COAKLEY
CONSULTING ENGINEERS

Proposed Student Village Development, Ballybeg, Waterford
Noel Frisby Construction Ltd
Traffic and Transport Assessment (TTA) Report

Coakley Consulting Engineers
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1 Introduction

1.1 General

This Traffic and Transport Assessment (TTA) Report was prepared by Coakley Consulting Engineers (CCE) on behalf of the client, Noel Frisby Construction Ltd, to support the Large-Scale Residential Development (LRD) planning application for a proposed Student Village Development on a site located between the R680 Cork Road and Ballybeg Drive Road, Waterford.

Coakley Consulting Engineers are traffic and transport consultants based in Tralee, Co. Kerry. This report should be read in conjunction with all other documents and information submitted as part of this planning application. The project scope and proposed site access has been discussed with a Waterford City and County Council Roads Department Engineers prior to submission. Coakley Consulting Engineers has made reference to the following documents in preparation of this report:

- Project information and drawings from Fewer Harrington and Partners Architects (FHP)
- Roads and Engineering drawings by Malone O'Regan Consulting Engineers (MORCE)
- Discussions and agreements with Waterford City and County Council Roads Department
- DMURS - 'Design Manual for Urban Roads and Streets' and other design standards
- Waterford City and County Development Plan 2022-2028
- Waterford Metropolitan Area Transport Strategy, 'Urban Renewal Scheme' & Greenroutes

1.2 Site Location and Local Road Network

As shown below in Figure 2.1, the site is ideally located only a short walk (2mins) from the South East Technological University Waterford campus and will provide students with high quality connectivity, permeability and accessibility to the university and also city centre on foot, cycling or by public transport. The roads surrounding the site have good infrastructure for vulnerable road users including signalised crossing points, footpaths, cycle lanes, grass verges, dropped kerbs, and street lighting. The speed limit surrounding the site is 50km/h.

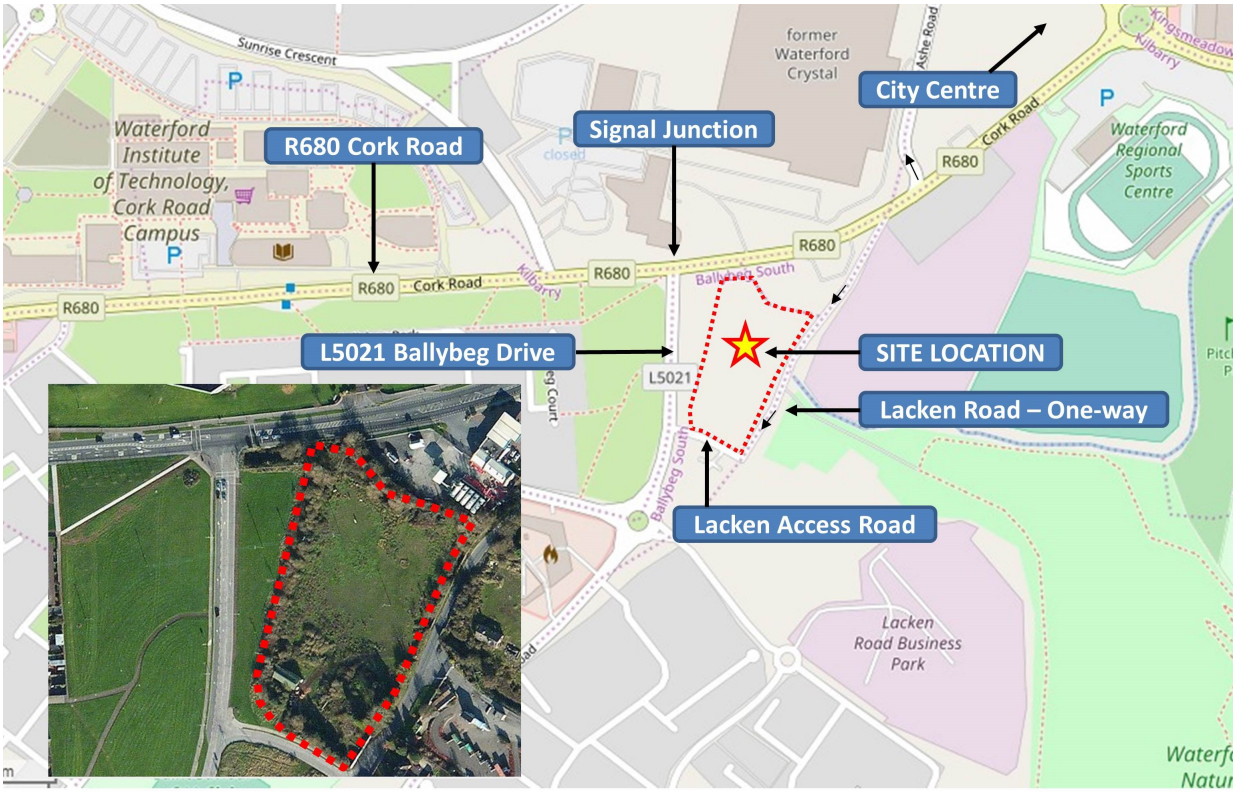
Figure 1.1 Site Location

2 Existing Road Network & Travel Patterns

2.1 General

As shown in Figure 1.1 above and Figures 2.1 and 2.2 below, the proposed development is ideally located in close proximity to the university campus, on a site adjacent to the existing signalised junction between the R680 Cork Road and Ballybeg Drive Road, Co. Waterford. The proposed development also takes into accounts several proposed Active Travel and other upgrades planned for the Cork Rd including improved cycle infrastructure, bus priority measures, junction improvements and more.

Figure 2.1 *Existing Local Road Network and Key Junctions*



In traffic terms, the site and local urban road network have the following key characteristics:

- The Speed Limit adjacent to the site is 50km/h
- The sites surrounding road network provides significant site accessibility for both vehicles and vulnerable road users and provide for the efficient distribution of traffic.
- The site is located within walking and cycling distance and is surrounded by significant residential areas and other key trip generators for the proposed development.
- The site is located approximately 3.0km southwest of Waterford City Centre
    - Drive: 10mins, Walk: 35mins, Cycle: 10mins

2.2 R680 Cork Road – Northern Site Boundary

As shown in Figure 2.1 and in Figures 2.2 and 3.3 below, the R680 Cork Road runs in an east west direction along the site's northern boundary from the city centre in the east to the R710 Outer Orbital Road to the west. This road was reclassified as the R680 regional route following the opening of the N25 Waterford Bypass in 2009. The R680 meets the L5021 Ballybeg Drive Road at the sites northwestern corner, at a signalised junction with pedestrian crossings provided on all junction arms.

The R680 is a high quality, 6.0 to 10m wide urban carriageway with footpaths, on-road cycle lane, advanced cycle stop line and street lighting on both sides of the road

Figure 2.2 *R680 – Looking west from Signal Junction*

Figure 2.3 *R680 – Looking east from Signal Junction*

2.3 L5021 Ballybeg Drive – Western Site Boundary

As shown in Figure 2.1 above and Figures 2.4 and 2.5 below, Ballybeg Drive Road is a typical urban road running in a north south direction along the sites western boundary.

This road serves a variety of land uses including residential, commercial, and retail and connects to the R710 Outer Orbital Road approximately 2.0km to the south of the site. The Ballybeg Drive Road is a high quality, 6.0 to 9m wide urban carriageway with 1.0m grass verge, 2.0m footpaths and street

lighting on both sides of the road. A left and right turn lane have been provided on Ballybeg Drive on the approach to the R680 Cork Road signal junction.

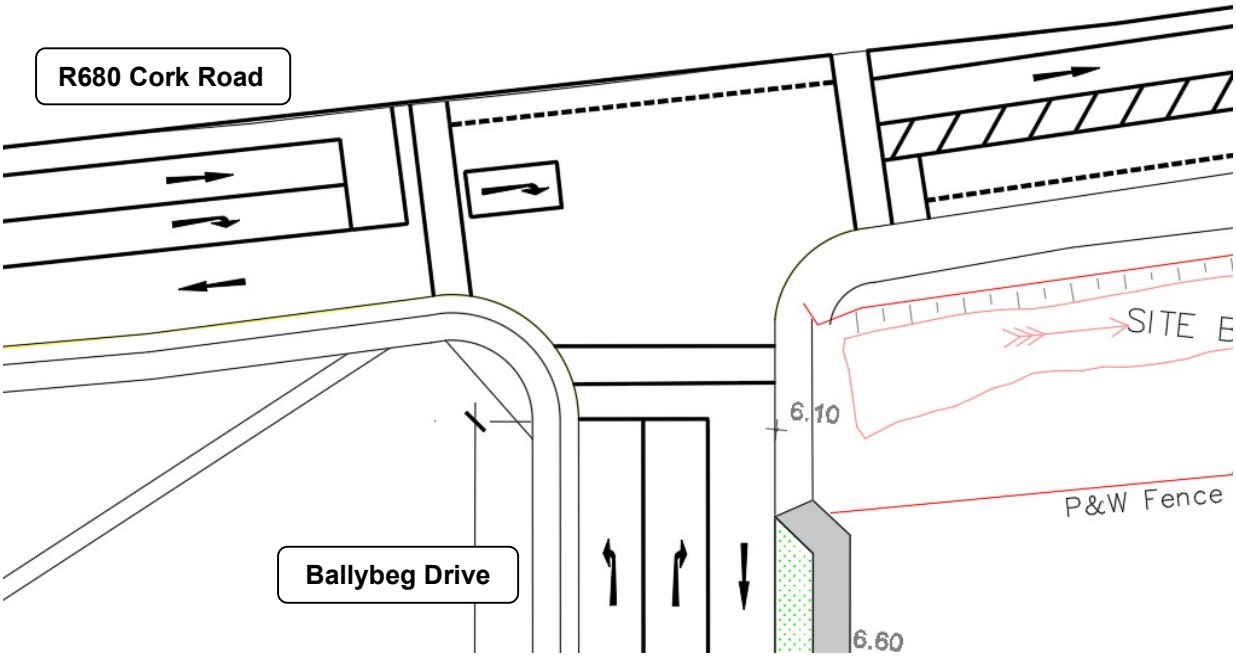
Figure 2.4 *Ballybeg Drive – looking south from Cork Road*

Figure 2.5 *Ballybeg Dr – looking north on Ballybeg Drive*

2.4 Existing R680 / Ballybeg Drive Signal Junction

As shown in Figures 2.1 to 2.5, the junction between the R680 and Ballybeg Drive is a typical urban signalised junction, the layout of which is shown below in Figure 2.6.

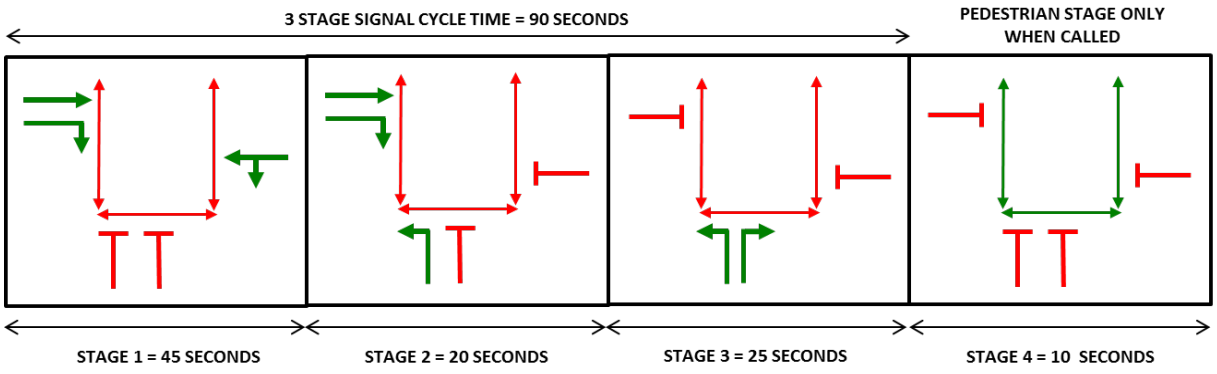
Figure 2.6 Existing R680 / Ballybeg Drive Signal Junction Layout



This junction has the following key characteristics:

- Signalised pedestrian 'full' crossings on each junction arm
- The individual left and right turn lanes on Ballybeg Drive extend to approx 160m in length
- Westbound and east bound cycle lanes on the R680. Ranging from 1-2m wide
- Advanced Stop Line (ASL) for cyclists on R680 Eastbound
- The signal staging and phasing with approximate timing for 3 stages in a 120 second signal cycle is shown below in Figure 2.7

Figure 2.7 R680 / Ballybeg Dr. Signal Junction Staging and Phasing Diagram



It appears that this junction operates on a vehicle and pedestrian actuated signal cycle. Signal stage times varied through the peak hour with the pedestrian stage operating (called) only when requested by push button activation and traffic stages activated by demand via loop detectors in the ground on the approach to and at the junction. The junction was observed to operate under capacity at peak times, with all queues dispersed during each stage (i.e. green light).

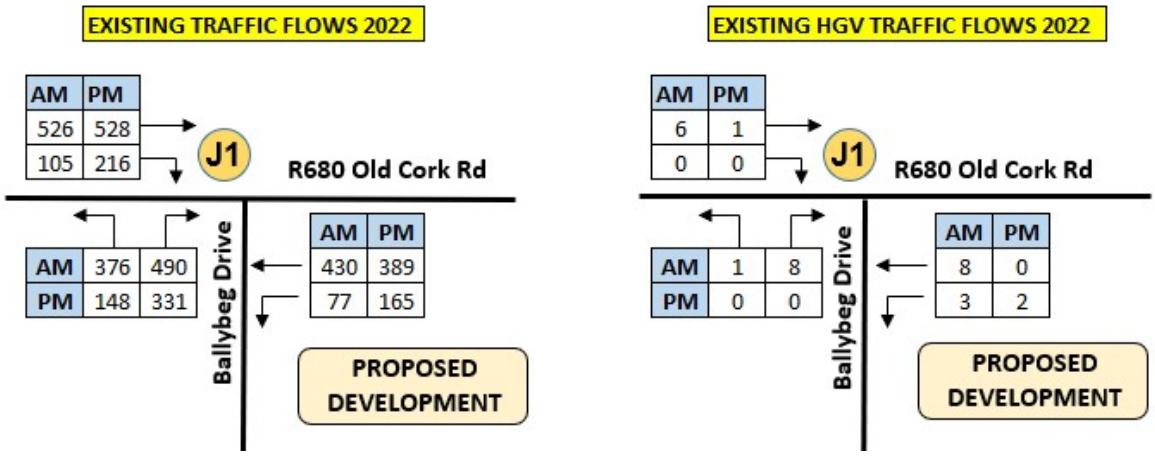
2.5 Existing Traffic Volumes

Although historic traffic data is available from 2014 and 2018, a new *independent* turning count survey was undertaken on Wednesday 28th September 2022 by Traffinomics Ltd at the junction of the R680 Cork Rd and Ballybeg Drive.

This traffic data was used as part of the traffic analysis for the proposed development and suitable growth rates applied to estimate future traffic flows outlined in Section 2.6.

A summary of the 2023 AM (8-9am) and PM (5-6pm) peak hour flows from the above turning count survey is shown in Figure 2.8 in addition to separate Heavy Goods Vehicle (HGV) only flows.

Figure 2.8 - Existing Peak Hour Traffic and HGV Flows



Using this 2023 traffic data, the Annual Average Daily Traffic (AADT) and following traffic flow patterns were estimated using industry standard calculations, guidelines, and best practice[1] and future growth rates applied taking into account national standards[2].

The R680 Cork Road AADT (Annual Average Daily Traffic) adjacent to the site was estimated to be *approx. 14,000* vehicles per day (two-way) to the west of Ballybeg Drive and *15,500* to the east.

The L5021 Ballybeg Drive AADT (Annual Average Daily Traffic) adjacent to the site was estimated to be *approx. 9,500* vehicles per day (two-way).

For illustration purposes, the estimated average daily flows on the R680 Cork Road (West) are shown below in Figure 2.9, average 24-hour traffic flow profile shown in Figure 2.10 and daily flows by month in Figure 2.11.

