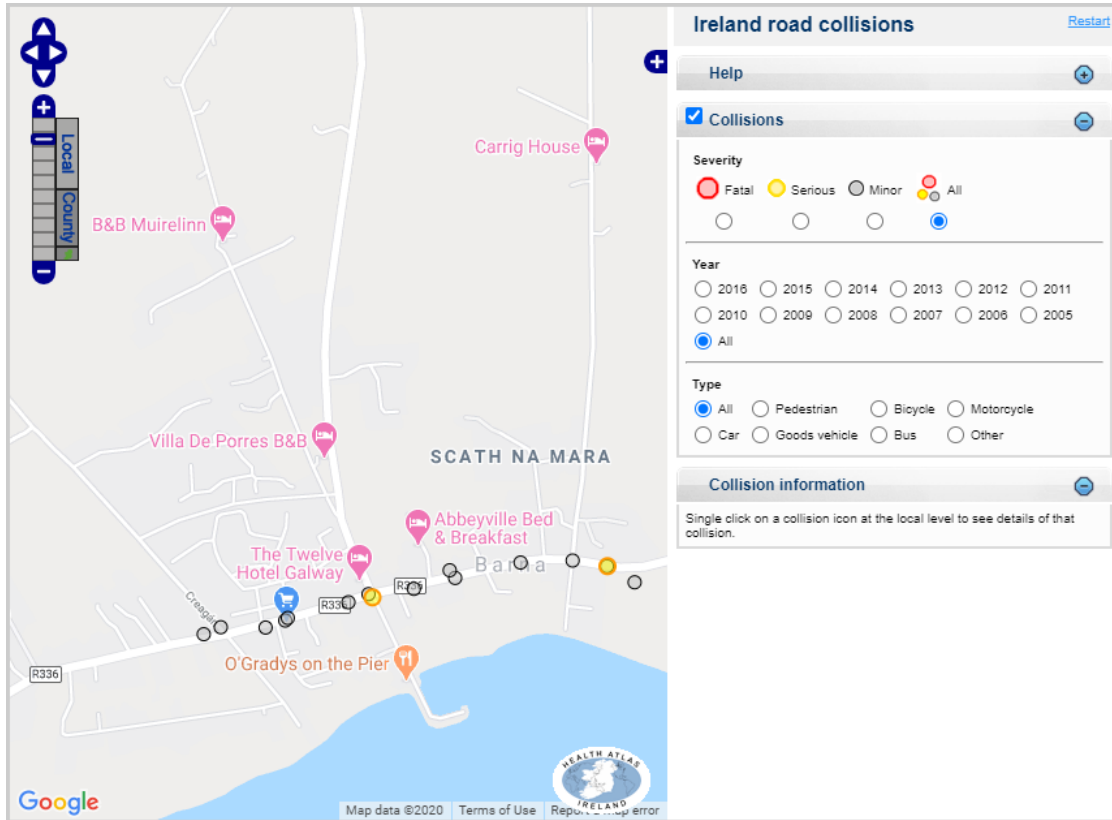


Figure 13-2 : Collision History

13.1.4.9 Traffic Surveys

Traffic surveys were undertaken during May 2018. Three Junction Turning Counts (JTC) were undertaken as well as one Automatic Traffic Count (ATC). The JTC counts were 12-hour, classified, counts conducted between 07h00 and 19h00 on a normal weekday. The ATC count was carried out over a 7-day period at a single location. The ATC count commenced on the same day as the JTC counts for a period of 7 days.

- > JTC: R336 Bearna Road / L1321 Local Road;
- > JTC: L1321 Local Road / Thornberry Road (Bearna Inner Relief Road);
- > JTC: L1321 Local Road / Cnoc Fraoigh Development Access Road; and
- > ATC: L1321

The JTC surveys were undertaken on Tuesday 15th May 2018, covering a 12-hour period from 07h00 to 19h00. These traffic counts have been taken at 15 minute intervals and were classified into four vehicle categories namely car, light vehicles (LV), heavy vehicles (HV) and bus. These have then been converted to passenger carrier units (PCU) using the following conversion factors:

- > Car 1.0 PCU
- > LV 1.0 PCU

- > HV 2.0 PCU
- > Bus 2.0 PCU

The location of each count is shown in Figure 13-3. These counts were used to determine the baseline traffic flows shown in Figure 13-3.



Figure 13-3 : Traffic Count Locations

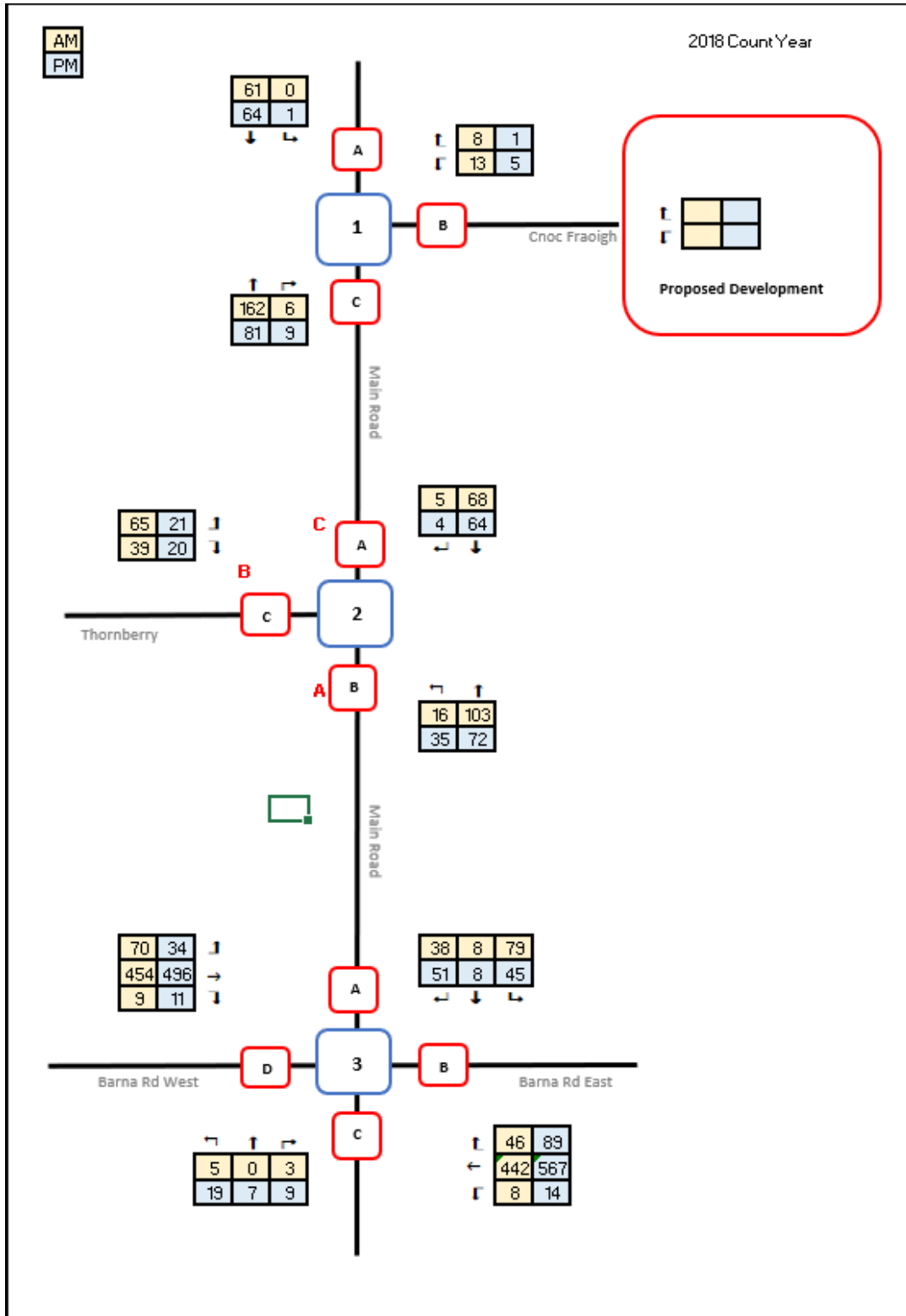


Figure 13-4 : Baseline Traffic Flows

13.1.4.10 Walking & Cycling

A review of walking and cycling distances has been undertaken. The assessment included walking distances for all five minute intervals within a 25 minute period. The assumed average walking speed is 1.5 m/s and the cycling speed is assumed to be 4 m/s. The walking and cycling distances achievable with these average speeds are presented in

Table 13-2 below.