[1]Transport Infrastructure Ireland (Tii) document 'Expansion Factors for Short Period Traffic Counts 2016'
[2]Transport Infrastructure Ireland (Tii) document 'Link Based Traffic Forecasting 2011'

Figure 2.9 *– Estimated Average Daily Traffic Flows*

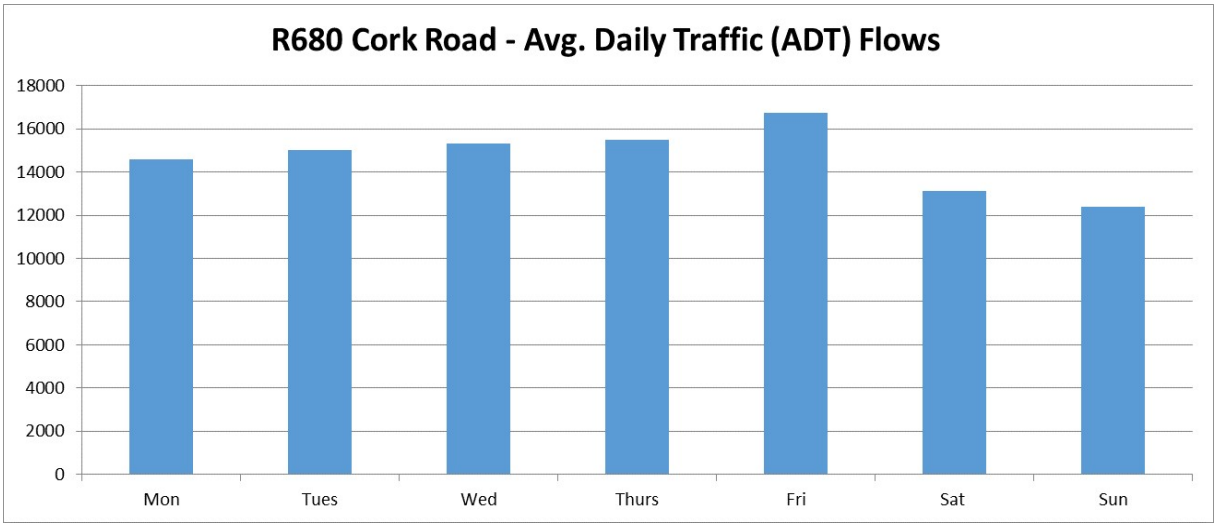


Figure 2.10 *– Estimated Hourly Traffic Flows*

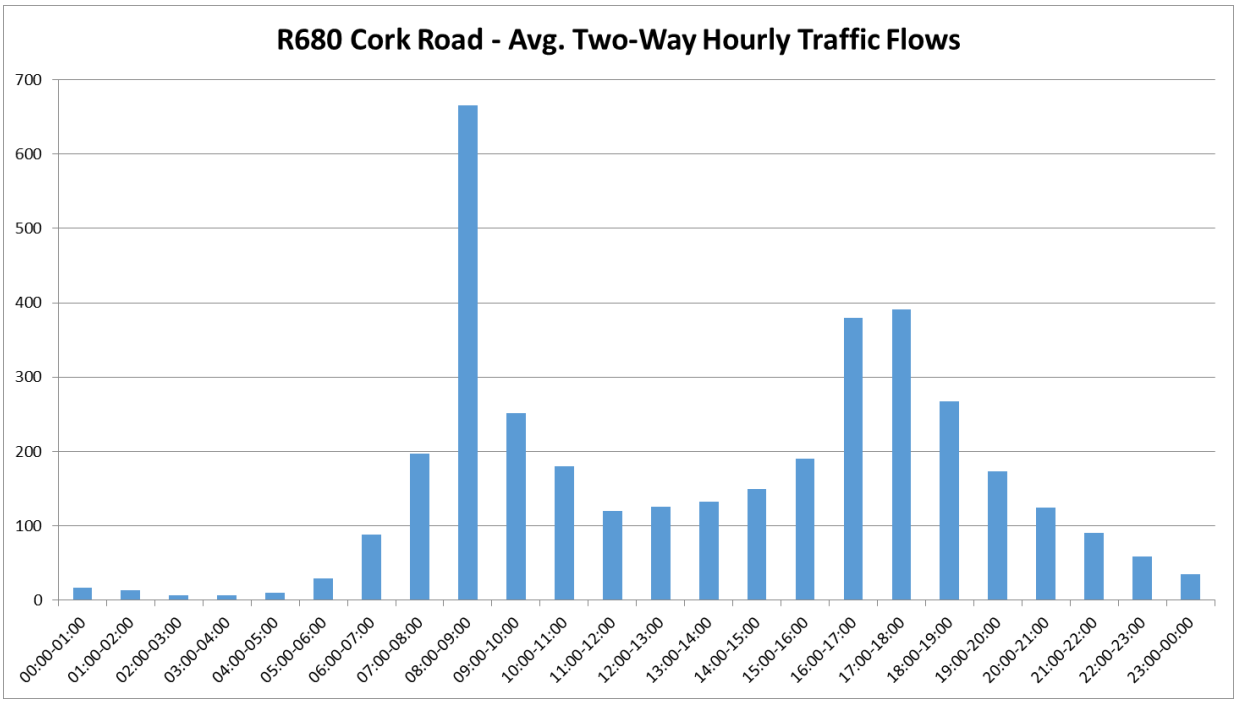
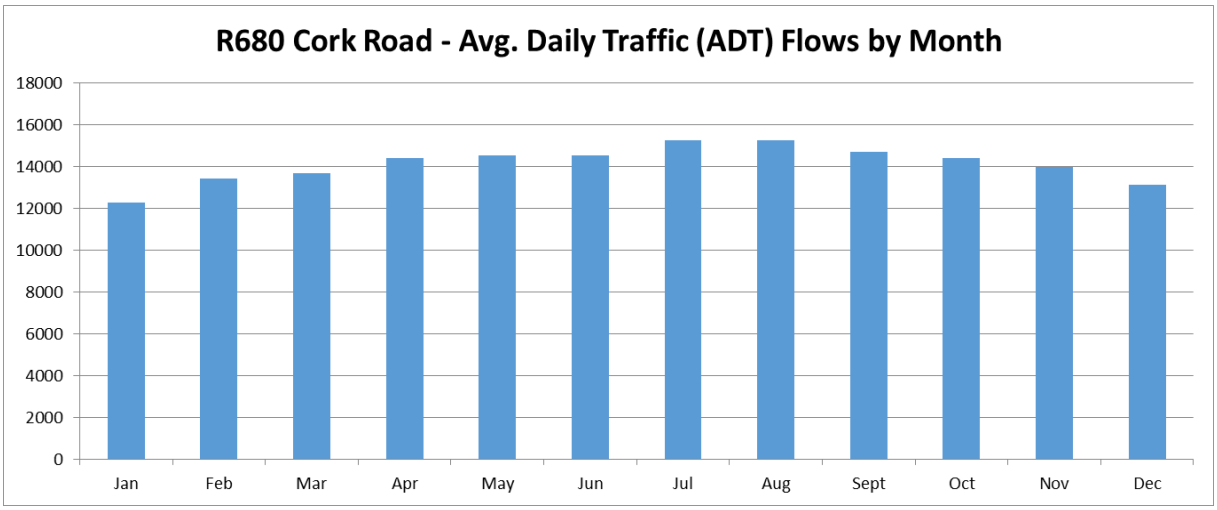


Figure 2.11 *– Estimated Daily Traffic Flows by Month*



2.6 Future Traffic Volumes

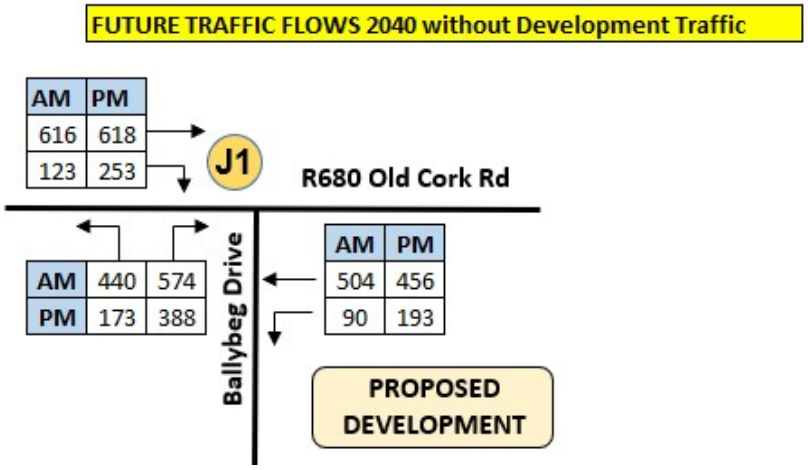
A comparison of 2018 and 2022 traffic data reveals that peak hour traffic flows at the Cork Road / Ballybeg Drive junction have remained somewhat similar in intervening 4-year period, with some turning movements decreasing whilst others increasing slightly.

Irrespective of the above, the analysis in this report has assumed and applied a conservative 17% growth rate to traffic flows between 2022 and 2040 (Opening Year + 15 years) based on the Tii (NRA) 2021 document 'Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections'.

This level of traffic growth will provide a robust safety buffer for the analysis of any future traffic scenario.

The estimated future Design Year 2040 AM and PM peak hour traffic flows 'without' proposed development traffic is shown in Figure 2.12.

Figure 2.12 *– Future 2040 Traffic Flows* ***without*** *proposed Development Traffic*



Key data from these surveys and observations include the following:

- The signal junction operates under capacity and disperses all vehicle queues each signal cycle
- It was assumed that each queuing vehicle (veh) represented 6m in length
- Maximum queue length on Ballybeg (left turn lane): 5 veh (AM) & 4 veh (PM)
- Maximum queue length on Ballybeg (right turn lane): 7 veh (AM) & 10 veh (PM) (i.e. 60m)
- Average queue lengths are significantly lower outside the AM and PM peak hours
- The proposed development will generate minimal traffic (vehicle) flows. See Section 4.
- The majority of traffic to and from the proposed development will occur outside of peak hours
- The proposed site access with be located over 100m from the Cork Road / signal junction

2.7 Existing Travel Patterns – CSO

The Central Statistics Office (CSO) Census 2016* Small Area Population Statistics (SAPMAP) has been used to gather data for existing mode of travel patterns for 4no. similar student accommodation areas in Galway city (see Figure 2.13), selected as they have somewhat similar characteristics to the proposed development in terms of their location, proximity to the main campus (~500m), accessibility characteristics, type of accommodation and type of resident (i.e. students).

*2022 CASO SAPMAP data not yet available.

- Area 1 - Small Area Ref. Sa2017_068006013 – Corrib Village
- Area 2 – Small Area Ref. Sa2017_068010010 – Cúirt na Coiribe / Dun na Coiribe.
- Area 3 - Small Area Ref. Sa2017_068010011 – Gort na Coiribe
- Area 4 - Small Area Ref. Sa2017_068010012 – Gort na Coiribe (rear)

Figure 2.13 *– CSO SAPMAP Comparable Areas for assumed Mode of Travel Statistics*

The principal mode of travel used by student residents in each catchment area is summarised in Table 2.1 below which reveals that the clear majority of those travelling to School/College from these primarily student residential areas do so on Foot (89.3%), followed by cycling (6.8%). In comparison only 3.4% travel by private car (2.3% car driver & 1.1% car passenger). Only 0.6% travel by bus to college, however this is not surprising given the close proximity of these areas to the NUIG campus.

Table 2.1 *– 2016 CSO Limerick City Settlement Area & Local Area Surrounding Site - Mode of Travel*

Travel Mode	2016 Mode of Travel to School/College
	Galway Student Accomodation
On foot	89.3%
Bicycle	6.8%
Car driver	2.3%
Car passenger	1.1%
Public Transport (Bus)	0.6%

3 Proposed Development

3.1 Proposed Development

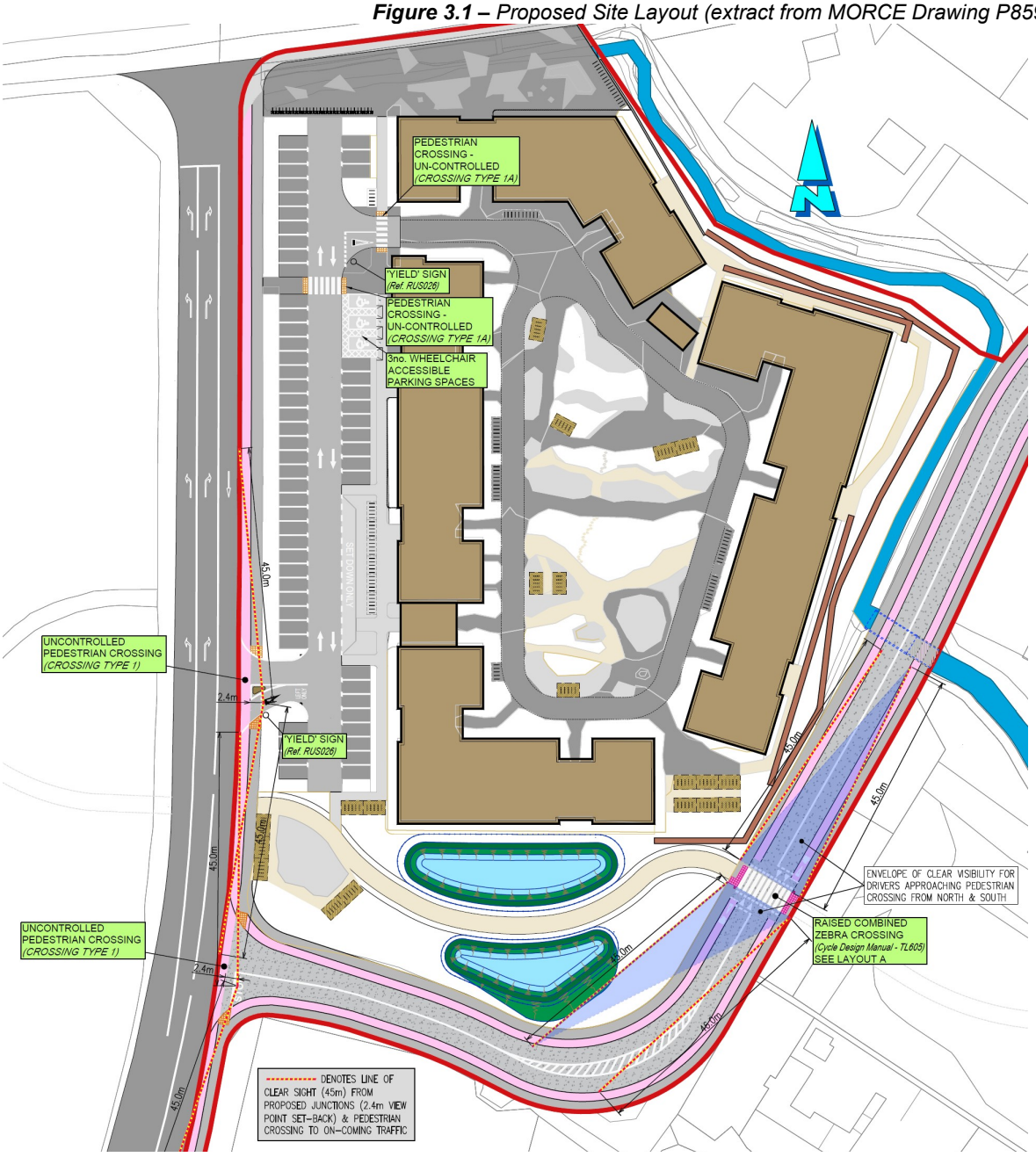
The proposed schedule of the LRD student accommodation development is outlined below in Table 3.1

Table 3.1 – *Proposed Development Schedule*

Proposed Development	Apartments	Bedrooms	GFA
Student Accommodation	**85**	**582**	
Retail Unit			**139.75m^2**

The proposed site layout shown below in Figure 3.1 was designed by Fewer Harrington and Partners Architects (FHP) with civil engineering input from Malone O'Regan Consulting Engineers (MORCE) and CCE. Please refer to all original scale drawings submitted for planning.

Figure 3.1 – *Proposed Site Layout (extract from MORCE Drawing P859)*



The site layout was carefully designed to take into account the following key elements:

1. The overarching guidelines and principles of DMURS within the development and place greater importance on the movements of vulnerable road users throughout the development. See DMURS Compliance Statement report in Appendix F.
2. The site layout has also been designed with the principles of safety, connectivity, permeability, accessibility, security and sustainability.
3. The proposed layout has included design recommendations contained in the independent DMURS Quality Audit (QA) including Road Safety Audit (RSA). See Section 3.7.
4. Pedestrian crossing points, dropped kerbs and tactile paving are proposed at several uncontrolled pedestrian crossing locations throughout the development to match the likely desire lines of pedestrians.
5. A new off road cycle lane on the eastern side of Ballybeg drive replacing the existing grass verge and connecting to existing cycle lane facilities to the south and on the proposed upgrade works to Lacken Road outlined below.
6. A detailed AutoTrack assessment was undertaken during the site layout and junction design process to ensure that multiple vehicle types including emergency, refuse and other vehicles can access, egress and safely negotiate the internal road layout and all junctions. Please refer to MORCE Drawing P859.
7. Taking on board the 'self-regulating street' and other approaches outlined in DMURS, the proposed site layout encourages low vehicle speeds using a variety of measures to change driver behaviour and enhance quality of life within the development.
8. Although the vast majority of trips to and from the development will be by on foot or cycling by students to and from the nearby campus, sufficient parking has been provided.
9. Lacken Road Upgrade: Although Lacken Road does not serve the development in terms of vehicular access, as part of the application it was agreed to upgrade the existing one-way and two-way sections of the *Lacken Road* alignment within the sites redline boundary. Please refer to MORCE engineering drawings for details.
    - Two 3.0m wide lanes in two-way section and one 3.5m wide lane in the one-way section
    - 1.5m wide cycle lane on both side
    - 1.8m wide footpath on both sides
    - A 'Raised' Pedestrian / Cycle Combined Zebra crossing is proposed on Lacken Road to serve the proposed Green Corridor/Link. This controlled crossing has been designed taking into account the TL605 layout specification contained in the recently published Cycle Design Manual guidelines. Please refer to MORCE drawings for additional detail. In excess of the required DMURS forward stopping sight distances (sightlines) are available for drivers on Lacken Road approaching crossing and vice versa. If required, this can be upgraded in the future to a fully signalised Toucan crossing if traffic, pedestrian or cycle flows increase.

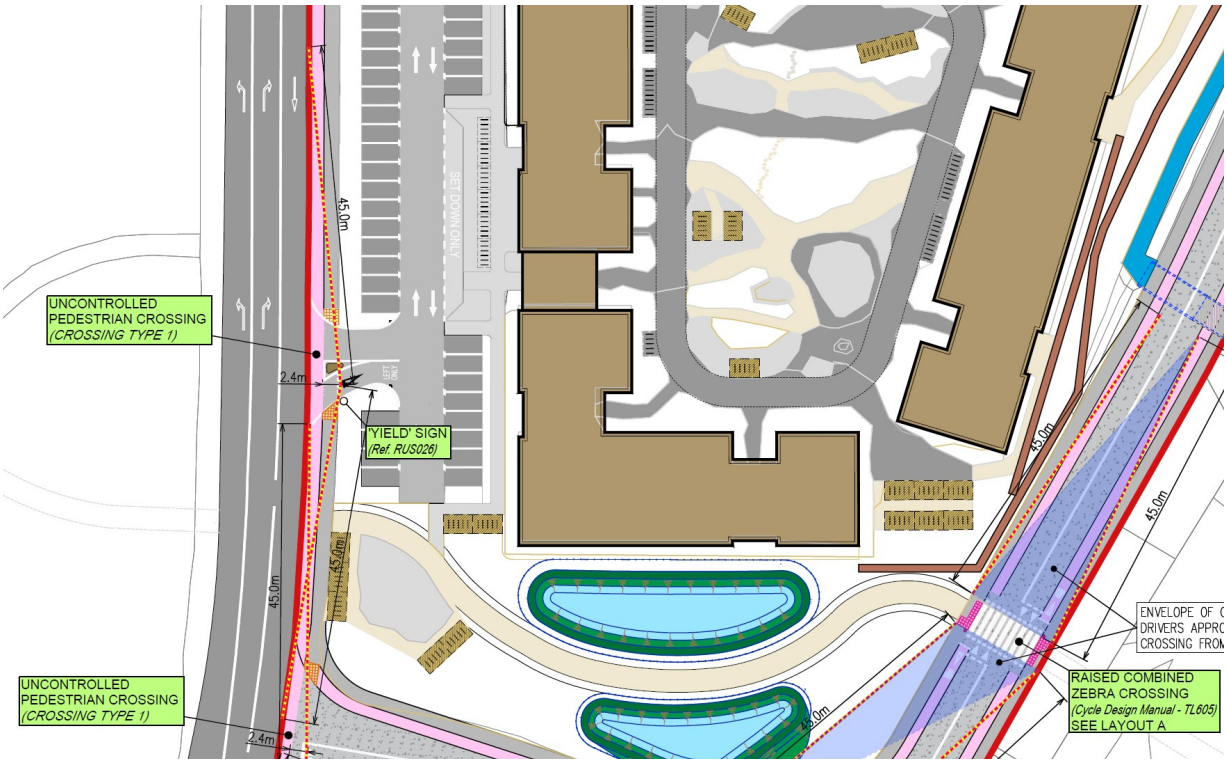
- A 'Slow Zone' speed limit of 30km'h is proposed for this road considering the low traffic flows and also the likely pedestrian/cycle demand across this road (green corridor/link).
- The upgrade works have increased the horizontal alignment radius to DMURS minimum 26m at existing 90-degree bend on Lacken Road to ensure ease of movement for 30km/h design speed and to also ensure forward stopping sight distances are available (visibility / sight lines) along the entire length of road.

3.2 Proposed Development Access Junction

Several roads and access options were reviewed and assessed as part of an initial pre-planning study. As part of this study, several discussions with the Local Authority Roads Department Engineers (LA) were undertaken and the optimum site access solution on Ballybeg Drive was agreed with the LA. The agreed preliminary design of proposed access is shown below in Figure 3.2 and includes the following:

- The design allows for safe access and movement for both vehicles and vulnerable road users in terms of junction type, crossing points, pedestrian desire lines and vehicle speeds, sightlines, dropped kerbs, tactile paving and more.
- Minimal impact on the nearby signal junction (Cork Rd/Ballybeg Drive)
- No Right Turn out of the development due to queuing lanes from signal junction
- Proposed access located over 100m from the existing signalised junction
- The standards contained in the Transport Infrastructure Ireland (TII) document Geometric Design of Junctions DN-GEO-03060 June 2017
- The independent DMURS Quality Audit including Road Safety Audit (see Section 3.6).

Figure 3.2 - Preliminary Design of Proposed Site Access (extract from MORCE Drawing P859)



3.3 Sightlines and Visibility

The proposed site access junction and proposed raised pedestrian/cycle crossing on Lacken Road both achieve in excess of the required DMURS sightlines. As shown below the required 45m DMURS visibility sightlines are available for drivers emerging from (Sightlines) and on the approach to the proposed site access (Stopping Sight Distance - SSD) and raised crossing. Visibility requirements are based on the 50 km/h current speed limit of the road and take into account Table 4.2 of the Department of Transport document 'Design Manual for Urban Roads and Streets' DMURS shown below.

SSD STANDARDS

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

Forward Visibility

Design Speed (km/h)	SSD Standard (metres)
10	8
20	15
30	24
40	36
50	49
60	65

Forward Visibility on Bus Routes

Table 4.2: Reduced SSD standards for application within cities towns and villages. Reduced forward visibility increases driver caution and reduces vehicle speeds.

3.4 Vehicle Movement and Turning Analysis

A vehicle swept path assessment was undertaken during the internal road layout and junction design process to ensure that multiple vehicle types including emergency, service and refuse/delivery vehicles can access, egress, and safely negotiate the internal road layout. Suitably sized turning heads have been provided where required. Please refer to MORCE Drawing P859 for swept path analysis

3.5 Proposed Parking Provision

As shown on the site layout plans, the proposed parking provision takes into account the car and cycle parking requirements laid down in Table 7.1 and 7.2 of the WCCC Development Plan.

As shown in Table 3.2 below, although there is a specific *cycle* parking requirement for Student Accommodation in the Development Plan (Table 7.2), there is no specific *car* parking requirement for Student Accommodation contained in the development plan (Table 7.1). It was assumed that the development car parking provision of 62 spaces take into account a compromise between both general Apartment parking standards and Hostel parking standards shown below:

- Apartments require between 0-1 car spaces per apartment for residents depending on location. A compromise rate of 0.5 spaces per apartment was assumed = 42.5
- Apartments require 1 space per 4 apartments for visitors = 21.25
- Total required: 63.75 or 64 spaces
- Hostel Parking Standards require 1 car space per 8 beds = 72.75 or 73 spaces

It was assumed that the proposed retail unit would generate no 'new' parking demand as trips to and from the unit would be either internally generated (i.e. students / residents) or pass-by trips (walking).

Table 3.2 – *Parking Requirements and Provision*

Land-use	GFA / Units	Parking Standard	Requirement	Provision
Student Accommodation	85 Apartments	See above	64	62
Including				
EV parking		1/5 spaces	13	13
Disabled Parking		5%	3	3
Cycle Parking (Short Stay)	582 beds	1 per 5 bedrooms	117	117
Cycle Parking (Long Stay)		1 per 2 beds	291	291

3.6 Quality Audit including Road Safety Audit

An independent DMURS compliant Quality Audit (QA) report of the proposed site layout was undertaken by a TII approved independent audit team and is contained in Appendix B.

The Quality Audit Report combines the following DMURS audit elements into one single report.

1. Road Safety Audit
    - undertaken to formal TII standards and signed off by both designer and audit team
2. Access Audit
3. Walking Audit
4. Non-Motorised User Audit
5. Cycle Audit

The recommendations made by both the Road Safety Audit and Quality Audit report have been reviewed and accepted in full by the design team and these recommendations have been addressed and incorporated into the final site layout drawings submitted for planning.

3.7 Walking and Cycle Accessibility

The site is ideally located in terms of potential connectivity, permeability and accessibility to the university and city centre on foot or cycling or by public transport.

The sites ideal proximity and accessibility to the university, city centre and other key local attractors including retail, public transport and more will ensure that walking is the key mode of travel for residents. High quality toucan crossings (i.e. supper crossing) is planned on the R680 Cork Rd to cater for the pedestrian and cyclists desire line and demand between the subject site and university campus.

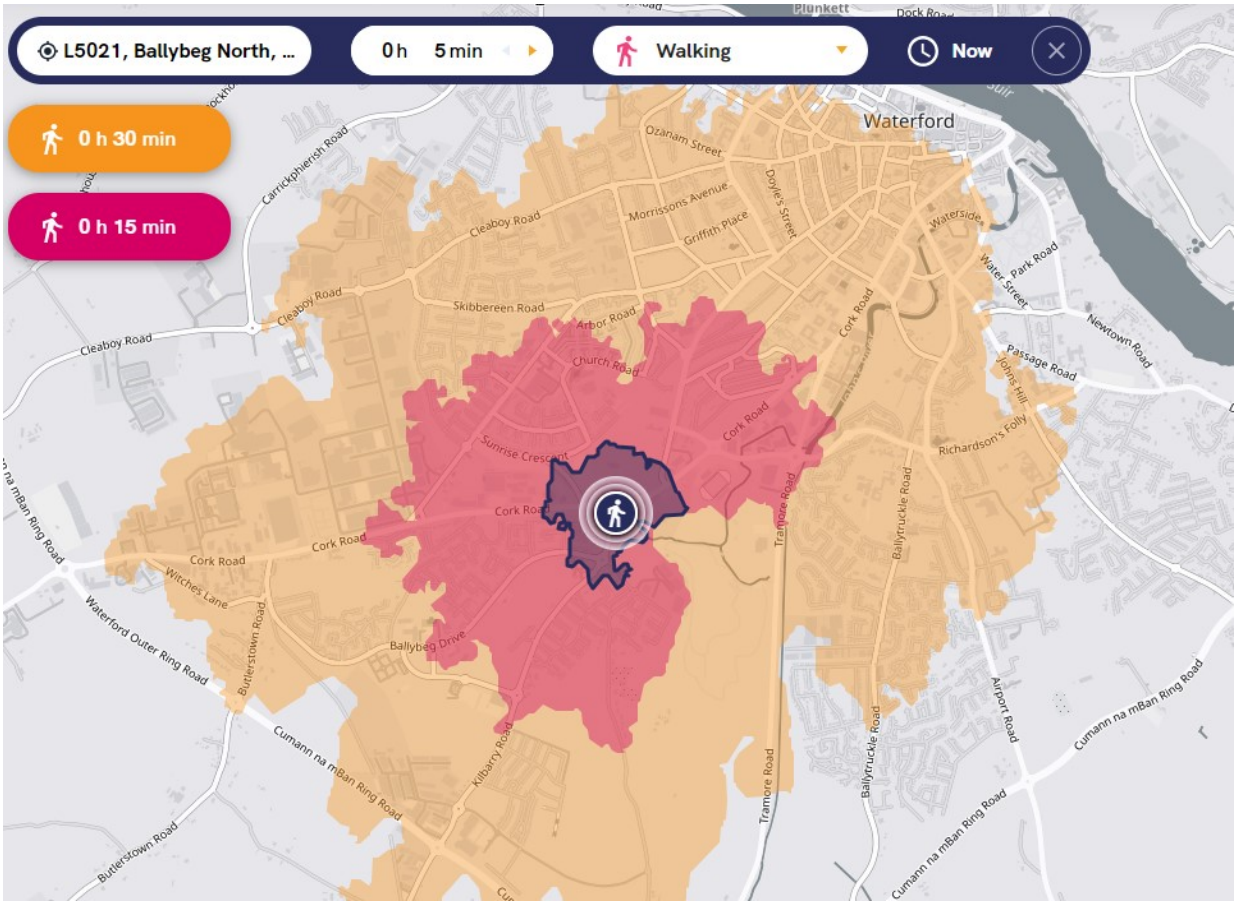
Typical walk times are outlined on Table 3.3 and Figure 3.3 shows a isochrones diagram illustrating how far the average Adult (3.1mph/5km/h) can walk in 15, 25 and 55 minutes from the site.

Table 3.3 – *Average Walk Times and Distances*

Walking Time	Avg. Distance (Child)	Avg. Distance (Adult)	Avg. Distance (Commuter)
	4.3 km/h or 1.21m/s	5km/h or 1.39m/s	6km/h or 1.65m/s
5 minutes	363m	417m	495m
10 minutes	726m	834m	990m
20 minutes	1,452m (1.45km)	1,668m (1.67km)	1,980m (1.98km)

The potential of walking as the main mode of travel is highly likely considering the development type and site location and further potential accessibility improvements as part of nearby planned Local Authority Active Travel measures.

Figure 3.3 *Approx. Walking Time Isochrones Diagram from proposed site*



3.8 Cycling

Similar to walking, the proposed site is located within easy and acceptable cycling distance of the university campus, city centre, local shops, amenities, the Waterford Greenway and more.