Table 13-2 : Walking & Cycling Distances and Times

Time Interval	Walking Distance	Cycling Distances
5 minutes	450m	1,200m
10 minutes	900m	2,400m
15 minutes	1,350m	3,600m
20 minutes	1,800m	4,800m
25 minutes	2,250m	6,000m

The respective walking and cycling catchments are shown in

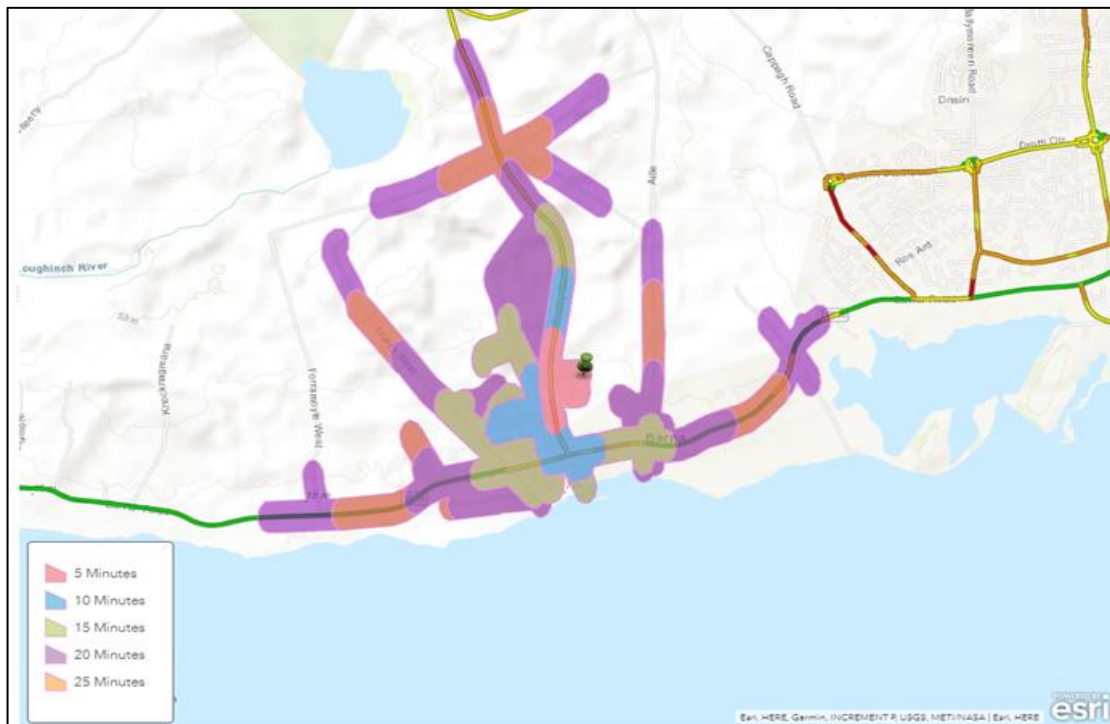


Figure 13-5 : Walking Catchment

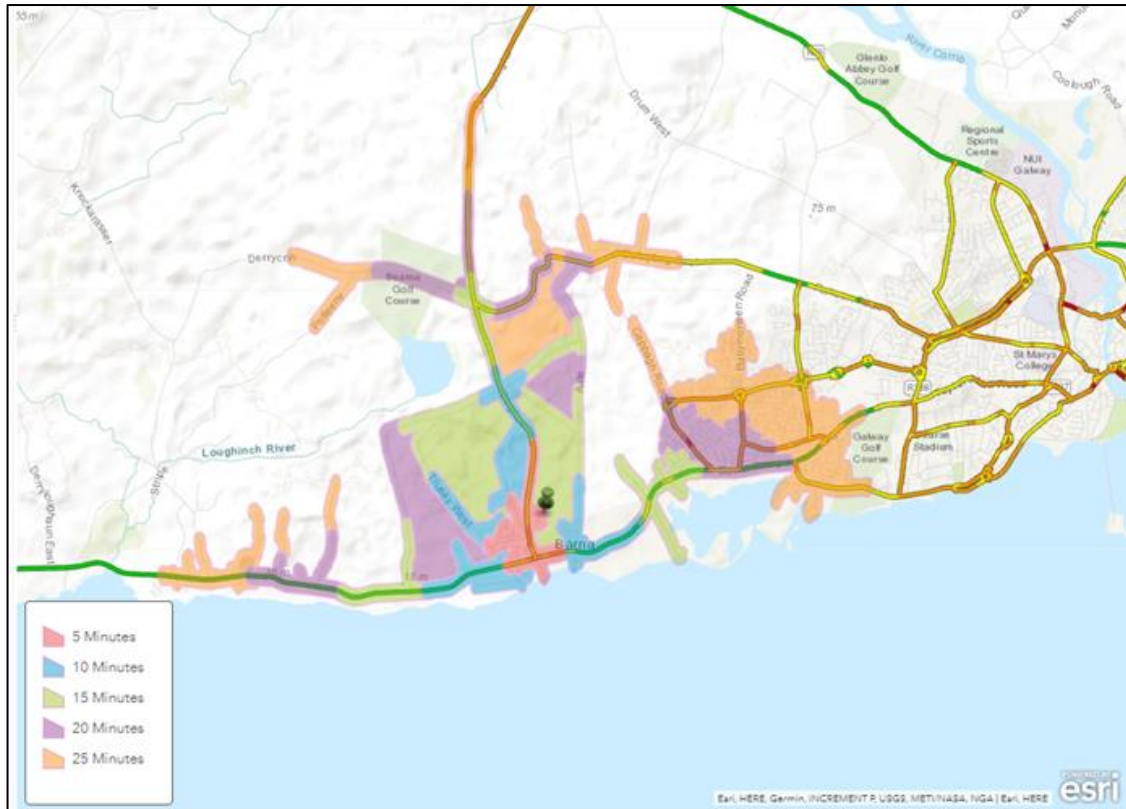


Figure 13-6 : Cycling Catchment

It can also be seen from the above graphic that all services and amenities within Bearna Village Centre are easily accessible within a 5 to 10 minute cycling time. It is also shown that the western area of Galway City is accessible to commuter cyclists within a cycling time of 25 minutes.

13.1.5 Characteristics of the Proposed Development

13.1.5.1 Proposed residential and crèche development

The proposed residential development consists of apartment, duplexes and housing units as well as a creche. In total, there are 33 no. apartments, 36 no. duplexes and 52 no. house units. The proposed development will also include a small creche. The mix of units and number of bedrooms are illustrated in Table 13.3 below.

Table 13.3 : Proposed Accommodation

Unit Type	No of Units	No of Bedrooms
1 Bed Apartment	9	9
2 Bed Apartment	24	48
2 Bed Duplex	18	36
3 Bed Duplex	18	54
3 Bed House	37	111
4 Bed House	15	60
Total	121	318

The development will also consist of 198 car parking bays which includes provision for residents, visitors and the creche. A further 117 bicycle parking bays are to be provided in a combination of communal bike stores, external Sheffield stands and rear gardens.

13.1.5.2 Proposed Linear Park along the Trusky Stream

The proposed Linear Park which incorporates Trusky Stream, delivers a key section of greenway, offering the potential for a future pedestrian link access to the village.

13.1.6 Development Access and Internal Layout

13.1.6.1 Development Access

The proposed development will utilise the existing access to the existing adjacent development off the L1321. This access is a 3 arm priority 'T' junction with priority given to the traffic along the L1321. There exists an uncontrolled pedestrian crossing on the minor arm (i.e. the development arm) of the junction.

13.1.6.2 Internal Road Street and Junction Layout

The internal street layout within the proposed development has been designed in accordance with DMURS and generally consists of a 5.5m wide carriageway with 2m footpaths provided either on one side of the road or both. The road alignment consists of smooth horizontal curves which are complemented with raised tables at specific locations to ensure that speeds are self-regulated below 30kph.

Internal junctions operate under priority control and generally consist of small radius curves to encourage slow approach speeds.

13.1.6.3 **Facilities for Pedestrians and Cyclists**

Cyclists are facilitated on street where they will cycle centrally within the traffic lane. The internal roads layout is designed to ensure vehicular speeds are low thereby providing a sense of safety and conform to cyclist and encouraging them to 'take the lane'.

Pedestrians are facilitated by footpaths adjacent to the street carriageway either on one side or both sides. Where large open space areas are provided, additional footpaths are provided within these areas to facilitate desire lines and open the green space for activity and enjoyment.

As mentioned in the previous section, a total of 117 bicycle parking bays are to be provided in a combination of communal bike stores, external Sheffield stands and the rear gardens of larger units.

Figure 13-7 illustrates the internal development layout. Further information is contained within the Engineering Report.



Figure 13-7 : Proposed Development Layout

13.1.6.4 External Pedestrian and Cyclist Improvements

Works are proposed to the L1321 Local Road to support the accessibility of both pedestrians and cyclist and improve connectivity with Bearna village centre. This includes for an extension of the footpath on the eastern side of the L1321 southwards for a length of circa 300m. This is accompanied with an uncontrolled crossing to facilitate pedestrian progression to the footpath on the western side of the L1321 that links directly with the footpath network associated with the village centre.

In addition, to accommodate these footpath works the carriageway of the L1321 is amended to ensure that a consistent 5.5m wide carriageway is maintained. This will ensure that the road will accommodate two-way car traffic whilst also being substantially narrow to encourage slow speeds along the local road thereby making the road attractive to cyclists in terms of safety and comfort. Further information is contained within the Engineering Report.

13.1.7 Future Transport Proposals

13.1.7.1 Galway County Development Plan

- Bearna is located within the Galway Metropolitan Area as identified within the Galway County Development Plan 2015 to 2021. As such there are a number of future projects and objectives outlined within the Plan for Bearna. These are as follows.
- The R336 Bearna Road from Bearna to Scrib via Ros An Mhíl is identified for upgrade as Priority Transportation Infrastructure during the life time of the Plan;
- The plan outlines to support, promote and implement walking and cycling strategies for other towns in County Galway, inclusive of Bearna, which will link in with the National Cycle Network Scoping Study (2010) and the Galway County Walking and Cycling Strategy;
- The Plan identifies the design and development of a coastal walkway/cycleway from Bearna to Oranmore in conjunction with Galway City Council;
- The Plan identifies the need for a review of the Traffic Management Plan within and on the approaches to Bearna Village Centre.

13.1.7.2 Bearna Local Area Plan

The Galway County Development Plan 2015 to 2021 has been varied to incorporate the Bearna Local Area Plan. This variation will inform and manage all future development within Bearna. Future projects and objectives identified within the Bearna LAP with regards to Movement and Transport are outlined following.

Objective RT1 - Transport Network

Facilitate improvements to the existing transportation network in Bearna village to promote the principles of National Smarter Travel, including the following road-related measures:

- Preparation and implementation of a traffic management plan for Bearna
- Provision of radar control speed signs along the R336 within the plan area, in particular in advance of the national school.
- Provision of tactile paving and dished kerbs at all crossing points to facilitate ease of access for the mobility impaired. Providing raised pavement areas at various junctions along the existing R336, in order to ensure slow traffic speeds.
- Providing advance radar speed analyses to activate traffic lights, where excessive speeds noted.

Objective RT2 - New Village Street

Support the completion of the proposed new Village Street (Inner Relief Road) north of the existing R336 and prohibit any development that would affect the future construction of the approved route.

Objective RT3 - Public Footpath & Lighting Network

Support improvements to the existing public footpaths network within the plan area.

New development shall be required to connect to the footpath and public lighting network that currently serves the village centre.

Support the provision of footpaths and public lighting from the existing residential development to the village centre. In order to protect light sensitive species such as bats, lighting fixtures should provide only the amount of light necessary for personal safety and should be designed so as to avoid creating glare or emitting light above a horizontal plane.

Facilitate the provision of pedestrian crossings adjacent to the national school, residential areas and at other appropriate locations within the plan area, as required.

Objective RT4 – Schools

Promote and facilitate greater ease of traffic movement and safe routes to the national school, in partnership with the local school, and ensure that the existing school has a safe drop off/collection facility for pedestrians, cyclists and vehicles and adequate and appropriately located staff parking.

Objective RT5 - Bus Services, Stops and Shelters

Promote an improved bus service in Bearna and investigate the potential to provide more frequent stops and bus shelters along the R336 and new Village Street.

13.1.7.3 **Galway City to Bearna Greenway**

The Galway City to Bearna Greenway scheme represents a significant opportunity to create a high-quality greenway for pedestrians and cyclists linking Wolfe Tone Bridge in the city centre to Bearna Pier at the western edge of Bearna Village.

The over-arching vision for the Bearna Greenway is that it will ultimately form part of a continuous network of greenways within Galway City and County. It is envisaged that the proposed greenway will serve as both an amenity route along Galway’s Atlantic seaboard for recreational users and as a commuter route from the key residential areas in the southwest of the City such as Knocknacarra.

The development of this greenway facility would allow for an extremely attractive and safe route for cyclists of the proposed development to access Galway City and its associated services and amenities.

Furthermore, the Linear Park and pedestrian route being provided within the proposed development presents a future opportunity for the potential of a link between the Galway City to Bearna Greenway and the proposed development.

The scheme is being developed by the National Transport Authority, Galway City Council and their consultants and is currently at preliminary design stage.

13.1.7.4 **N6 Galway City Ring Road (GCRR)**

The proposed N6 GCRR comprises of approximately 5.6km of a single carriageway from 2km west of Bearna Village as far as the Ballymoneen Road and approximately 11.9km of dual carriageway from Ballymoneen Road to the eastern tie in with the existing N6 at Coolagh, Briarhill. The proposed N6 GCRR adds a key new east-west spine to the road network and important north-south links to provide the interconnection to the new spine. It addresses the transport problem in Galway City by:

- Adding trip capacity to the existing transport network thereby reducing trips through the city centre.
- Connecting Galway City and the West Region to the national road network.

The N6 GCRR will facilitate population growth of compact and sustainable development by providing space for allocation of public transport and active modes which will allow a greater shift to public transport and sustainable transport modes.

13.1.8 Construction Traffic Impacts of Development

13.1.8.1 Construction Phase Impacts

The likely traffic impact of the construction works will be short-term in nature. The number of staff on site will fluctuate over the construction phase of the subject development. Based on previous experience of similar developments, it is envisaged that on average there would be in the order of 20-30 staff on site on a typical day. It should be noted that construction workers will typically make use of shared transport thereby reducing traffic generation. Consequently, it is expected that the typical two-way vehicle traffic generation during the construction phase would be of a low level, of the order of 10- 15 arrival trips during the AM and the same departure trips during the PM periods over the construction period of the works.

However, during the peak of construction the level of staff on site could ramp up to approximately 50 – 60 staff. As such this peak level of construction activity could equate to approximately 25-30 arrival trips during the AM and the same during the PM. In terms of arrivals and departure times, on-site employees will typically arrive before 08:00 and will generally depart shortly after 16:00. These typical arrival and departure times are generally offset and outside of the normal commuter AM and PM peak hours, therefore further reducing the impact of the construction phase. Note, that the two-way operational stage vehicle trips during the AM and PM are in the order of 50-70 with these occurring during the peak commuter hours.

Consequently, given the shared use of transport and the offset arrival and departure times inherent with construction worker travel characteristics, the level of traffic impact on the adjacent local road network during the construction stage, even during the peak construction phase, will be significantly less than that during the operational stage.

The main construction accesses to and from the proposed Development Site will be via the existing Cnoc Fraoigh development access off the L1321 and the R336. Proposed access routes along with further information are detailed in the Design Process Traffic Management Plan (DPTMP) submitted with the application.

At construction stage the traffic volumes will be, at their peak, notably less than the traffic volumes predicted for the completed operational development. In this context the existing junctions and the Cnoc Fraoigh residential access road will have adequate capacity to accommodate the relatively modest traffic volumes anticipated during the construction stage.

Therefore, the potential impact during the construction phase is considered to have a short-term slight negative impact on the surrounding network.