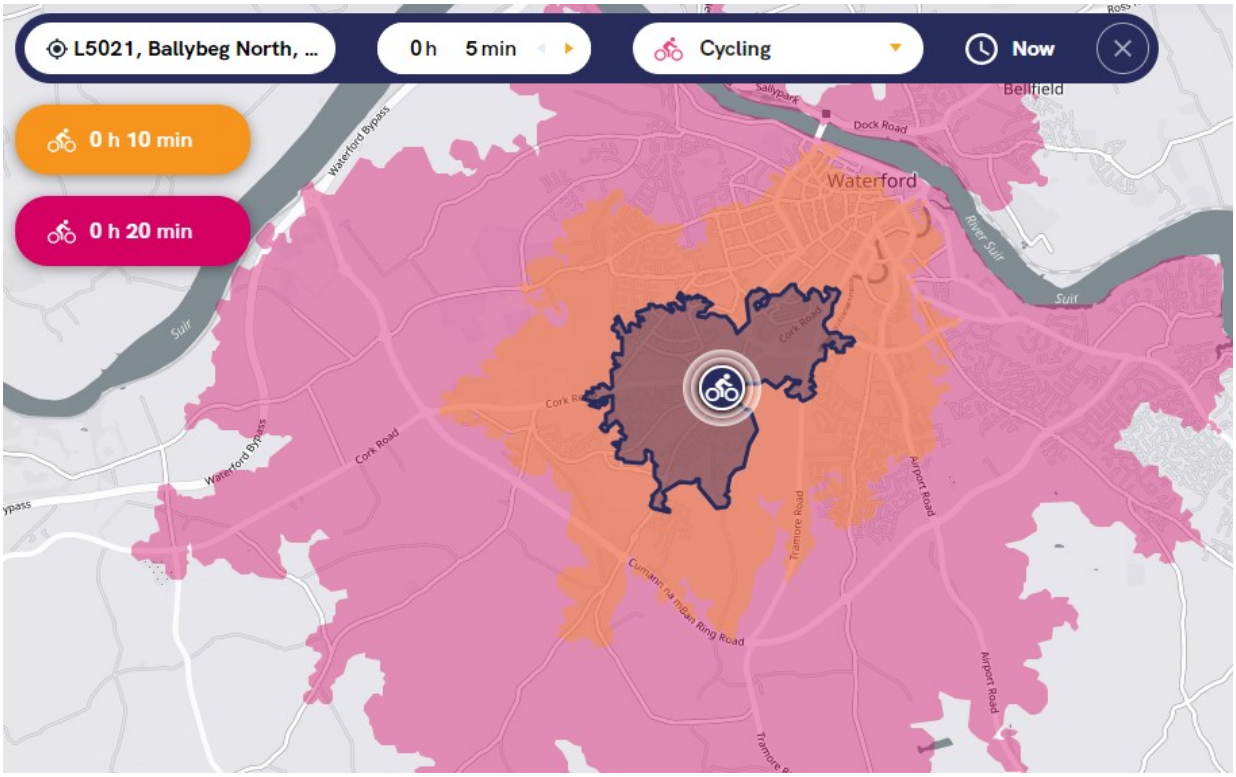
Typical cycling times are outlined below in Table 3.4 based on typical cycle speeds for school children (<14yrs is 8.5mph, 13.7 km/h or 3.8m per second), for adults (14yrs+ is 10mph,16.1km/h or 4.47m per second) and for commuting cycling speed (15mph, 24km/h or 6.7m per second).

Table 3.4 – *Average Cycle Times and Distances*

Cycle Time	Avg. Distance (Child)	Avg. Distance (Adult)	Avg. Distance (Commuter)
5 minutes	1,140m (1.14km)	1,341m (1.34km)	2,010m (2.01km)
10 minutes	2,280m (2.28km)	2,682m (2.68km)	4,020m (4.02km)
20 minutes	4,560m (4.56km)	5,364m (5.36km)	8,040m (8.04km)
30 minutes	6,840m (6.84km)	8,046m (8.05km)	12,060m (12.06km)

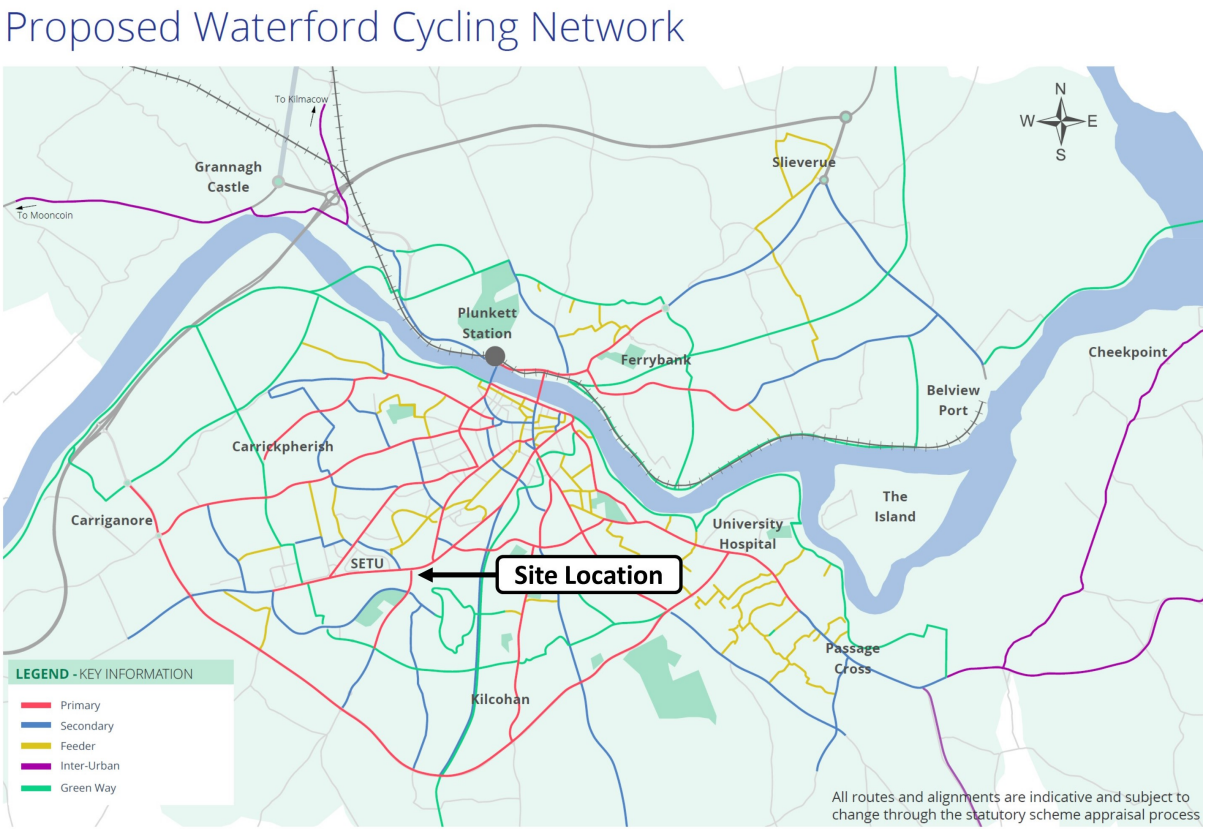
An isochrones diagram showing how far the average Adult (10mph/16km/h) can cycle in 5 and 10 minutes is illustrated in Figure 3.4. This diagram illustrates the majority of the city is within a 10 minute cycle of the proposed development site.

Figure 3.4 *Approx. Cycle Travel Time Isochrones Diagram from proposed site*



As shown in Figure 3.5, the proposed site is also ideally located on the proposed Primary Cycle routes contained on the 'Proposed Waterford Cycle Network' contained in the Waterford Metropolitan Area Transport Strategy report.

Figure 3.5 – *Proposed Waterford Cycle Network*



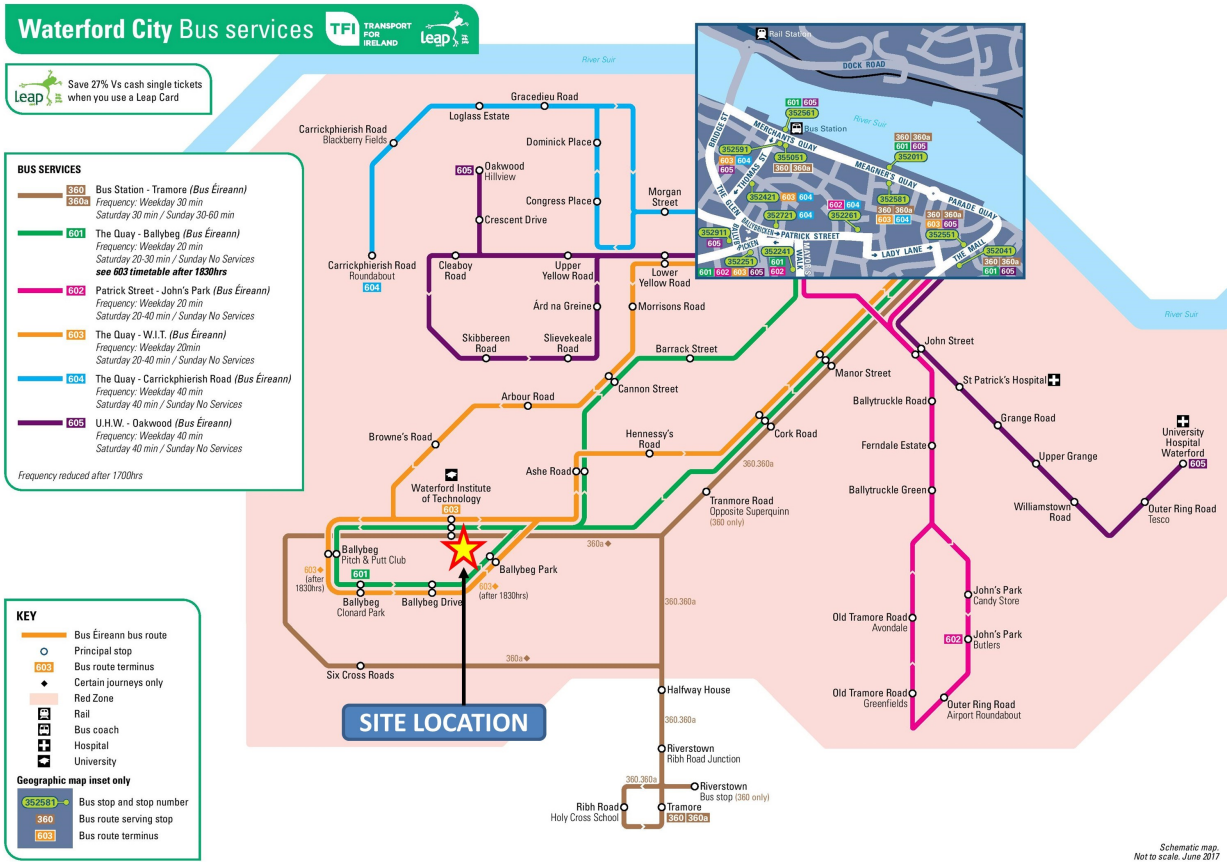
3.9 Public Transport

The proposed site and university are well served by Public Transport and this will improve further still with the major bus priority improvements planned as part of Active Travel measures proposed by the Local Authority and more. Key nearby Bus Stops on the R680 Cork Rd (<2mins walk) including the following services/routes: 354, 355, 360A, 367A, 370, 600, 609, 736, W1, W2

Waterford city is served by a number of public transport services including:

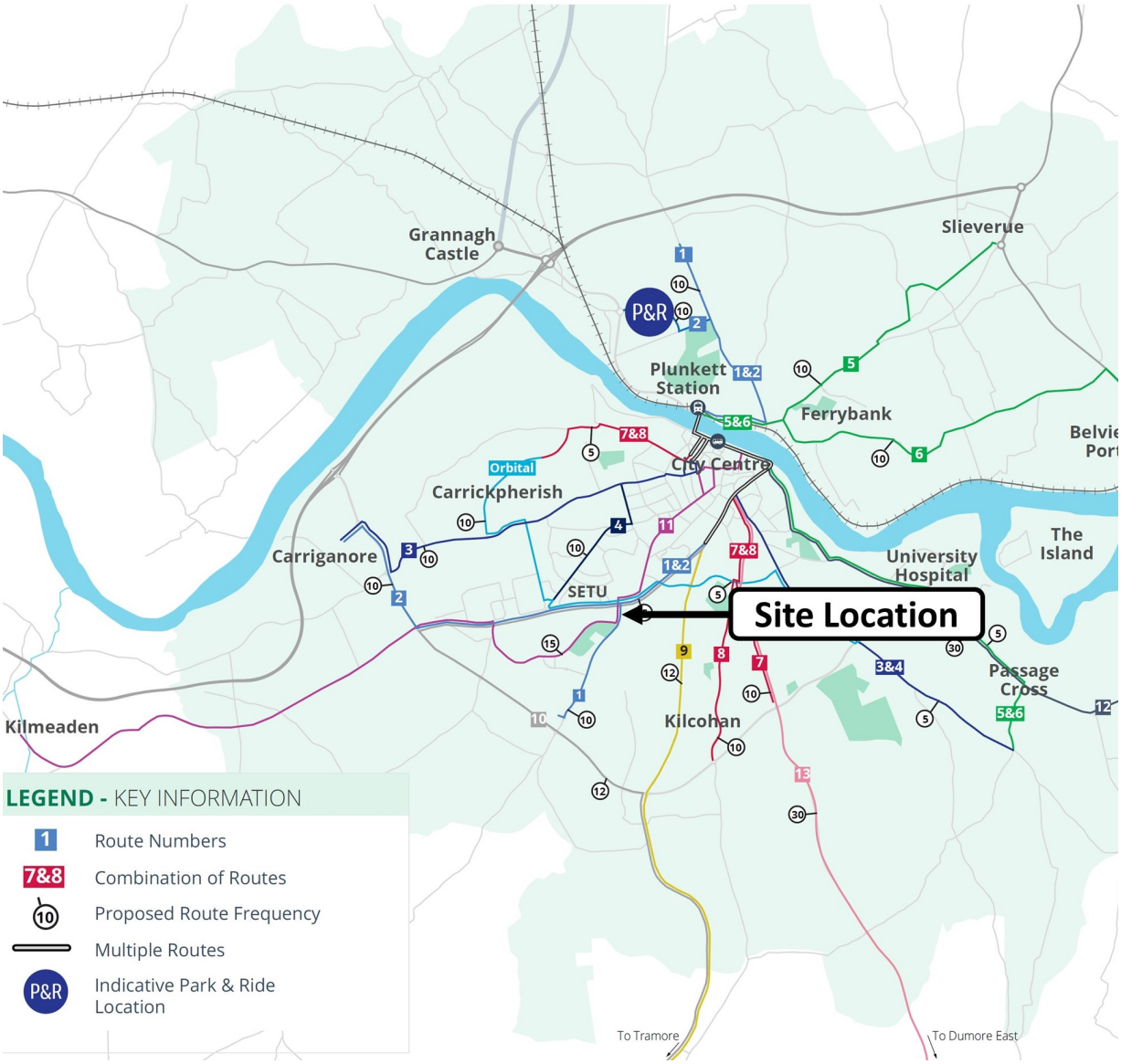
- Bus Services - Bus Éireann Route 40 Cork-Waterford: 9 services/day on the half hour
- Bus Services - Bus Éireann Route 55 Limerick to Waterford – 9 services/day on the half hour
- Bus Services - Bus Éireann Route 355 Cahir to Waterford – 7 service per day on the hour
- Other Local City Services (see Figure 3.5 below)
    - W1 The Clock Tower – Merchants Quay (via WIT) (Bus Éireann)
    - W2 The Clock Tower – Meagher's Quay (via WIT) (Bus Éireann)
    - W3 The Clock Tower – Meagher's Quay (via St. Johns Park) (Bus Éireann)
    - W4 Peter Street – Browne's Road (Bus Éireann)
    - W5 Waterford Hospital – Oakwood (Bus Éireann)
    - 360 / 360a Waterford – Tramore (Bus Éireann)
- Train Services - 4no. services per day on Waterford to Limerick Junction & connecting services

Figure 3.6 *Waterford City Bus Services*



As shown in Figure 3.7, the proposed site is also ideally located on key bus priority routes shown on the 'Proposed 2040 Bus Network' contained in the Waterford Metropolitan Area Transport Strategy report.

Figure 3.5 – *Proposed 2040 Bus Network*



4 Traffic Impact

4.1 Traffic Impact Assessment

This section of the report assesses the traffic impact of the proposed development on the local road network and nearby junctions including the proposed new development access on Ballybeg Drive.

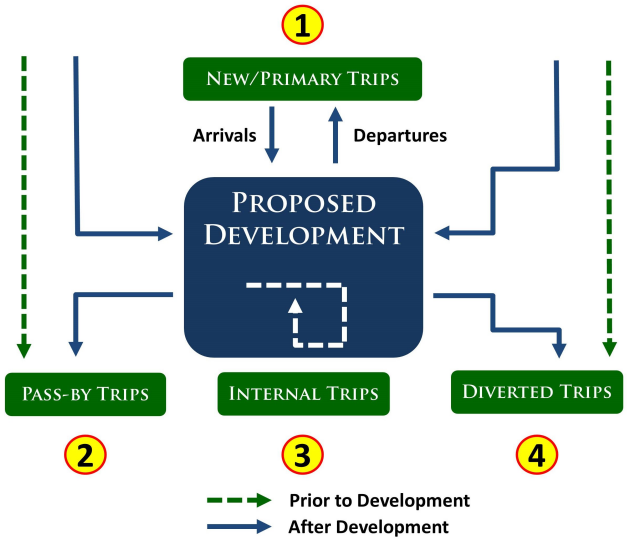
4.2 Development Traffic Generation

Estimated development traffic shown in Tables 4.1a to 4.1b below was calculated using the industry standard TRICS trip rate database and the proposed development schedule in Table 3.1. The TRICS database contains a wide sample of traffic surveys from various types of development throughout the Ireland and the UK. The total number of estimated multi-modal trips (i.e. incl. walk, cycle, car, public transport, etc) is shown in Table 4.1a.