13.1.8.2 Construction Phase Mitigation

All construction activities will be managed and directed in accordance with the mitigation measures detailed in the draft Design Process Traffic Management Plan (DPTMP) submitted with this application. Below is a list of proposed traffic management measures to be adopted during the construction stage. Note that this is not an exhaustive list, and it will be the appointed contractor's responsibility to prepare a detailed Construction Stage Traffic Management Plan.

- Warning signs / Advanced warning signs will be installed at appropriate locations in advance of the construction access;
- Construction and delivery vehicles will be instructed to use only the approved routes for access and movement;
- Appropriate vehicles and equipment will be used to minimise environmental impacts from transporting construction material;
- Speed limits of construction vehicles to be managed by appropriate signage, to promote low vehicular speeds within and adjacent the site;
- Parking of site vehicles will be managed, and will not be permitted on public roads, unless otherwise agreed with the Local Authority subject to traffic management measures;
- A road sweeper will be employed to clean the public roads adjacent to the site of any residual debris that may be deposited on the public road leading away from the construction site;
- On site wheel washing will be undertaken for construction trucks and vehicles to remove any debris prior to leaving the site, to remove any potential debris on the local roads;
- All vehicles will be suitably serviced and maintained to avoid leaks or spillage of oil, petrol or diesel;
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footway. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will cater for vulnerable users and mobility impaired persons.

The above mitigation measures will minimise any significant environmental degradation or safety concerns in the vicinity of the proposed works, due to the presence of construction traffic.

13.1.8.3 Construction Phase Residual Impacts

The implementation of the above mitigation measures will assist in managing the significance of the potential impacts however there will remain a short term slight negative impact on the surrounding road network.

13.1.8.4 Significance of Effects Arising from Construction Phase

There will be a slight negative impact due to construction traffic. However, this impact will be short term. This will be mitigated by the introduction of a Design Process Traffic Management Plan (DPTMP). The DPTMP will manage these potential impacts but they shall remain at a similar level. Residual impacts for the construction phase will therefore be short term slight negative effect.

13.1.9 Traffic Assessment of Proposed Development

13.1.9.1 Trip Generation and Distribution

A trip rate estimation exercise has been undertaken using the TRICS (Trip Rate Information Computer System) v7.5.1 online system. The land uses chosen for the trip rate analysis were '03 Residential/A–Houses Privately Owned'. It is assumed that the creche will cater exclusively for internal trips and, as such, is not expected to generate any primary trips.

Trip rates calculated are derived from multimodal surveys and thus the trip rates presented below relate to total people arriving and departing. Trip rates are based on a calculation factor of 1 housing unit. Several selection criteria have been applied to obtain a representative sample size of comparable sites. Refer to Appendix 1 for details of the TRICS data.

Table 13-4 below details the multi modal total people trip rates estimated for the development during 08:00 – 09:00 AM and 17:00 – 18:00 PM peak hours.

Table 13-4 : Multimodal Trip Rates

Type	Period	Units	No. Dwellings	Arrival	Departure	Total
Houses	AM	Dwellings	121	0.220	0.841	1.061
	PM			0.611	0.321	0.923

In order to determine an appropriate mode share associated with private vehicles arriving and departing the proposed development, a review of the 'Small Areas' adjacent to the site were reviewed and amalgamated to derive an appropriate mode share. The 'Small Areas' utilised are presented in Table 13-5 below:

Table 13-5 : Small Areas

Small Area ID	Small Area Extents
Small Area sa2017_067032006	
Small Area sa2017_067032002	

Small Area ID	Small Area Extents
Small Area sa2017_067032004	

The consolidation of the above ‘Small Areas’ results in the following modal distribution:

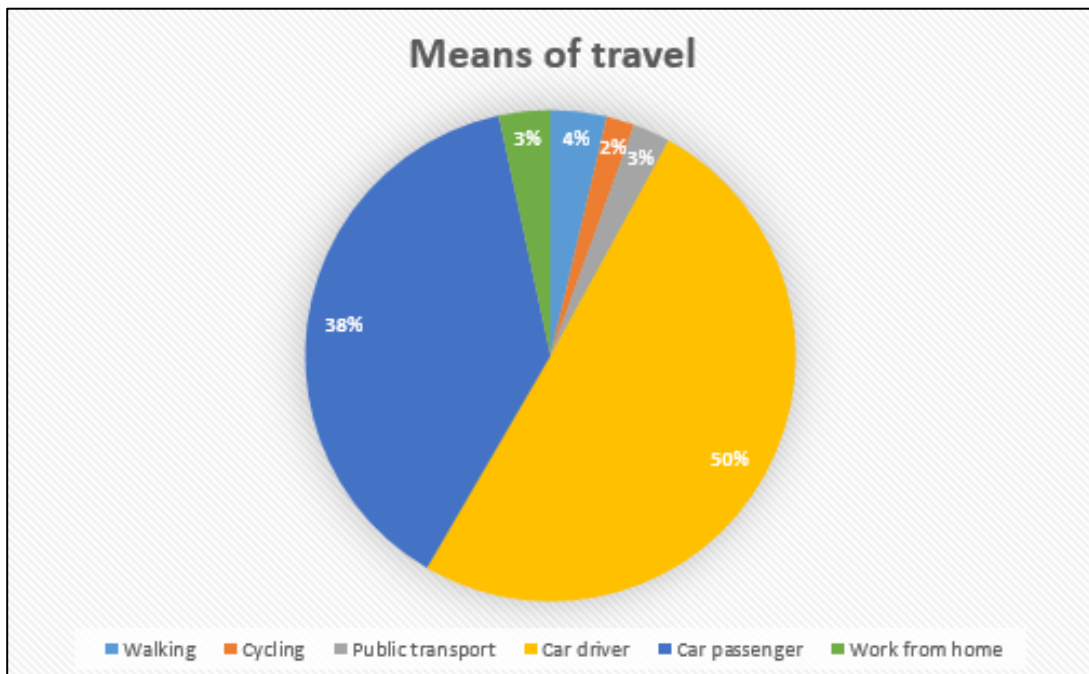


Figure 13-8 : Localised Mode Share

As such, a mode share of 50% has been applied to the multi modal total people trip rates to derive localised vehicle trip rates.

Table 13-6 below indicates these rates and, once applied to the number of dwellings, the vehicles trip volumes are shown in Table 13.7.

Table 13-6 : Vehicle Trip Rate

Type	Period	Units	No. Dwellings	Arrival	Departure	Two-way
Houses	AM	Dwellings	121	0.111	0.424	0.535
	PM			0.308	0.162	0.465

Table 13-7 : Vehicle Trip Volume

Type	Period	Units	No. Dwellings	Arrival	Departure	Two-way
Houses	AM	Dwellings	121	13	51	65
	PM			37	20	56

13.1.9.2 Trip Distribution and Assignment

The trip distribution of vehicles originating and terminating at the proposed development has been based on the distribution of traffic arriving and departing the local road network inclusive of the Bearna Road junction, the Thornberry Road junction and the Cnoc Fraoigh Road junction. The distribution percentages for each entry and exit point to this local road network has been calculated from the available traffic turning proportions from the traffic surveys undertaken on the 15th May 2018. These percentages are presented in Table 13.8 below.

Table 13-8 : Trip Distribution

Period	AM		PM	
	%In	%Out	%In	%Out
Zone				
Main Road (Local Road North)	5	14	5	7
Main Road (Local Road South)	4	0	0	1
Thornberry Junction	8	2	3	3
Bearna Rd East	40	44	51	41
Bearna Rd West	43	40	41	48
Total	100	100	100	100

The resultant distribution and assignment of development traffic generation volumes are illustrated in Figure 13-9 below.

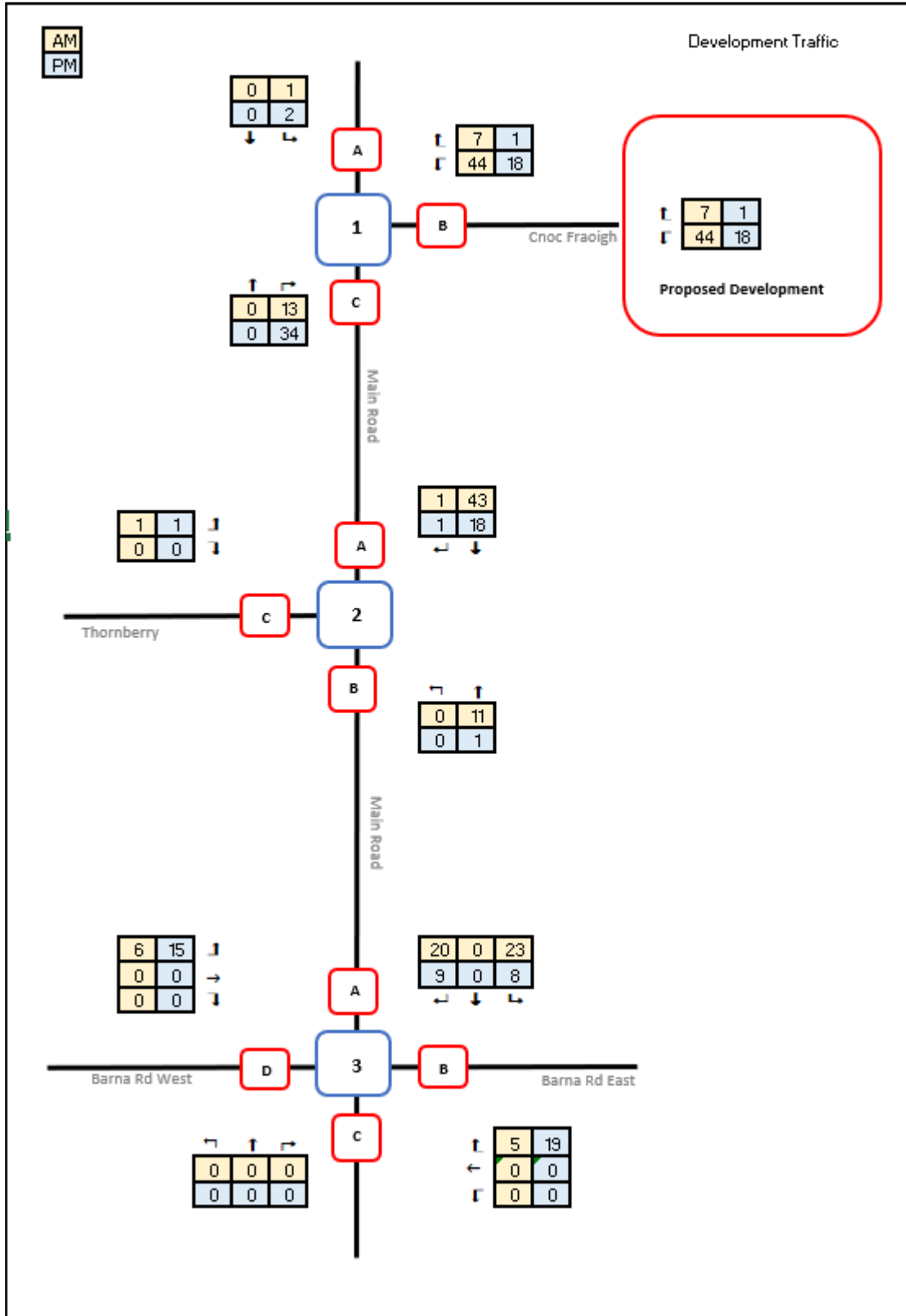


Figure 13-9: Assigned Trips

Traffic turning movement diagrams for all assessment years are presented in Appendix 2.

13.1.10 Detailed Assessment of Potential Operational Traffic Impacts

Traffic signal-controlled junctions are modelled using JCT's LINSIG V3.2. This was utilised for junction 3, whilst priority-controlled junctions are modelled using the PICADY module within TRL's Junctions 9. This programme was used junction 1 and 2.

The following Terminology should be referenced when interpreting the assessment result

13.1.10.1 Traffic Signal Junctions

- **DOS:** This is the ratio of demand flow to capacity on a link. The saturation level is normally 90%. A degree of saturation below 90% represents a junction that is operating in an efficient and stable condition. If a link has a degree of saturation of between 90% and 100% it may still be operating to an adequate standard depending on the acceptability of queuing and delay. A degree of saturation of above 100% is considered to be over-capacity;
- **Mean Maximum Queue:** The sum of the maximum queue on a link (including uniform, random and oversaturation queues) averaged over all the cycles in the modelled time period;
- **Average Delay:** The average delay for each passenger car unit (pcu) on the lane averaged over the modelled time period.

13.1.10.2 Priority Junctions

- **RFC:** This is the ratio of demand flow to capacity. The practical capacity threshold is normally 0.85. An RFC below 0.85 represents a junction which is operating in an efficient and stable condition. An RFC of between 0.85 and 1 represents variable operation, and may be said to be operating adequately, if the queuing and delay are deemed acceptable. RFC values in excess of 1 represent an oversaturated condition;
- **Max Queue Length:** This represents the maximum queue length of vehicles waiting to enter the junction on each arm;
- **Average Delay:** This shows the average amount of traffic delay at the junction per vehicle over the peak hour period.

13.1.10.3 Links

On any road or street network, the critical features that effect the capacity of that network are the intersections between those roads and streets. As such, given that the following junction assessments do not find any traffic capacity issues at any of the junctions assessed, it is considered that the links associated with the R336 Bearna Road, L1321 Local Road and the Cnoc Fraoigh residential access road have more than adequate capacity to cater for the additional traffic generated by the proposed development.

13.1.10.4 Traffic Impacts

An assessment of the traffic impact imposed on the local road network by the proposed development has been undertaken. This assessment includes for the:

- The Existing Development Access Junction at the existing (Cnoc Fraoigh) Residential Estate – Results presented in Appendix 3;
- Thornberry Road (Future Bearna Inner Relief Road) – Results presented in Appendix 4, and;
- The Bearna Road Junction, – Results presented in Appendix 5.

To determine the impact of the proposed development site and to demonstrate that it can operate sustainably within the local road network, the AM and PM peak capacity of junctions identified above have been modelled for the following assessment years:

- 2018 Base Year
- 2022 Opening Year without Development;
- 2022 Opening Year with Development;
- 2027 Opening Year +5 without Development;
- 2027 Opening Year +5 with Development;
- 2037 Opening Year +15 without Development;
- 2037 Opening Year +15 with Development;

The recorded traffic data for the 2018 count year has been projected to future assessment years using the TII Project Appraisal Guidelines for National Roads Unit 5.3 ‘Travel Demand Projections’. The ‘Link Based Methodology’ has been utilised and ‘Central’ growth factors as associated with ‘Galway Metropolitan Area’ have been applied. The baseline flows have thus been projected to the 2022 opening year, the 2027 opening year plus five and the 2037 opening year plus fifteen.

The results of each scenario for each junction are presented on the following pages.

13.1.11 Worst Case Impact

The worst-case scenario is that the proposed development is fully built and occupied at the opening year of 2022. In reality the construction of the 121 no. house units will be phased out over a longer short to medium time period depending on market conditions and availability of the required construction workforce and skills

This worst-case full development build out scenario has been modelled in the opening year and subsequent plus 5 and plus 15 year assessments and it is demonstrated that there is sufficient capacity within the local road network to cater for the associated additional traffic generated.

13.1.11.1 Base Year Assessment

The assessment results below indicate that during the base year 2018 scenario, the proposed access junction at Cnoc Fraoigh operates well within capacity.

Table 13-9 : 2018 Assessment: Junction 1 - Cnoc Fraoigh Access Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Without Dev	Stream B-AC	0.0	7.00	0.04	0.0	6.28	0.01
	Stream C-AB	0.0	5.35	0.01	0.0	5.74	0.02

The assessment below results indicate that during the base year 2018 scenario, the Thornberry Road junction operates well within capacity.

Table 13-10 : 2018 Assessment: Junction 2 - Thornberry Road Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Without Dev	Stream B-AC	0.2	7.41	0.19	0.1	6.85	0.08
	Stream C-AB	0.0	5.80	0.01	0.0	5.78	0.01

The assessment results below indicate that during the base year 2018 scenario, the Bearna Road junction operates within capacity.

Table 13-11 : 2018 Assessment: Junction 3 - Bearna Road Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	Degree of saturation (%)	Queue (PCU)	Delay (s)	Degree of saturation (%)
Without Dev	A	3.3	48.5	47.7%	3.1	61.7	57.5%
	B	7.8	14.8	49.6%	11.0	14.8	62.0%
	C	0.2	40.7	3.1%	0.9	49.7	19.5%
	D	8.1	14.1	47.4%	7.3	11.5	44.2%

13.1.11.2 Opening Year Assessment

The assessment results indicate that during the future year 2022 without and with development scenario, the existing access junction at Cnoc Fraoigh, which will be utilised by the proposed development, will operate well within capacity.