Table 4.1a – Estimated Development Traffic: *Student Accommodation – ALL trips / ALL Modes of Transport*

Accommodation	Arrivals		Departures	
Units: 582 Beds	Trip Rate	No. of Trips	Trip Rate	No. of Trips
Time	Per Bed	All travel modes	Per Bed	All travel modes
08:00-09:00	0.018	10	0.206	120
17:00-18:00	0.181	105	0.093	54

It was assumed that the proposed retail unit would generate no 'new' parking demand during peak hour, as trips to and from the unit would be either internally generated (i.e. students / residents) or pass-by trips (walking). See illustration of various trip types below.



Using CSO travel mode statistics for similar student accommodation developments outlined in Section 2.7, the estimated peak hour private car trips only (2.3% of all daily trips generated) are shown in Table 4.1b below.

Table 4.1b – Estimated Development Traffic: *Student Accommodation – New Private CAR trips only*

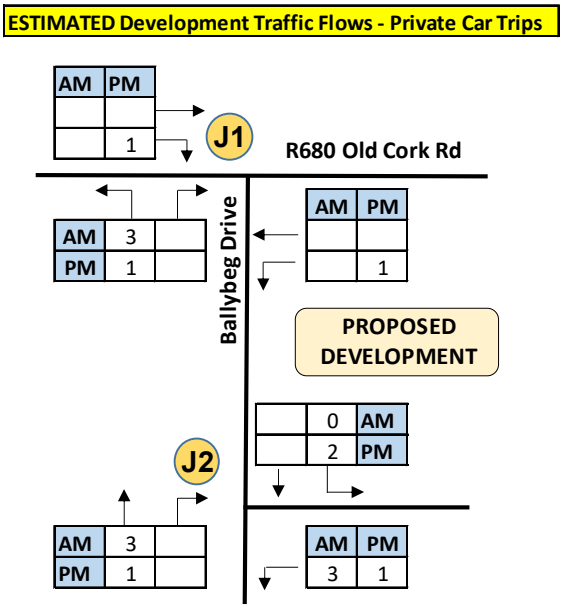
Mode of Travel	Arrivals	Departures
Car Driver: 2.3%	No. of Trips by private car	No. of Trips by private car
08:00-09:00	0	3
17:00-18:00	2	1

Full details of the TRICS trip rates used are contained in Appendix C.

4.3 Trip Assignment and Distribution

As shown in Figure 4.1, the assumed assignment and distribution of estimated private car development traffic (see Table 4.1a) onto the local road network was based on the existing traffic survey patterns and other factors such as access to local road network, to the university campus, the city and more.

***Figure 4.1** – Estimated Development Traffic Flows (Private Car Trips Only)*

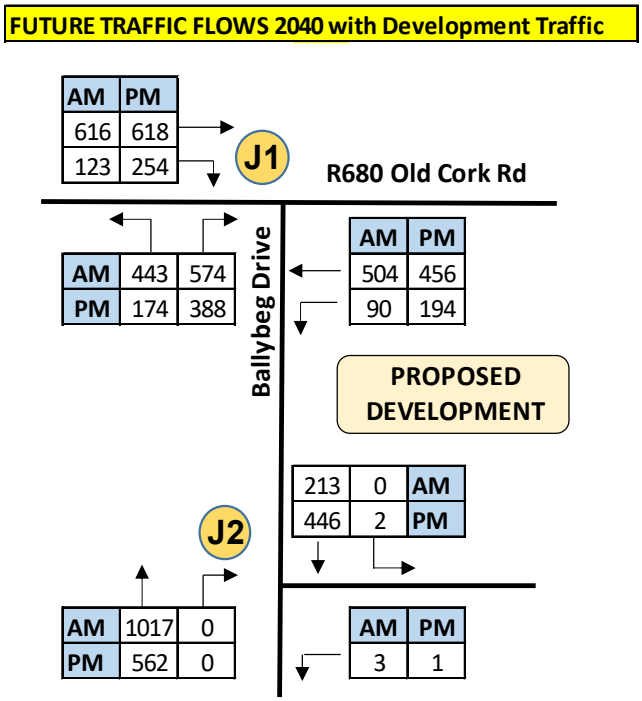


4.4 Estimated Future Traffic Flows and Assessment Years

The future 2040 traffic flows **'with'** development traffic are shown in Figure 4.2 and combine the following:

1. Figure 2.12 - Future 2040 Traffic Flows 'without' Development Traffic
2. Figure 4.1 - Estimated Development Traffic Flows

***Figure 4.2** – 2040 Future Year 'with' Development Traffic (private car trips)*



4.5 TII Traffic Impact Threshold

Comparing the traffic data from Figure 4.1 and 4.2, the estimated traffic (private car trips) from the proposed development represents only approximately 0.13% of AM peak and 0.14% of the existing PM peak hour traffic flows through the nearby signalised junction and therefore will have negligible (near zero) impact on the operation of the R680 Cork Road / Ballybeg Drive signal junction and Ballybeg Drive itself.

The estimated development traffic therefore does not formally meet the 5-10% threshold for the requirement of a formal Traffic and Transport Assessment (TTA) Report as per of the TII Traffic and Transportation Guidelines document (para 2.1). If required, the R680 Cork Road / Ballybeg Drive signal junction can also be analysed by request.

4.6 Junction Capacity Analysis – Site Access

Junction capacity analysis used the Transport Research Laboratory's (TRL) computer programme PICADY for uncontrolled priority junctions. A ratio of flow to capacity (RFC) above a threshold value of 85% (0.85) are considered above capacity, where queuing and delay issues would begin to occur.

4.7 Proposed Development Access

Using the 2040 'with' development traffic flows in Figure 4.2, the proposed development access junction was analysed with the capacity results shown in Table 4.2. Considering 'Right Turn Out' from the development to Ballybeg Drive is not possible and minimal/negligible 'Right Turn In' traffic flows are expected from Ballybeg Drive to the development access and no junction capacity issues are expected.

Table 4.2 - *Proposed Development Access Capacity Analysis – 2040 'with' Development Traffic*

Development Access on Ballybeg Drive	**AM Peak Hour**	
	Capacity RFC	**Vehicle Que (veh)**
Left onto Ballybeg Drive from Development	0.006 (1%)	0.0 (0 veh)
Straight/Right from Ballybeg Drive into Development	0.000 (0%)	0.0 (0 veh)
	PM Peak Hour	
Left onto Ballybeg Drive from Development	0.002 (0%)	0.0 (0 veh)
Straight/Right from Ballybeg Drive into Development	0.000 (0%)	0.0 (0 veh)

As expected, the capacity results in Table 4.2 clearly demonstrates that the proposed development access junction will operate well below capacity and in an efficient manner due to the extremely low predicted development traffic flows (private car trips). Any priority 'STOP' controlled junction that operates below the maximum allowable capacity of 85% or 0.85 is considered acceptable. The full capacity analysis PICADY output files for the above results are available on request.

4.8 Existing Signalised Junction of R680 Cork Rd and Ballybeg Drive

Taking into account key modelling characteristics of the existing signal junction in Section 2.4 and the Using the traffic flows in Figure 2.12 (without development traffic) and Figure 4.2 (with development traffic), the capacity analysis of the existing signalised junction was undertaken using the Transport Research Laboratory's (TRL) computer programme OSCADY for signalised junctions. A ratio of flow to capacity (RFC) above a threshold value of 90% (0.90) is considered above capacity, where queuing and delay issues would begin to occur. However, a signalised junction operating as close to 90% is at its most efficient with minimal delay for both pedestrians/cyclists crossing phases and also vehicles. The capacity results are shown in Table 4.3.

Table 4.3 – *R680 Cork Rd / Ballybeg Dr Signal Junction Capacity Analysis – 2040 Traffic Flows*

2040 Future Design Year Flows	Without Development		With Development	
90 Second Cycle Time	**Capacity RFC**	**Max Queue Veh (metres)**	**Capacity RFC**	**Max Queue Veh (metres)**
AM Peak Hour				
Arm A: Cork Rd. East-Straight/Left	0.859 (86%)	12.8 (77m)	0.859 (86%)	12.8 (77m)
Arm B: Ballybeg Dr. - Left Turn	0.592 (59%)	6.7 (40m)	0.596 (60%)	6.7 (40m)
Arm B: Ballybeg Dr. - Right Turn	0.869 (87%)	13.0 (78m)	0.869 (87%)	13.0 (78m)
Arm C: Cork Rd. West - Straight	0.647 (65%)	9.1 (55m)	0.647 (65%)	9.1 (55m)
Arm C: Cork Rd. West – Right turn	0.617 (62%)	2.3 (14m)	0.617 (62%)	2.3 (14m)
PM Peak Hour				
Arm A: Cork Rd. East-Straight/Left	0.770 (77%)	9.6 (58m)	0.769 (77%)	9.6 (58m)
Arm B: Ballybeg Dr. - Left Turn	0.296 (30%)	2.8 (17m)	0.298 (30%)	2.8 (17m)
Arm B: Ballybeg Dr. - Right Turn	0.836 (84%)	9.6 (58m)	0.836 (84%)	9.6 (58m)
Arm C: Cork Rd. West - Straight	0.538 (54%)	6.2 (37m)	0.538 (54%)	6.2 (37m)
Arm C: Cork Rd. West – Right turn	0.807 (81%)	4.3 (26m)	0.809 (81%)	4.3 (26m)

- Capacity results above clearly show the existing signal junction operates below capacity (90%) with or without the proposed development traffic. The maximum vehicles queues are fully dispersed during each signal cycle (i.e. green light).
- The capacity results shown above clearly demonstrate that the predicted development traffic flows have negligible impact on the operation of the existing signalised junction.
- For maximum queue length estimations, 1no. vehicle was assumed to be a conservative 6.0m in length, which includes distance between vehicles in a rolling queue (i.e. during green light).
- The location of the proposed site access junction on Ballybeg Drive is over 100m from the Cork Road and therefore does not impact on the above absolute maximum predicted peak hour queuing on Ballybeg Dr. of 13no. vehicles or 78m in length.

4.9 Construction Phase

The applicant will provide a contractors compound within the site boundaries to accommodate all construction staff, parking, deliveries and safe vehicle turning within the site. Typically construction would commence a minimum of 1 month after grant of full planning permission and construction traffic levels are anticipated to be lower than those tested in Section 4.6 above. The following are a number of simple construction stage details:

- Construction vehicles will be covered during dry weather to prevent dust emissions;
- Wheel washers provided to ensure debris and mud are not taken onto the Local Road;
- Trained banksmen will marshal delivery vehicles within the site & access/exit.

5 Summary and Conclusion

This Traffic and Transport Assessment (TTA) report has been undertaken on behalf of the applicant, Noel Frisby Construction Ltd, to support the Large-Scale Residential Development (LRD) planning application for a proposed Student Village Development located between the R680 Cork Road and Ballybeg Drive Road, Waterford. The summary and conclusions of the report are as follows:

Proposed Development	Apartments	Bedrooms	GFA
Student Accommodation	85	582	
Retail Unit			139.75m^2

Using TRICS, the estimated total trips to and from the development by all modes of transport include:

Accommodation	Arrivals		Departures	
Units: 582 Beds	**Trip Rate**	**No. of Trips**	**Trip Rate**	**No. of Trips**
Time	**Per Bed**	**All travel modes**	**Per Bed**	**All travel modes**
08:00-09:00	0.018	10	0.206	120
17:00-18:00	0.181	105	0.093	54

Of these, the estimated trips by private car to and from the development are negligible and include:

Mode of Travel	Arrivals	Departures
Car Driver: 2.3%	**No. of Trips by private car**	**No. of Trips by private car**
08:00-09:00	0	3
17:00-18:00	2	1

- The development has been designed taking into account DMURS principles of safety, accessibility and sustainability to allow safe access, movement and parking throughout the site.
- An independent DMURS compliant Quality Audit (QA) including Road Safety Audit was undertaken by a TII approved audit team, the recommendations of which have been accepted and have been fully incorporated into the final site layout drawings submitted for planning.
- As agreed with the Local Authority roads department, access to the development will be via a proposed 'Left out only' priority 'T' junction on Ballybeg Drive road.
- The estimated development traffic (private car trips) does not formally meet the 5-10% threshold for the requirement of a Traffic and Transport Assessment (TTA) Report as per of the TII guidelines.
- The capacity analysis results using PICADY clearly demonstrate that the proposed access junction will operate significantly below maximum capacity (<0.85 or 85%) for the future Design Year 2040 with negligible 'zero' queuing or delay predicted.
- The capacity analysis results using OSCADY clearly demonstrate that the development will have negligible (near zero) impact on the continued operation of the existing R680 Cork Road / Ballybeg Drive signal junction under capacity. The estimated development car traffic represents only approx. 0.13% of AM peak and 0.14% of the PM peak hour traffic flows through the signalised junction.

Overall Conclusion: It is considered that on the basis of the above, the application, in terms of roads, traffic and junction capacity, would operate in a safe and efficient manner, with minimal impact on other road users and on the capacity of local road network well into the future.

Appendix A – Proposed Site Layout Drawings

Please refer to all original scale drawings submitted as part of the overall planning application.

Appendix B – DMURS Quality Audit including Road Safety Audit

Coakley Consulting Engineers

Proposed Student Accommodation, Ballybeg Drive, Co. Waterford

Quality Audit

P·M·C·E

October 2023

Coakley Consulting Engineers

Proposed Student Accommodation, Ballybeg Drive, Co. Waterford

Quality Audit

Document Ref:	P23106-PMCE-XX-XX-RP-QA-GEN-3_ZZ_01

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2.0	AP	TAG	TAG	5th Oct. 2023	Final
1.0	AP	TAG	TAG	15th August 2023	Draft Report

P·M·C·E

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1 Quality Audit Report

1.1 Introduction

This report was prepared in response to a request from Mr Brian Coakley of Coakley Consulting Engineers to provide a Quality Audit of the proposed student accommodation at Ballybeg Drive, Co. Waterford.

The Quality Audit considers the following elements:

- Access Audit (Appendix I)
- Walking Audit (Appendix II)
- Non-Motorised User Audit (Appendix III)
- Cycle Audit (Appendix IV)
- Road Safety Audit (Appendix V)

The Quality Audit followed a site visit on the 9th August 2023. At the time of the site visit the weather was dry, the ground surface was dry and traffic volumes in the vicinity of the site were low.

The different audits included in the appendices to this report address the implications for the different types of non-motorised road users of the proposed development.

The Access (Accessibility) & Walking Audits assess potential usability/accessibility for pedestrians and, in particular, people with sensory or intellectual disabilities. The Cycle Audit predominantly focusses on cycle use, whilst the Road Safety Audit identifies potential safety implications of the scheme.

1.2 Project Objectives

The Project Objective is the provision of a new student accommodation building on Ballybeg Drive, Co. Waterford.

1.3 Description of Proposed Development

It is proposed to construct a new student accommodation building in an urban area on Ballybeg Drive, Co. Waterford. The site is bound to the west by Ballybeg Drive, to the north by Cork Road and to the south and east by Lacken Road. Minimal development (student) trips by private car are expected due to the nature of the development (i.e. student accommodation) and the site's proximity to the university campus across the Cork Road.

The proposed works include the following:

- The construction of two 5-storey blocks, one 4-storey block and one 6-storey block
- Provision of a public realm plaza to the north and widening of Cork Road
- Provision of a secondary substation, boundary, and internal courtyard landscaping.
- Provision of a vehicular access point from Ballybeg Drive via a left-in left-out junction.
- 62 car parking spaces at ground level, including three mobility impaired parking spaces.
- A set-down area which would be used by refuse vehicles when collecting rubbish. The set-down area would be located adjacent to the bin store.
- Seven two-level bicycle storage shelters located in the internal courtyard.
- Internal green link connecting Ballybeg Drive and Lacken Road.
- Upgrades to Lacken Road to provide cycle lanes on both sides and relocating the transition between the two-way and one-way sections of carriageway and the access to the Kilbarry Civic Amenity Site.