Table 13-12 : 2022 Assessment: Junction 1 - Cnoc Fraoigh Access Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Without Dev	Stream B-AC	0.0	7.09	0.05	0.0	6.29	0.01
	Stream C-AB	0.0	5.32	0.01	0.0	5.72	0.02
With Dev	Stream B-AC	0.2	7.45	0.14	0.1	6.37	0.05
	Stream C-AB	0.1	5.41	0.04	0.2	6.07	0.09

The assessment results below indicate that during the future year 2022 without and with development scenario, the Thornberry Road junction will operate well within capacity.

Table 13-13 : 2022 Assessment: Junction 2 - Thornberry Road Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Without Dev	Stream B-AC	0.3	7.59	0.21	0.1	6.94	0.08
	Stream C-AB	0.0	5.79	0.01	0.0	5.76	0.01
With Dev	Stream B-AC	0.3	7.63	0.21	0.1	7.16	0.08
	Stream C-AB	0.1	5.72	0.01	0.0	5.76	0.01

The assessment results below indicate that during the future year 2022 without and with development scenario, the Bearna Road junction will operate within capacity. Queuing and delay are all of an acceptable level for an urban traffic signal junction with single lane approaches and as can be seen the introduction of the proposed development results in an almost negligible impact.

Table 13-14 : 2022 Assessment: Junction 3 - Bearna Road Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	Degree of saturation (%)	Queue (PCU)	Delay (s)	Degree of saturation (%)
Without Dev	A	3.6	49.4	50.8%	3.3	63.0	59.7%
	B	8.5	15.4	53.1%	12.3	15.8	66.2%
	C	0.2	40.7	3.1%	1.0	49.9	20.6%
	D	8.9	14.6	50.7%	8.2	11.9	47.4%
With Dev	A	4.0	48.7	53.6%	3.8	61.4	62.2%
	B	9.3	16.5	55.9%	13.4	17.2	69.1%
	C	0.2	39.3	2.9%	0.9	47.4	18.6%
	D	9.5	15.6	53.2%	8.8	12.8	49.7%

With respect to the results tables and narrative provided above, the resultant impact for all three junctions can be reported as representing a long term not significant negative effect during the opening year assessment.

13.1.11.3 Opening Year Plus 5 Assessment

The assessment results below indicate that during the future year 2027 without and with development scenario, the proposed access junction at Cnoc Fraoigh will operate well within capacity.

Table 13-15 : 2027 Assessment: Junction 1 - Cnoc Fraoigh Access Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Without Dev	Stream B-AC	0.1	7.10	0.05	0.0	6.28	0.01
	Stream C-AB	0.0	5.27	0.01	0.0	5.70	0.02
With Dev	Stream B-AC	0.2	7.50	0.15	0.1	6.39	0.05
	Stream C-AB	0.1	5.37	0.04	0.1	6.05	0.09

The assessment results below indicate that during the future year 2027 without and with development scenario, the Thornberry Road junction will operate well within capacity.

Table 13-16 : 2027 Assessment: Junction 2 - Thornberry Road Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Without Dev	Stream B-AC	0.3	7.84	0.23	0.1	7.01	0.09
	Stream C-AB	0.0	5.78	0.01	0.0	5.76	0.01
With Dev	Stream B-AC	0.3	7.93	0.23	0.1	7.03	0.09
	Stream C-AB	0.0	5.61	0.01	0.0	5.69	0.01

The assessment results below indicate that during the future year 2027 without and with development scenario, the Bearna Road junction will operate within capacity. Queuing and delay are all of an acceptable level for an urban traffic signal junction with single lane approaches and as can be seen the introduction of the proposed development results in an almost negligible impact.

Table 13-17 : 2027 Assessment: Junction 3 - Bearna Road Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	Degree of saturation (%)	Queue (PCU)	Delay (s)	Degree of saturation (%)
Without Dev	A	4.0	51.1	55.4%	3.8	67.8	66.4%
	B	9.8	16.3	57.7%	14.5	17.5	72.0%
	C	0.2	40.7	3.1%	1.1	50.2	22.3%
	D	10.1	15.3	55.0%	9.3	12.5	51.6%
With Dev	A	5.0	47.3	58.5%	4.4	66.3	68.8%
	B	10.7	19.0	61.7%	15.7	19.3	75.0%
	C	0.2	36.7	2.6%	1.0	47.7	20.0%
	D	11.1	17.9	59.1%	9.9	13.4	54.0%

With respect to the results tables and narrative provided above, the resultant impact for all three junctions can be reported as representing a long term not significant negative effect during the opening year plus 5 assessment.

13.1.11.4 Opening Year Plus 15 Assessment

The assessment results below indicate that during the future year 2037 without and with development scenario, the proposed access junction at Cnoc Fraoigh will operate well within capacity.

Table 13-18 : 2037 Assessment: Junction 1 - Cnoc Fraoigh Access Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Without Dev	Stream B-AC	0.1	7.21	0.06	0.0	6.29	0.02
	Stream C-AB	0.0	5.20	0.02	0.0	5.68	0.02
With Dev	Stream B-AC	0.2	7.69	0.16	0.1	6.53	0.05
	Stream C-AB	0.1	5.30	0.05	0.1	6.02	0.09

The assessment results below indicate that during the future year 2037 without and with development scenario, the Thornberry Road junction will operate well within capacity.

Table 13-19 : 2037 Assessment: Junction 2 - Thornberry Road Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Without Dev	Stream B-AC	0.3	8.22	0.25	0.1	7.16	0.10
	Stream C-AB	0.0	5.78	0.01	0.0	5.73	0.01
With Dev	Stream B-AC	0.3	8.31	0.26	0.1	7.19	0.10
	Stream C-AB	0.1	5.59	0.01	0.0	5.67	0.01

The assessment results below indicate that during the future year 2037 without and with development scenario, the Bearna Road junction will operate within capacity. Queuing and delay are all of an acceptable level for an urban traffic signal junction with single lane approaches and as can be seen the introduction of the proposed development results in an almost negligible impact.

Table 13-20 : 2037 Assessment: Junction 3 - Bearna Road Junction

Scenario	Arm	AM			PM		
		Queue (PCU)	Delay (s)	Degree of saturation (%)	Queue (PCU)	Delay (s)	Degree of saturation (%)
Without Dev	A	4.6	54.1	62.3%	4.7	77.2	75.2%
	B	11.8	18.0	65.1%	18.7	21.6	81.1%
	C	0.2	40.7	3.9%	1.2	50.9	25.6%
	D	12.3	16.8	62.3%	11.1	13.5	57.9%
With Dev	A	5.9	53.7	68.3%	5.2	74.4	76.2%
	B	12.7	20.1	68.2%	20.5	24.4	84.2%
	C	0.2	38.0	3.4%	1.2	48.2	23.1%
	D	13.1	18.7	65.3%	11.8	14.6	60.5%

With respect to the results tables and narrative provided above, the resultant impact for all three junctions can be reported as representing a long term not significant negative effect during the opening year plus 15 assessment.

13.1.12 Operational Impacts of the Proposed Development

13.1.12.1 Operational Phase Mitigation Measures

The proposed development is consistent with all national, regional and local policies. In particular those policies and objectives aligned with active and sustainable travel and transportation. The following transportation characteristics are integrated into the development proposal to assist in mitigating the impacts:

- The proposed development incorporates extensive site permeability with high quality footpaths and streets appropriate for mixed traffic cycling, with high quality cycle parking and car parking all in line with the County Development Plan and national standards and best practice.
- The internal roads layout is designed to ensure vehicular speeds are low. The road alignment consists of smooth horizontal curves which are complemented with raised tables at specific locations to ensure that speeds are self-regulated below 30kph. Internal junctions operate under priority control and generally consist of small radius curves to encourage slow approach speeds.
- The development incorporates upgrades to the local road network, namely the L1321 creating a high quality direct pedestrian and cyclist link towards the town centre of Bearna and ensuring integration with existing walking, cycling, public transport provisions and local amenities.
- Demand Management is also underpinned by the co-location of residential, childcare and leisure and amenity facilities.
- The propensity for car ownership and car use is managed through measures that include reduced residential parking provision and increased cycle parking provision in line with the County Development Plan and national standards and best practice
- The development contains the required infrastructure to provide electric charging to all car parking spaces.

The implementation of the above mitigation measures will assist in managing the significance of the potential impacts however there will remain a short term not significant negative impact on the surrounding road network.

13.1.12.2 Operational Phase Residual Impact

During the operation of the proposed development (Opening Year) there will be a long term not significant negative impact due to increased traffic flows. This will be mitigated by the transportation characteristics integrated into the development as previously noted.

Additionally, during operation there will be an increase in pedestrian and cyclist movements, due to developments proximate location to the town centre and its services, amenities and public transport facilities and the upgrade of the link from the proposed development to the town centre. This will positively impact the proposed development and will assist in reducing dependency on car travel.

Residual impacts for the operational phase will therefore be long term, not significant, and of negative effect.

13.1.12.3 Significance of Effects Arising from Operational Phase

There will be a long term negative effect due to the operational phase traffic associated with proposed development. However, this effect will be not significant. The existing road network consisting of junctions and links will all continue to work well within capacity. This will be mitigated by the introduction of a range of mitigation measures that intrinsically form part of the proposed development, including footpaths, links, traffic and speed management features, co-location of creche, amenities and residential units, improved pedestrian connection to the Village and high quality cycle parking. These

measures will manage the potential impacts to ensure that they shall remain at a similar level. Residual impacts for the operational phase will therefore be long term, not significant, and of negative effect.

13.1.13 Cumulative In-Combination Effects

13.1.13.1 Other Developments

The potential cumulative effects of the proposed development in combination with the other projects described in Chapter 15 of this report have been considered in terms of impacts on traffic and transport.

Review of the Bearna Local Area Plan (LAP) 2015-2021 indicates that there some other smaller future development lands zoned residential Phase 1 and Phase 2 adjacent the proposed development. There are also some future development lands zoned residential Phase 1 and Phase 2 on the periphery of Bearna to the east and west.

A further detailed review of projects listed in Chapter 15 of this EIAR has identified a number of small scale developments that are imminent or have been granted permission. The list of development projects is as follows:

- 105 unit SHD Bearna Village : Freeport Ref: pre-planning
- 48 unit development - An Maolán: Ref: 19/1749
- 20 unit development – An Cnocán Carrach Ref: 19/314
- 15 unit development - Rinn Na Mara Ref: 16/147

Figure 13-10 below outlines the location of the above listed developments in relation to the proposed SHD. Where appropriate the application documentation, EIAR and NIS have been reviewed to inform the assessment.



Figure 13-10 : Cumulative Development Locations

As is standard industry practice, the growth rates applied during the opening year, opening year plus 5 and opening year plus 15 assessment has been applied so as to take account of future traffic growth on the local road network and it is considered that this growth on the local road network within and adjacent Bearna and its environs will be predominantly associated with future residential development such as the confirmed projects as listed above.

However, an exercise has been undertaken to demonstrate that the traffic growth rate applied comfortably accounts for the potential traffic generated by the noted cumulative development projects. This has been undertaken by comparing the anticipated traffic generation of these cumulative developmental against the increase in traffic contributed by the traffic growth rate projections between the base year and the opening plus 5 year.

Given the spatial relationship of the cumulative development project sites and the proposed development it is anticipated that there will be only one location of the road network where all traffic associated with the these developments will converge, namely the Bearna Road (R336) / Local Road (L1321) junction. As such traffic increase volumes associated with this junction has been utilised. It should be noted, that whilst traffic associated with the noted cumulative development projects will in reality distribute onto the local road network in different proportions to the west north and east, it has been conservatively assumed that all traffic generated by these cumulative development projects will pass through this junction.

With reference to the trip generation rates used in the trip generation section of this Chapter the cumulative traffic volumes of these developments is expected to generate a total of 101 vehicle trips in the AM peak, and 87 vehicle trips in the PM peak.

With reference to the base year traffic volumes compared to the opening plus 5 year volumes at the R336 / L1321 junction there is a traffic increase of 191 vehicle trips and 240 vehicle trips. The results are shown in Table 13-21.

Table 13-21 : Cumulative Impact of Other Developments

Traffic Type	2 - Way Traffic	
	AM	PM
Generated Traffic		
Cumulative Development Traffic	101	87
Traffic at R336/L1321		
Traffic Count (2018)	1160	1350
Opening Year + 5 (2026)	1351	1570
Increase from 2018 to 2026	191	220
Relative contribution%	53%	40%

The traffic generated by the cumulative development projects only represents 53% of the traffic increase assessed in the opening year plus 5 AM period, whilst this figure reduces to 43% during the PM period.

As such the cumulative impact of the small scale confirmed residential development projects as noted above has been accounted for through application of the projected growths rates and the assessment of the opening year scenarios and by virtue of the same assessments. Accordingly, the cumulative impact of the proposed development with the projects noted above has already been assessed in the preceding section and is a long term not significant negative effect.

13.1.13.2 N6 Galway City Ring Road (GCRR)

The proposed N6 GCRR comprises of approximately 5.6km of a single carriageway from 2km west of Bearna Village as far as the Ballymoneen Road and approximately 11.9km of dual carriageway from Ballymoneen Road to the eastern tie in with the existing N6 at Coolagh, Briarhill.

As stated in the EIAR Traffic Chapter for the N6 GCRR, there will be no negative traffic impacts associated with the proposed development of the road. The traffic impact carried out shows that the introduction of the road proposal will result in significant benefits in terms of junction operation,

network performance and journey time savings. This alternative route around the city will result in reduced traffic levels and congestion in Galway City Centre, its existing approaches and the towns and villages on those approaches.

In terms of Bearna, the road proposal will have a significant positive impact through reducing traffic levels within the village and thereby facilitating the future provision of public realm plans and infrastructure to support walking, cycling and public transport.

In terms of the proposed strategic housing development subject of this EIAR, the proposed GCRR will have a positive impact by providing an alternative safe and efficient route into the city and by improving the environment within Bearna Village and facilitating the potential for future improvements to the public realm, walking and cycling environment.

The proposed strategic housing development will not have any negative impacts on the GCRR as the GCRR is design with the objective to facilitate population growth of compact and sustainable development, such as the proposed strategic housing development.

13.1.14 **Monitoring**

Not applicable for this Chapter.

13.1.15 **Reinstatement**

Not applicable for this Chapter.

13.1.16 **Difficulties Encountered**

There were no difficulties encountered in undertaking the assessment discussed within this Traffic and Transport section.

13.1.17 **Conclusion**

The proposed development is to consist of 121 residential units, a creche and public park along the Trusky Stream and is well located in terms of proximity to Bearna village centre, with upgraded walking facilities proposed along the L1321 Local Road, ensuring that all services and amenities are appropriately accessible within 15 to 20 minutes walking time.

There are good public transport options available to potential Galway City commuters with multiple services available during morning and evening peak periods. Galway City is also accessible via bicycle with an expected journey time of approximately 25mins.

The traffic impact assessment indicates that in terms of base year traffic, all key junctions assessed operate well within capacity. The assessment of all future scenarios also demonstrates that with the introduction of traffic generation associated with the proposed development on the adjacent local road network, all junctions are expected to operate within capacity with no adverse impacts in terms of traffic queuing, delay or capacity.

With respect to the results tables and narrative provided for the assessment of the operational traffic impacts, the resultant impacts for all three junctions can be reported as representing a long term not significant negative effect during assessment years.

In this context it is concluded that in terms of traffic, the proposed developed is both sustainable and appropriate for the area.

13.2 Water and Other Services

13.2.1 Statement of Authority

This section of the EIAR has been prepared by Eoin Gilson and reviewed by Michael Watson, both in MKO. Eoin Gilson is an Environmental Scientist and Michael Watson is a Project Director with MKO; with over 2 and 18 years of experience in the environmental sector respectively. Their environmental experiences involves report writing of Environmental Reports (ER), Environmental Impact Statements/Environmental Impact Assessment Reports (EIS/EIAR) & Strategic Environmental Assessments (SEA) as well as project management of a variety of small and large scale jobs, including residential and commercial development projects.