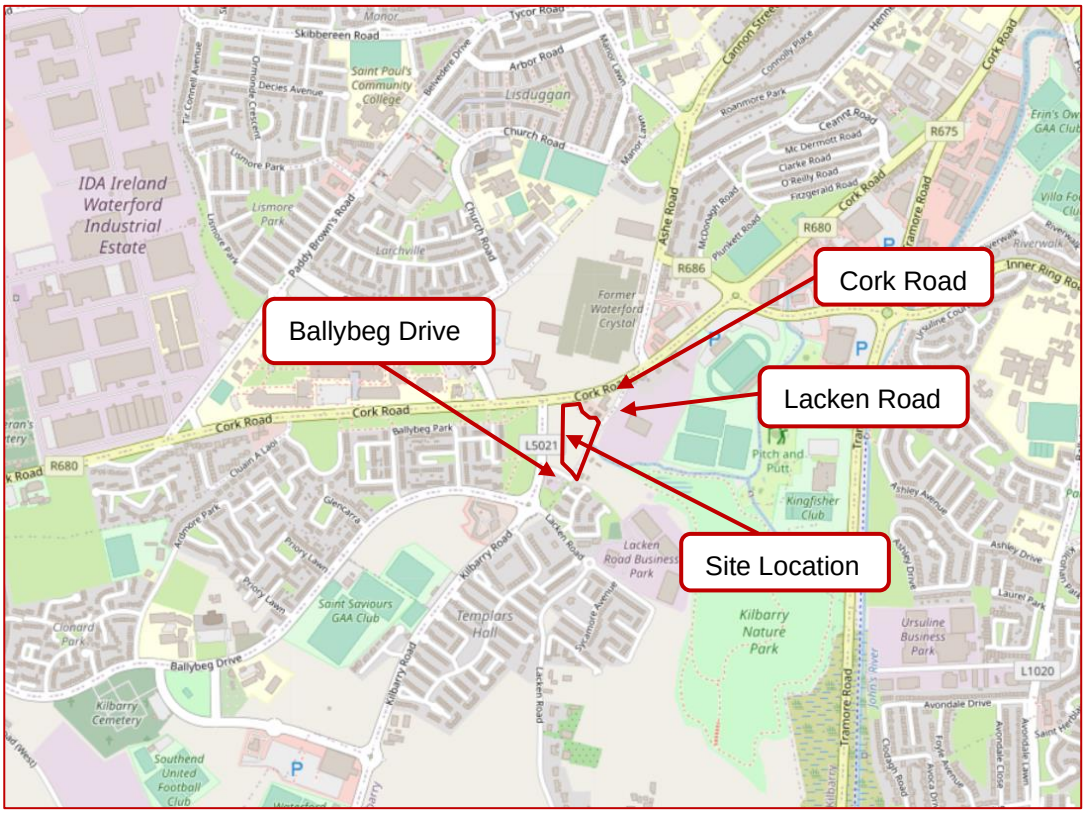


FIGURE 1.1: SITE LOCATION (SOURCE: WWW.OPENSTREETMAP.ORG)

A secured courtyard would be located in the centre of the accommodation blocks and this would be accessible by residents of the proposed student accommodation development only, and their guests. The courtyard would be accessed by pedestrians and cyclists through the primary access located in Block A, where a reception/security desk would be located. This would be accessed from the internal footpath network within the development's carpark and would then exit to the secure courtyard, to the rear of Block A, onto the 4m wide shared path surrounding the courtyard.

A fire tender access gate is located adjacent to the primary access to Block A however this would only be used during times of an emergency, or for access for maintenance vehicles to the ESB substation, and would remain locked at all other times.

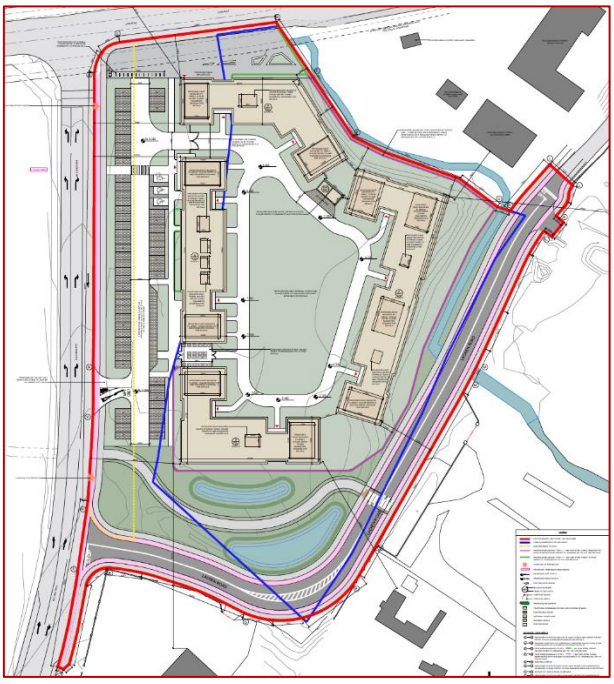


FIGURE 1.2: PROPOSED DEVELOPMENT

When collecting refuse from the proposed development a refuse truck will enter the development via the left-in left-out access junction, enter the set-down area adjacent to the bin store and then perform a turning manoeuvre within the turning head at the access adjacent to the locked fire tender access gate, and leave the development via the left-in left-out access junction.

Similarly, during times of an emergency, a fire tender will enter the development via the left-in left-out access junction, enter the private courtyard via the fire tender access gate and traverse the 4m wide path around the courtyard before exiting via the left-in left-out access junction.

1.3.1 Existing Road Network

R680 (Cork Road)

The R680 Regional Road (Cork Road), is a two-way single carriageway road with footpaths on both sides. It runs in an east to west direction to the north of the proposed development. There are existing advisory cycle lanes provided on both sides of Cork Road. It is approximately 8.6m wide and provides access to Waterford City Centre, Waterford Business Park, and the IDA Ireland Industrial Estate. It has a junction with the Waterford Outer Ring Road (R710) at its western extents.

L5021 (Ballybeg Drive)

The L5021 Local Road (Ballybeg Drive) extends in a predominantly north to south direction and connects with Cork Road at a signalised junction to the northwest of the proposed student accommodation development. In the vicinity of the proposed development it consists of a three-lane carriageway approximately 10m wide with a posted speed limit of 50 kph. It has footpaths and public lighting on both sides.

Lacken Road

Lacken Road is located to the east and south of the development, and is accessed from Cork Road at its northern extent and Ballybeg Drive at its southwestern extent. It is a one-way single carriageway road for approximately 200m in a north-to-south direction from its junction with Cork road to the access to the Kilbarry Civic Amenity Site. To the south of this access, Lacken Road transitions to a two -way single carriageway as far as its junction with Ballybeg Drive. A footpath is provided on the northern side of Lacen Road within the two-way section for approximately 70m before terminating at the existing horizontal curve

1.3.2 Existing Pedestrian & Cyclist Facilities

At present there are footpaths on both sides of Cork Road, Ballybeg Drive, and Lacken Road. Cycle lanes also exist on Cork Road, but these do not extend onto surrounding roads.

1.4 Public Transport

There are existing bus stops on Cork Road and Ballybeg Drive, providing direct access to the local bus network, and Cork and Dublin Airport. The Ballybeg Park Stop is located immediately adjacent to, and southeast of, the proposed development (see Figure 1.3) and can be accessed within a 1-minute walk from the site entrance of the development access on Ballybeg Drive.

The nearest bus stops to the proposed development are listed on Table 1.1 including the bus routes which serve these bus stops, and Figure 1.3 indicates the location of these bus stops in relation to the proposed development.

TABLE 1.1: BUS ROUTES NEAR PROPOSED DEVELOPMENT

Bus Stop (Name)	Bus Stop (number)	Route No.	Proximity to the development	Travelling between
Ballybeg Park	352181 or 352101	W1	40m or 300m	The Clock Tower to Merchants Quay via SETU
		354		Portlaw to Dunmore East via Waterford
Old Crystal Factory	7640	W1	250m	The Clock Tower to Merchants Quay via SETU
		W2		The Clock Tower to Meaghers Quay via SETU
		354		Portlaw to Dunmore East via Waterford
SETU	352111 or 352501	40	500m	From Tralee to Rosslare via Cork and Waterford
		354		Portlaw to Dunmore East via Waterford
		360A		Waterford Bus Station to Tramore Bus Station
		362		Waterford Bus Station to Davitts Quay, Dungarvan
		367a		Davitts Quay, Dungarvan to Waterford Hospital
		600		Dublin, Arlington Hotel to Cork, Anderson's Quay
		736		Dublin Airport to Tramore Bus Station
		W1		The Clock Tower to Merchants Quay via SETU
		W2		The Clock Tower to Meaghers Quay via wit
IT Waterford		340	600m	Whitfield Clinic to Redmond Square

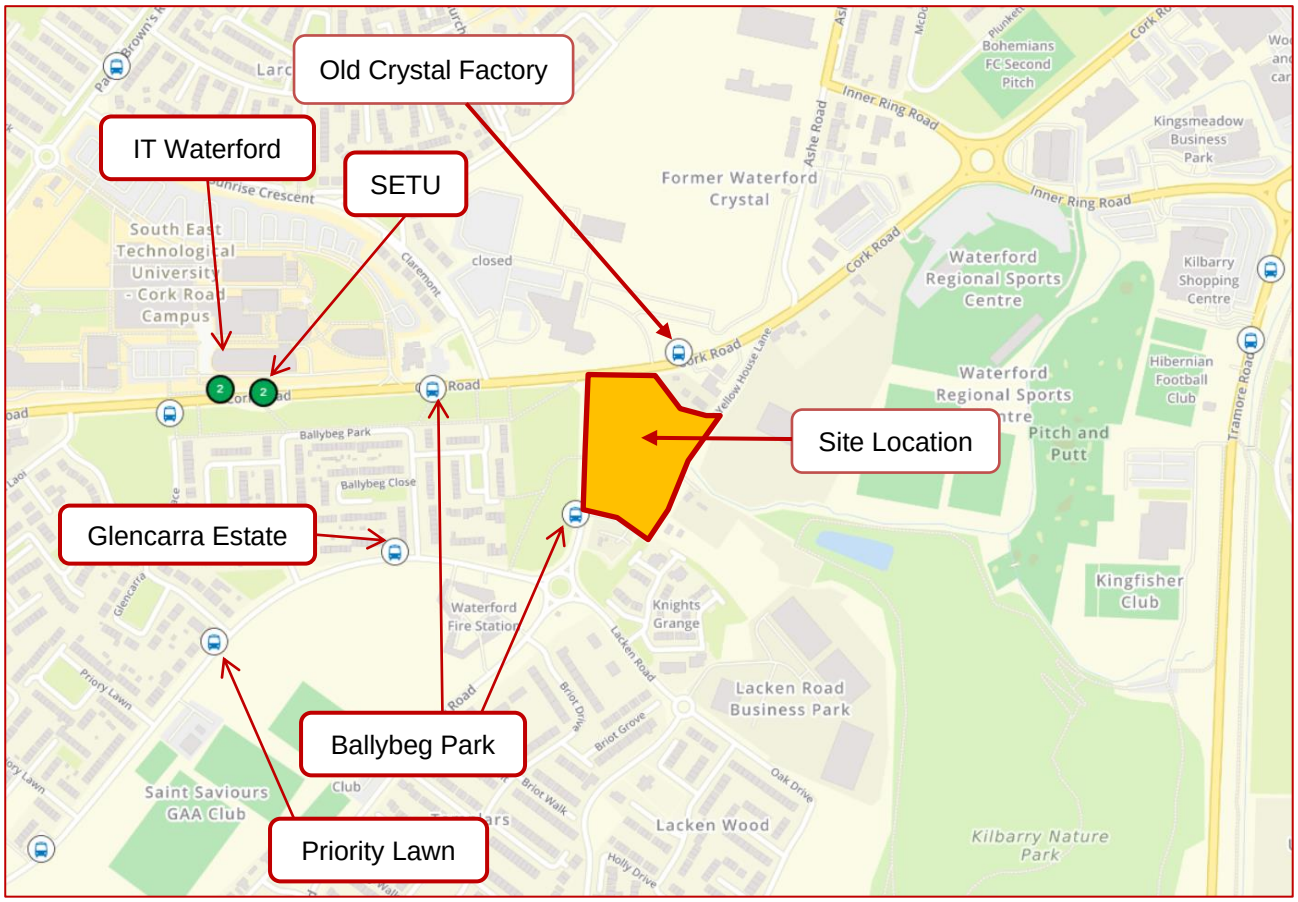


FIGURE 1.3: NEARBY BUS STOPS AND LUAS STOP (SOURCE: WWW.TRANSPORTFORIRELAND.IE)

In addition, the Waterford Train Station (Plunkett) is located to the northeast of the proposed development and can be accessed within a 15-minute cycle or approximately 25-min bus, which provides two routes (see Figure1.4) with direct train services to Dublin, Cork, Limerick.

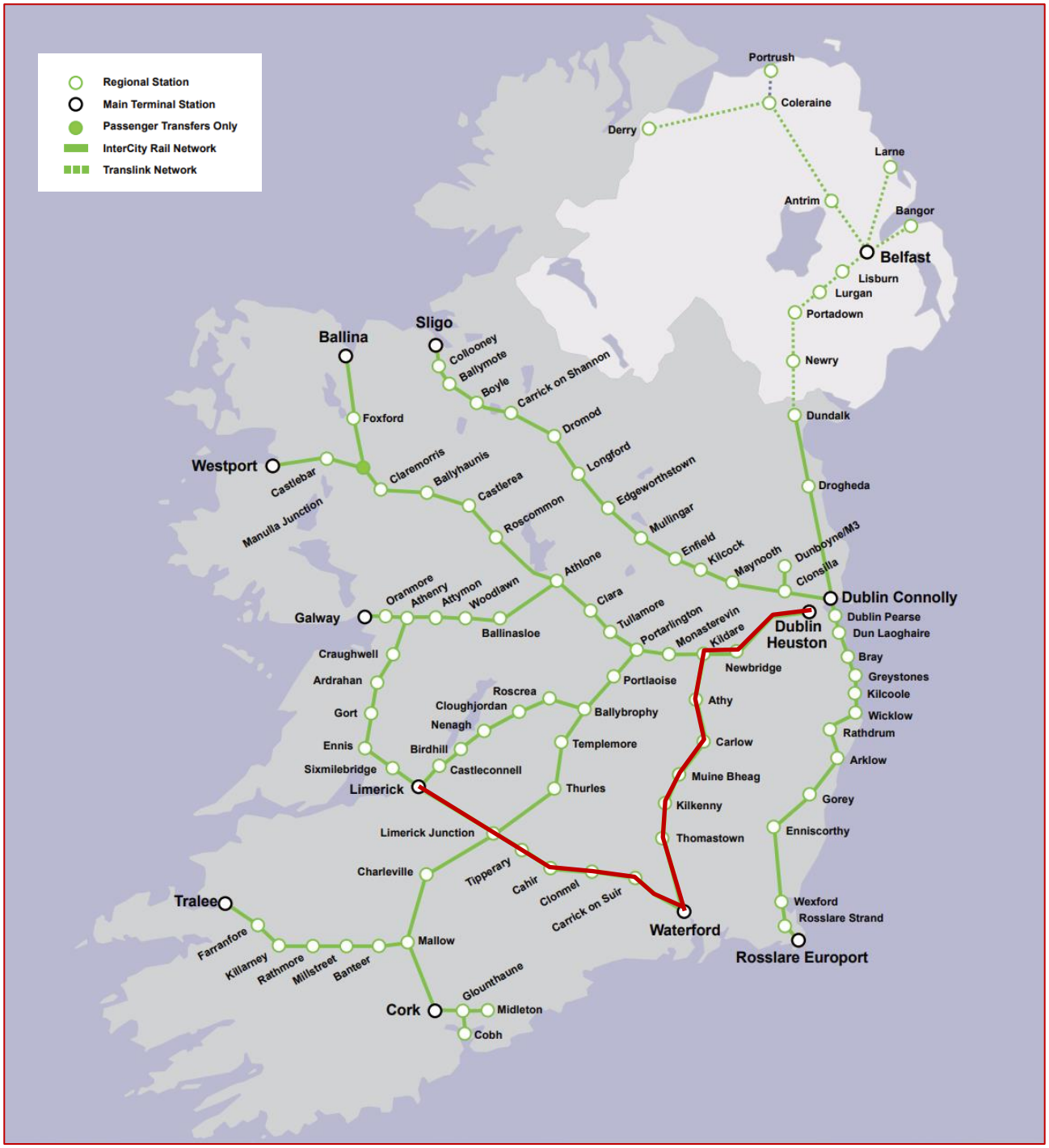


FIGURE 1.4: IRELAND INNER CITY AREA TRAIN SERVICES

1.5 Local Amenities

The proposed development is located in a densely populated residential area within the metropolitan area of Waterford. The area provides a wide range of amenities within walking distance of the proposed development including grocery shops, schools, sports facilities, restaurants, cafés, parks, and more.