13.2.2 Consultation

The relevant national and regional authorities and bodies listed in Section 2.7 were consulted to identify any potential impact on material assets. Irish Water and Transport Infrastructure Ireland (TII) made a number of recommendations which can be viewed in Appendix 2-2 of this EIAR. The scoping responses are discussed in further detail in Section 2.7.2 of this EIAR.

13.2.3 Construction Methodology

The construction methodology detailed in Chapter 4 of this EIAR describes the manner in which the proposed development will be constructed, including excavations and installation of services. Prior to works, the area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e. ESB, Bord Gáis, Eir, Galway County Council etc. will be contacted and all drawings for all existing services sought.

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications. Construction methodologies are described in further detail in Chapter 4 of this EIAR.

13.2.4 Receiving Environment

The existing site is almost entirely a greenfield site, and so the presence of underground services will be limited in extent, if present at all. It is not proposed to do any significant excavation works at the site boundary. With this in mind, the proposed development could have the potential to impact the following:

- Electricity Network
- Telecommunications Networks (including phone and broadband)
- Water Supply Networks
- Wastewater Networks
- Land Use
- Waste Management

13.2.4.1 Electricity

There are no overhead electricity cables on the site of the proposed development. There is a short section of underground electrical cable route that extends through the Cnoc Fraoigh residential estate and extends into the proposed development site. While it is unlikely that there will be any additional

underground electrical services encountered during the construction works (as the site is greenfield agricultural land), there is still a possibility that an issue may occur while carrying out works, particularly at the site boundaries. The striking of an underground electricity cable during construction operations could potentially result in serious injury or death of site staff. Details on the existing electrical cables at the development site are provided in the Utility Report (Appendix 13-6 of this EIAR). All proposed works for the project have been designed to avoid these services as much as possible, but where any moving of electricity lines is required, this will be carried out in consultation with ESNB.

13.2.4.2 Telecommunications

There are no known telecommunication cables within the site of the proposed development. However, there is existing EIR infrastructure that currently runs through the Cnoc Fraoigh residential estate and up to the western boundary of the site via underground ducts and overhead cables. While it is unlikely that there will be any underground telecommunications services encountered during the construction works (as the site is greenfield agricultural land), there is still a possibility that an issue may occur while carrying out works, particularly at the site boundaries. The breaking of an underground telecommunications cable during construction operations could potentially result in disruption to businesses and homes in the area. Details on the existing electrical cables at the development site are provided in the Utility Report (Appendix 13-6 of this EIAR). All proposed works for the project have been designed to avoid these services as much as possible.

13.2.4.3 Water Supply

While it is unlikely that there will be any water mains encountered during the construction works (as the site is greenfield agricultural land), there is still a possibility that an issue may occur while carrying out works, particularly near the site boundaries. Rupturing a water main during construction operations could potentially result in disruption to local supply. All proposed works for the project have been designed to avoid this network as much as possible and is provided in the Engineers Services Report (Appendix 4-3 of this EIAR). The project has received a confirmation of feasibility for connection to Irish Water assets outside the proposed development.

13.2.4.4 Wastewater Networks

The existing wastewater treatment plant (wwtp) for the Cnoc Fraoigh residential development will be decommissioned as part of the proposed development. The existing Cnoc Fraoigh wastewater network will be maintained and connected to the wastewater network of the proposed development via a new pump station and rising main. Wastewater from both the proposed development (121 residential units) and the existing Cnoc Fraoigh development (21 residential units) will be connected to the existing public sewer via a new wastewater line to be installed along the L-1321.

Decommissioning of wwtp, which is located in the southeastern corner of the proposed development site, will be accomplished by disconnecting all electrical connections, and demolishing and removing all above ground elements of the plant. The wwtp will then be filled with inert material and covered with at least 30cm of topsoil. The area will then be landscaped as part of the general landscaping plan for the proposed development. A portion of the existing Cnoc Fraoigh wastewater network will be decommissioned. The existing pipe will be plugged and left in-situ.

13.2.4.5 Land Use

The subject site is currently in use for extensive pastoral livestock grazing. The current statutory planning policy document for the subject lands is Variation No.2(a) to the Galway County Development Plan 2015-2021 (the 'Bearn Plan'). The plan is generally supportive of high quality residential development provided they adhere to the sustainable development and proper planning of the area and several objectives and policies support this. The application site is located within 'R' –

Residential (Phase 1) and 'OS' Open Space/Recreation & Amenity zoned lands. All of the lands zoned 'OS' within the subject site are also identified as being under Constrained Land Use.

The proposed development will assist Galway County Council in meeting its commitment to provide for residential development and public amenity open space, which will ensure the protection of existing residential amenity and will contribute to sustainable residential neighbourhoods.

The proposed scheme includes a series of measures to encourage/increase the use of public transport, walking and cycling for residents, staff and visitors and for work-related travel and to facilitate travel by bicycle, bus and train.

In summary, it is submitted that the proposed development results in a development which accords fully with the proper planning and development of the area while providing an attractive, high quality, contemporary development which enhances the development of the area.

13.2.4.6 Waste Management

As with any project of this scale, there will be significant volumes of waste produced, both during the construction and operational phases. For the construction phase, a project specific Waste Management Plan (WMP) will be adhered to by all Subcontractors / Specialists and all other site personnel involved in the project. The WMP which will be explained during the induction process for all site personnel. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase. Reuse of certain types of construction wastes such as broken rock will cut down on the cost and requirement of raw materials therefore further minimising waste levels. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage. Recycling of waste will be the preferred option with disposal of waste to landfill minimised as much as possible. Further details on waste management for the project during both the construction and operational phases are provided in Sections 4.5.1 and in Appendix 4-2, EIAR.

13.2.5 Potential Impacts and Associated Mitigation Measures

13.2.5.1 Construction Phase

The construction of the proposed development has the potential to impact the existing wastewater network of the Cnoc Fraoigh residential development. There is the potential for short-term nuisance to users of this network. Construction of the proposed development also has the potential to impact existing above ground or underground telecommunications networks or other services. The overall proposed development has the potential to have a short-term, slight negative impact on the existing services.

Mitigation

Specific measures are incorporated into the Construction and Environmental Management Plan, included as Appendix 4-2 of this EIAR, to ensure that the construction of the proposed development will not have any adverse effect on any service networks in the vicinity. The mitigation measures include the following:

- Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works.
- Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified.
- Excavation permits will be completed and all plant operators and general operatives will be inducted and informed as to the location of any services.

To mitigate for any potential negative impacts to the Cnoc Fraoigh wastewater network the following measures will be implemented:

- The Cnock Fraoigh wastewater network will be connected to the completed wastewater network of the proposed development, and from there to the public sewer system, in advance of the decommissioning of the existing wastewater treatment plant.
- This will ensure continuity of wastewater service for the residents of Cnoc Fraoigh.

Residual Impacts

There will be an overall short term, imperceptible, neutral impact on telecoms and other services.

13.2.5.2 Operational Phase

There will be no operational phase impacts or associated effects on telecoms or other services associated with the proposed development. Wastewater will be accommodated by the within the public waste system which has the capacity to treat wastewater from the development. There will therefore be no operational phase impacts on wasterwater infrastructure.

13.2.5.3 Decommissioning Phase

The proposed housing development will become a permanent part of the local housing supply, and therefore the requirement for decommissioning is not foreseen. There is therefore considered to be no potential for impacts on telecoms and other services.

13.2.5.4 Cumulative effects resulting from Interactions between various elements of the proposed development

The interaction of the various elements of the proposed development was considered and assessed in this EIAR with regards material assets. The potential for each individual element of the proposed development on its own to result in significant effects on material assets was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on material assets in the impact assessment presented.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

13.2.5.5 Cumulative In-Combination Effects

The potential cumulative impacts and associated effects between the proposed development and the projects described in Section 15 of this EIAR, hereafter referred to as the other projects, have been considered in terms of telecoms and other services. Where appropriate the application documentation, EIAR and NIS associated with the other projects have been reviewed to inform the assessment.

The measures outlined above and, in the Construction, and Environmental Management Plan (CEMP), included as Appendix 4-2 of this EIAR, will eliminate any potential for cumulative effects in relation to telecommunications and other services during the construction phases of the proposed development and the other projects.

There will be no cumulative operational phase effects in relation to telecommunications and other services.