1.6 Summary of Individual Audit Findings

The following table summarises the issues identified by the component audits of this Quality Audit, and the Design Team's response to the issues raised.

Item No.	Summary of Issue	Individual Audit References				Design Team Response/Action
		Access Audit	Walking Audit	Cycle Audit	Road Safety Audit	
1	Pedestrian Crossings	I.2.1			4.3, 4.4, 4.9	Accepted
2	Connectivity between the Internal Courtyard and the Development Carpark	I.2.2	II.2.2			Accepted
3	Connectivity to Kilbarry Nature Park	I.2.3	II.2.3			Accepted
4	Pedestrian Desire Lines	I.2.4	II.2.4		4.12, 4.13	Accepted
5	Footpath/Cycle Track Layout	I.2.5			4.2	Accepted
6	Mobility-Impaired Parking Spaces Facilities	I.2.6			5.3	Accepted
7	Mobility-Impaired Parking Spaces Dimensions	I.2.7			5.3	Accepted
8	Tactile Paving Colour	I.2.8			4.7	Accepted
9	Crossing Point Missing	I.2.9			4.7	Accepted
10	Inter-visibility between Road Users	I.2.10				Accepted
11	Overhanging trees/vegetation along the 'green link' path	I.2.11		IV.2.5		Accepted
12	Verge at Set-Down and Parking Spaces Area	I.2.12			4.5	Accepted
13	Lack of Edge Protection	I.2.13			4.14	Accepted
14	Carpark Crossing Details	I.2.14			4.4	Accepted
15	Layout of Pedestrian and Cycle Facilities at the Ballybeg Drive Crossing	I.2.15		IV.2.2		Accepted
16	Seating & Rest Areas		II.2.1			Accepted
17	Crossing Overshoot			IV.2.1		Accepted
18	Tie-in with Existing Facilities			IV.2.3	4.11	Accepted

Item No.	Summary of Issue	Individual Audit References				Design Team Response/Action
		Access Audit	Walking Audit	Cycle Audit	Road Safety Audit	
19	Cyclist Crossing Facilities to/from Bicycle Stand at Public Plaza			IV.2.4	4.1	Accepted
20	Bicycle Parking			IV.2.6		Accepted
21	Bicycle Stand Sizes			IV.2.9		Accepted
22	Bicycle Maintenance Areas			IV.2.10		Accepted
23	Transitions between the Footpath on Ballybeg Drive and Shared Surfaces				4.6	Accepted
24	Swept path analysis for a refuse truck and fire tender have not been provided.				4.8	Accepted
25	The proposed road layout at the transition between the two-way and one-way sections of Lacken Road may not be sufficient to advise northbound drivers of the restrictions at this location				4.10	Accepted
26	At this early stage in the design development, information regarding kerb types, drainage, public lighting and traffic signs have yet to be fully considered. These key design elements should be fully considered as part of the detailed design process, and included throughout the proposed development, as necessary, in the construction drawings.				5.1	Accepted
27	Electric Vehicle (EV) parking spaces have not been indicated within the proposed development and it is therefore unclear if these will be provided.				5.2	Accepted

Appendix I Access Audit

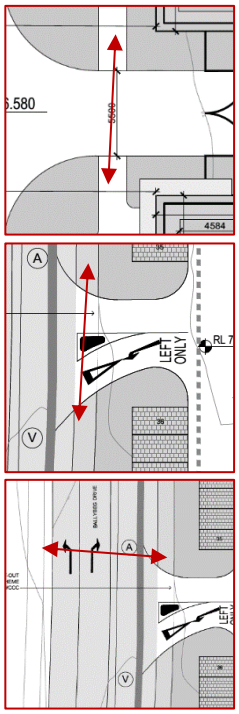
I.1 Introduction

The purpose of this Access Audit is to review the proposed Scheme, and the existing surrounding environment, to assess if it can be accessed, understood, and used to the greatest extent possible by all people regardless of their age, size, or disability. The Audit considers a number of aspects of the proposed Scheme, including wayfinding, lighting, tonal contrast of proposed materials, gradients, the provision of kerbs and/or dropped kerbs as appropriate, etc.

I.2 Access Audit Findings

I.2.1 Pedestrian Crossings

There are a number of locations within the proposed development where pedestrian crossings have not been indicated on likely pedestrian desire lines, these locations include:



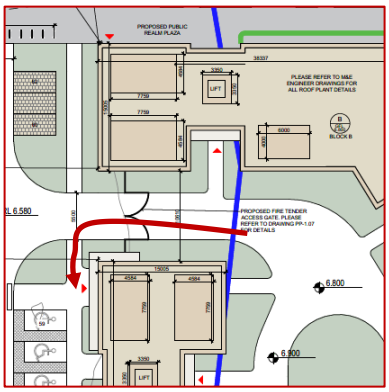
1. No pedestrian crossing has been indicated across the fire tender gated access.
2. No pedestrian crossing has been indicated across the development carpark access.
3. No pedestrian crossing has been indicated across Ballybeg Drive at the location of the vehicular access to the development carpark.

An absence of pedestrian crossings on likely pedestrian desire lines may lead to pedestrians crossing the road at locations where drivers may be less attentive to them, and may restrict mobility and visually impaired pedestrians from being able to independently navigate the local road network.

Recommendation

Pedestrian crossings, including dropped kerbs and appropriate tactile paving, which can accommodate the expected volume of pedestrians and cyclists, should be provided on likely pedestrian desire lines and where the footpath terminates at the edge of the carriageway.

I.2.2 Connectivity between the Internal Courtyard and the Development Carpark



It is unclear from the drawings provided how the pedestrian routes within the internal courtyard will connect to facilities at the location of the primary access.

Should no connectivity be provided, it may lead to pedestrians and cyclists travelling along the carriageway between the development's proposed internal courtyard and the carpark access road or the grass verge adjacent the gated access.

Recommendation

The likely pedestrian desire lines between the proposed development's internal courtyard and the pedestrian facilities at the primary access should be identified, and measures provided to cater for these desire lines safely.

I.2.3 Connectivity to Kilbarry Nature Park

The Kilbarry Nature Park to the southeast is likely to be an attractive destination for students in the student accommodation. However, it is not clear if direct pedestrian/cycle links will be provided between the southern and eastern extents of the development and this destination, or if this pedestrian desire line will be catered for in this, or a future development phase.

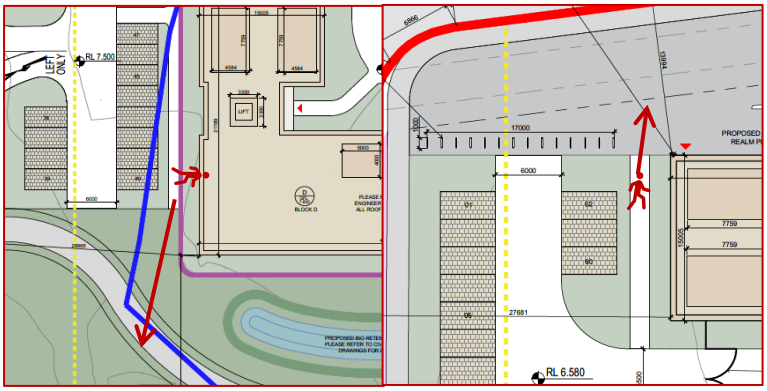
The absence of this direct route may discourage pedestrians from choosing walking as a regular form of travel, as the indirect route via the Cork Road, Inner Ring Road and Tramore Road may be considered too long.

Recommendation

Ensure a more direct route for pedestrians is provided to the Kilbarry Nature Park.

I.2.4 Pedestrian Desire Lines

The 'Green link' path runs along the southern side of the proposed student accommodation connecting the eastern footpath of Ballybeg Drive with the northern footpath of Lacken Road. The proximity of the development carpark to the green link may create a pedestrian desire line between these locations, however, no connection for pedestrians has been provided.



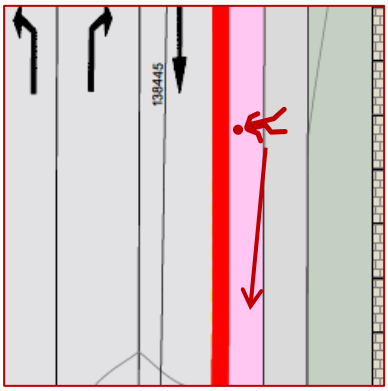
Similarly, a public plaza is indicated to the north of the development, however, no direct pedestrian link is provided between the development carpark and the plaza.

Recommendation

Measures should be provided to facilitate pedestrian movements along pedestrian desire lines.

I.2.5 Footpath/Cycle Track Layout

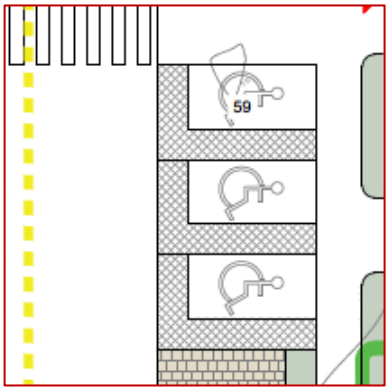
A cycle track and footpath has been indicated along both sides of Ballybeg Drive continuing to Lacken Road to the development extents. No information, however, has been provided in relation to the cross-section of the footpath/cycle track and it is, therefore, unclear if a level difference would be provided between the footpath and cycle track. The absence of a level difference may lead to visually-impaired pedestrians being insufficiently aware of the cycle track resulting in them inadvertently entering it, where there is an increased risk of being struck by a cyclist.



Recommendation

The footpath and cycle track should be vertically separated or appropriate tactile paving provided to advise visually-impaired pedestrians of the footpath/cycle track layout.

I.2.6 Mobility-Impaired Parking Spaces Facilities



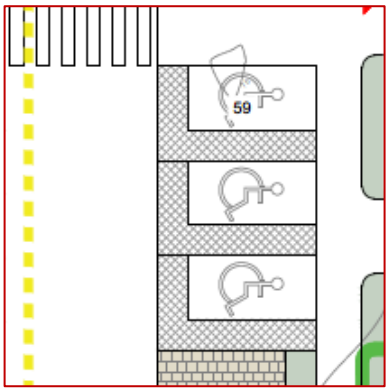
It is unclear if dropped kerbs would be provided adjacent to the mobility-impaired parking spaces indicated within the development carpark.

Should no dropped kerbs, and associated tactile paving, be provided this could lead to mobility-impaired vehicle occupants being unable to access the footpath resulting in them having to travel within the carriageway to a suitable access point.

Recommendation

Dropped kerbs, and associated tactile paving, should be provided adjacent to each mobility-impaired parking spaces.

I.2.7 Mobility-Impaired Parking Spaces Dimensions

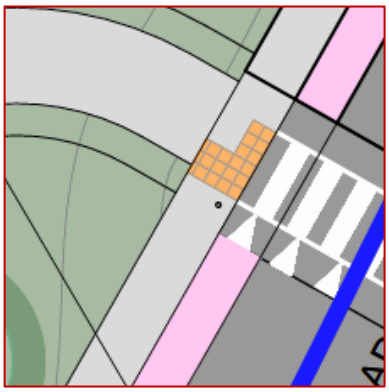


Parking space dimensions have not been provided at this early stage in the design process, so the width of parking spaces is unknown. However, the mobility parking spaces dimensions may be insufficient to accommodate mobility users getting in and out of their vehicles.

Recommendation

The width of mobility parking spaces should be compliant with the Traffic Signs Manual.

I.2.8 Tactile Paving Colour

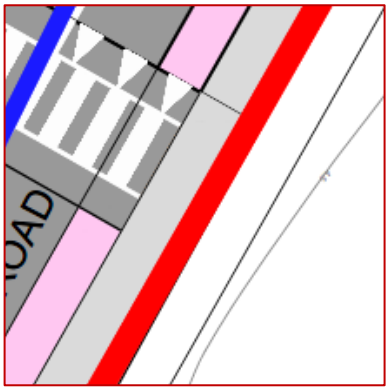


A ‘Zebra’ crossing is proposed across Lacken Road. The tactile paving on the western side of the crossing is not the required colour. This could lead to visually impaired pedestrians being insufficiently aware of the Zebra crossing.

Recommendation

Tactile paving at Zebra crossings (i.e. Controlled crossings) should be red in colour.

I.2.9 Crossing Point Missing

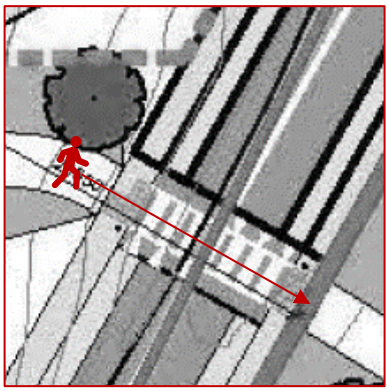


A crossing has been indicated across Lacken Road. However, dropped kerbs, and associated tactile paving, has not been indicated at the corresponding crossing point on the other side of Lacken Road.

Recommendation

Dropped kerbs, and associated tactile paving should be provided at the eastern side of the Zebra crossing across Lacken Road aligned towards the opposing crossing point.

I.2.10 Inter-visibility between Road Users



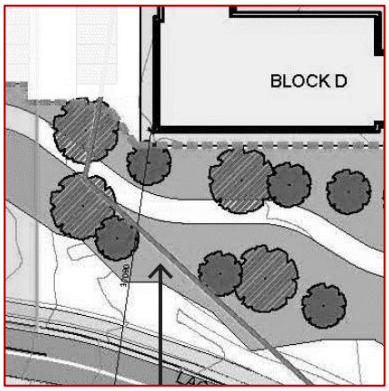
Inter-visibility between drivers and pedestrians waiting to cross at the Zebra crossing across Lacken Road may be restricted by trees located adjacent to the crossing.

Should inter-visibility between drivers and pedestrians (or cyclists) waiting at, or using, the crossing be restricted, there is a risk of drivers failing to stop.

Recommendation

Sufficient inter-visibility between drivers and VRUs should be provided at crossings within the proposed development.

I.2.11 Overhanging trees/vegetation along the 'green link' path

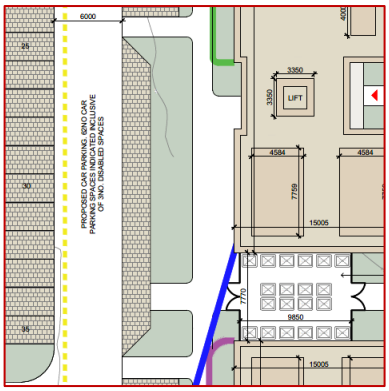


A number of trees have been indicated adjacent to the proposed 'green link' path which may obstruct pedestrian/cyclist movement.

Recommendation

Ensure new tree canopies or other items of roadside furniture do not present obstacles/hazards to pedestrians or cyclists.

I.2.12 Verge at Set- Down and Parking Spaces Area



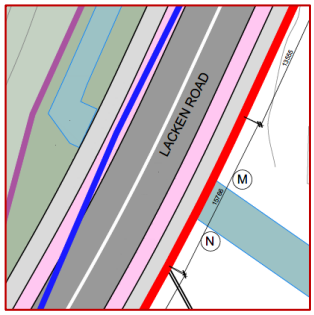
A verge has been indicated between the footpath and set-down area opposite block D. It is not clear what this verge would be comprised of (e.g. grass, planting, hardstand, etc). Should it include a grass verge or planting, it may restrict movement of vehicle occupants between the set-down area and the footpath.

Additionally, no footpath has been provided to the rear of most of the parking spaces.

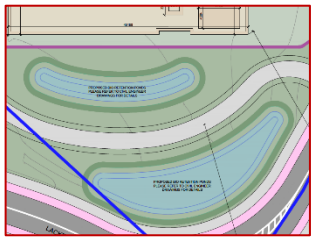
Recommendation

A paved connection between the footpath and set-down area and at the rear of parking spaces should be provided.

I.2.13 Lack of Edge Protection



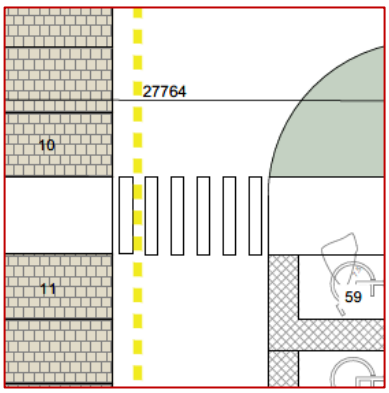
A stream is indicated along the northern boundary of the development and then diverts to the south adjacent to the eastern boundary. Additionally, it is proposed to provide two attenuation ponds at either side of the 'green link' path south of the proposed student accommodation. At this early stage in the design, edge protection, or buoyancy aids have not been indicated at the rear of the footpath where the footpath crosses the watercourse. This could lead to inattentive pedestrians descending into the watercourse below.



Recommendation

Ensure sufficient edge protection, and buoyancy aids, are provided at crossings of the stream and near attenuation ponds, ensuring it is clearly visible during the hours of darkness.

I.2.14 Carpark Crossing Details

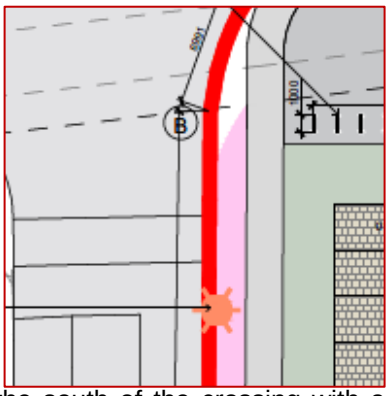


It is assumed that the NMU routes within the proposed development are delineated from the adjacent carriageway within the carpark by a physical kerb. A dropped kerb and tactile paving have not been indicated at the pedestrian crossing within the carpark. A failure to provide a dropped kerb at crossings and at the end of NMU routes may lead to mobility impaired pedestrians experiencing difficulties descending/ascending the kerb at this location or being insufficiently aware that they are in an area shared with vehicles.

Recommendation

Dropped kerbs and tactile paving should be provided at the pedestrian crossing in the carpark and at locations where NMU routes exit onto shared surfaces or other areas shared with other road users.

I.2.15 Layout of Pedestrian and Cycle Facilities at the Ballybeg Drive Crossing



An existing controlled crossing is provided at the southern arm of the Ballybeg Drive/ Cork Road junction. Segregated pedestrian and cycle facilities appear to be indicated on the eastern side of the crossing while a footpath only is indicated on its western side. It is therefore unclear how it is intended for cyclists to access these facilities and if pedestrians, or cyclists, would be required to cross the adjacent facility to access the footpath/cycle track.

Recommendation

A shared surface should be provided on both sides of the crossing with the segregated footpath and cycle track on the eastern side commencing to the south of the crossing with a suitable transition provided between the shared and segregated facilities.

Appendix II Walking Audit

II.1 Introduction

The purpose of this Walking Audit is to review the proposed Scheme, and the existing surrounding environment, to assess if it can be readily and comfortably traversed by pedestrians, that the needs of pedestrians have been prioritised over cyclists & vehicles, and that footpaths are continuous and wide enough to cater for the anticipated number of pedestrians.

II.2 Walking Audit Findings

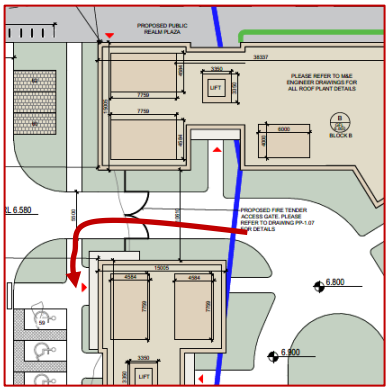
II.2.1 Seating & Rest Areas

No seating is indicated within the scheme. Given the provision of pedestrian routes and available public space, pedestrians may benefit from having rest areas located on pedestrian desire lines, and in public space areas.

Recommendation

Benching or seating should be located strategically within the development.

II.2.2 Connectivity between the Internal Courtyard and the Development Carpark



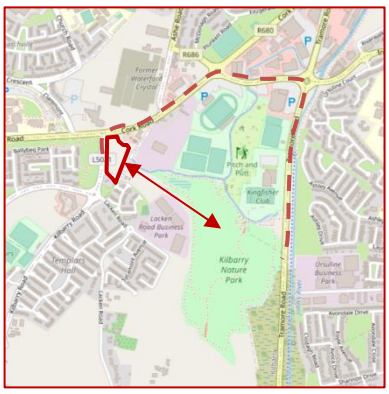
It is unclear from the drawings provided how the pedestrian routes within the internal courtyard will connect to facilities at the location of the primary access.

Should no connectivity be provided, it may lead to pedestrians and cyclists travelling along the carriageway between the development's proposed internal courtyard and the carpark access road or the grass verge adjacent the gated access.

Recommendation

The likely pedestrian desire lines between the proposed development's internal courtyard and the pedestrian facilities at the primary access should be identified, and measures provided to cater for these desire lines safely.

II.2.3 Connectivity to Kilbarry Nature Park



The Kilbarry Nature Park to the southeast is likely to be an attractive destination for students in the student accommodation. However, it is not clear if direct pedestrian/cycle links will be provided between the southern and eastern extents of the development and this destination, or if this pedestrian desire line will be catered for in this, or a future development phase.

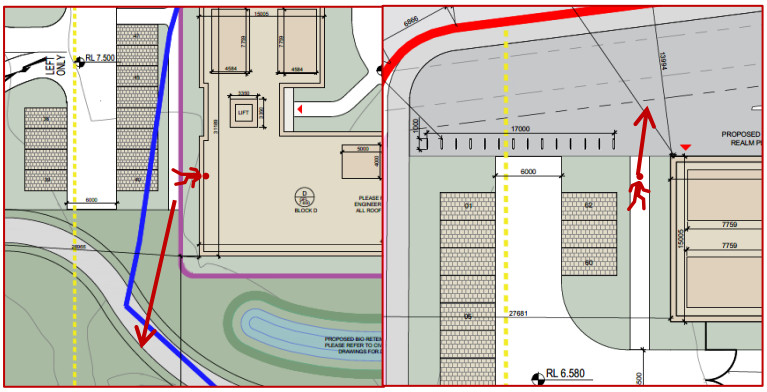
The absence of this direct route may discourage pedestrians from choosing walking as a regular form of travel, as the indirect route via the Cork Road, Inner Ring Road and Tramore Road may be considered too long.

Recommendation

Ensure a more direct route for pedestrians is provided to the Kilbarry Nature Park.

II.2.4 Pedestrian Desire Lines

The 'Green link' path runs along the southern side of the proposed student accommodation connecting the eastern footpath of Ballybeg Drive with the northern footpath of Lacken Road. The proximity of the development carpark to the green link may create a pedestrian desire line between these locations, however, no connection for pedestrians has been provided.



Similarly, a public plaza is indicated to the north of the development, however, no direct pedestrian link is provided between the development carpark and the plaza.

Recommendation

Measures should be provided to facilitate pedestrian movements along pedestrian desire lines.

Appendix III Non-Motorised User Audit

III.1 Introduction

The purpose of a Non-Motorised User (NMU) Audit is to review the proposed Scheme, and the existing surrounding environment, to assess if it will cater comfortably for all non-motorised road users, of all ages and abilities, and that the needs of these vulnerable road users have been prioritised over vehicular traffic.

For the proposed Scheme separate Access, Walking & Cycling Audits have been undertaken (ref Appendix I, Appendix II & Appendix IV), and these should be referred to for findings in relation to NMUs.

Appendix IV Cycle Audit

IV.1 Introduction

The purpose of this Cycle Audit is to review the proposed Scheme, and the existing surrounding environment, to assess if it will cater comfortably for cyclists, of all ages and abilities, and that the needs of cyclists have been prioritised over vehicular traffic.

There are existing advisory cycle lanes provided on the northern side of Cork Road, however there is currently a lack of existing cycle facilities on the southern side of Cork Road, and on either side of Ballybeg Drive and Lacken Road in the vicinity of the proposed development.

Segregated cycle facilities will be provided along the eastern side of Ballybeg Drive commencing at the southern arm of the Ballybeg Drive/Cork Road junction which will continue south before terminating south of its junction with Lacken Road. Segregated cycle facilities will also be provided on both sides of the two-way section of Lacken Road from its junction with Ballybeg Drive until its conversion to one-way traffic.

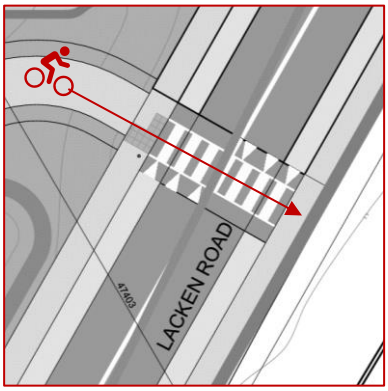
Cyclists within the development will be required to share the internal road with other vehicles, as the design does not include any segregated cycle facilities within the development. It is presumed that the road layout, which will be developed in compliance with DMURS, will aim to reduce vehicle speeds in the development, thus creating a more cycle friendly environment.

Two-level bicycle parking storage areas are proposed within the secured courtyard at seven locations and bicycle stands are indicated within the public realm plaza north of the proposed development

IV.2 Cycle Audit Findings

IV.2.1 Crossing Overshoot

A ‘Zebra crossing’ is provided at the southeastern end of the ‘green link’ path between Ballybeg Drive and Lacken Road, which is likely to be used by cyclists. Cyclists should dismount at the end of the footpath on the northern side of Lacken Road and cross the ‘Zebra’ crossing on foot. However, user behaviour may see cyclists continuing on their bicycle to cross to the southern side of Lacken Road. This could result in cyclists approaching, and continuing through, the crossing at speed, leading to sudden entry to the carriageway.



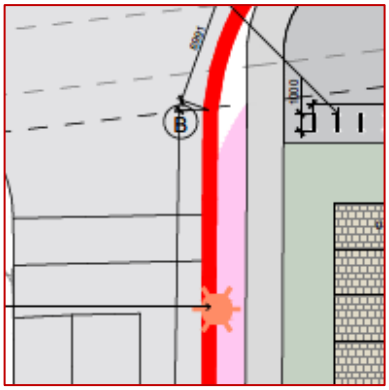
This problem may be exacerbated by the increasing use of electric bicycles and E-scooters.

Recommendation

Measures should be provided to encourage cyclists to slow on approach.

IV.2.2 Layout of Pedestrian and Cycle Facilities at the Ballybeg Drive Crossing

An existing controlled crossing is provided at the southern arm of the Ballybeg Drive/ Cork Road junction. Segregated pedestrian and cycle facilities appear to be indicated on the eastern side of the crossing while a footpath only is indicated on its western side.

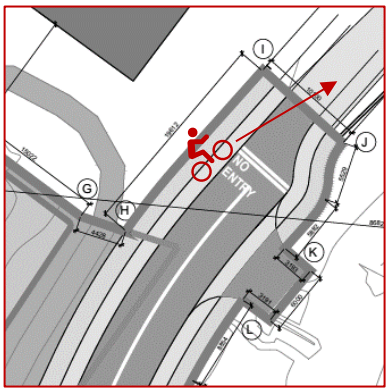


It is therefore unclear how it is intended for cyclists to access these facilities and if pedestrians, or cyclists, would be required to cross the adjacent facility to access the footpath/cycle track.

Recommendation

A shared surface should be provided on both sides of the crossing with the segregated footpath and cycle track on the eastern side commencing to the south of the crossing with a suitable transition provided between the shared and segregated facilities.

IV.2.3 Tie- in with Existing Facilities

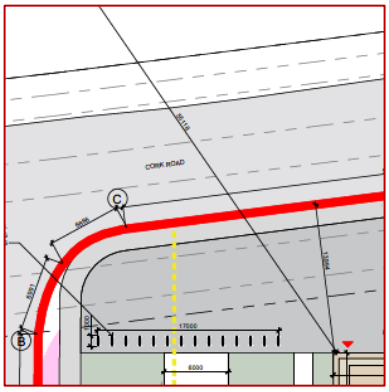


The absence of safe vertical and horizontal transitions could lead to confusion and abrupt route changes for cyclists transitioning between the new and old cross sections.

Recommendation

Transitions to existing facilities should be introduced at Lacken Road to support expected cyclists routes.

IV.2.4 Cyclist Crossing Facilities to/from Bicycle Stand at Public Plaza



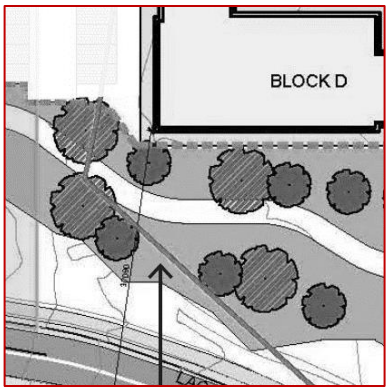
Existing pedestrian crossings and facilities are provided at the junction between Ballybeg Drive and Cork Road. However, no facilities have been indicated for cyclists travelling to/from the bicycle parking area on the public plaza and the existing advisory cycle lane to the north of Cork Road.

This may lead cyclists using the existing pedestrian crossing and mounting/dismounting a full height kerb to cross the carriageway where there is a risk of falls from their bicycle

Recommendation

Facilities for cyclists should be provided to travel to/from the bicycle parking spaces at public plaza and the advisory cycle lane on Cork Road.

IV.2.5 Overhanging trees/vegetation along the 'green link' path



A number of trees have been indicated adjacent to the proposed 'green link' path which may obstruct pedestrian/cyclist movement.

Recommendation

Ensure new trees canopies or other items of roadside furniture do not present obstacles/hazards to pedestrians or cyclists.

IV.2.6 Bicycle Parking

Two-level bicycle parking storage areas are proposed within the secured courtyard and bicycle stands are indicated within the public realm plaza north of the proposed development. However, the amount of provided bicycle parking spaces has not been provided and therefore it is unclear if provisions will be sufficient to accommodate the volume of residents at the student accommodation.

Recommendation

Sufficient bicycle parking spaces should be provided in accordance with the 'Waterford City and County Development Plan 2022-2028'.

IV.2.7 Bicycle Parking Locations

No issues were identified in relation to the location of the proposed bicycle parking as this parking is located at ground level, in close proximity to the building entrances.

IV.2.8 Gradients

No issues were identified in relation to gradients for cyclists travelling within the site or to/from the proposed bicycle parking locations.

IV.2.9 Bicycle Stand Sizes

The cycle stand dimensions are unclear.

Recommendation

The proposed dimensions of bicycle parking stands should meet the minimum cycle parking requirements.

IV.2.10 Bicycle Maintenance Areas

No areas appear to be provided within, or adjacent to, the bicycle parking areas for residents to undertake bicycle maintenance. It is unlikely that residents would be able to undertake bicycle maintenance within the proposed rooms, resulting in difficulties for cyclists undertaking routine bicycle maintenance.

Recommendation

An area should be provided within the development, including a bicycle stand, where residents can undertake routine bicycle maintenance.

Appendix V Road Safety Audit

Coakley Consulting Engineers

Proposed Student Accommodation, Ballybeg Road, Co. Waterford

Stage 1 Road Safety Audit

P·M·C·E

October 2023

Coakley Consulting Engineers

Proposed Student Accommodation, Ballybeg Road, Co. Waterford

Stage 1 Road Safety Audit

Document Ref:	P23106-PMCE-XX-XX-RP-SA-RSA-3_ZZ_01

Rev	Prepared By	Reviewed By	Approved By	Issue Date	Reason for Revision
2.0	AOR	RF	PJM	3rd Oct. 2023	Final
1.0	AOR	RF	PJM	15th August 2023	Draft Report

P·M·C·E

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1 Introduction

1.1 General

This report results from a Stage 1 Road Safety Audit on the proposed Student Accommodation, Ballybeg Road, Co. Waterford carried out at the request of Mr Brian Coakley of Coakley Consulting Engineers.

The members of the Road Safety Audit Team are independent of the design team, and include: -

Mr. Alan O'Reilly
(BA, BAI, MSc, PGDip(PM), RSACert, CEng, MIEI)
Road Safety Audit Team Leader

Ms. Rebecca Farnan
(BA, MAI, MIEI)
Road Safety Audit Team Member

The Road Safety Audit took place during August 2023 and comprised an examination of the documents provided by the designers (see Appendix A). In addition to examining the documents supplied the Road Safety Audit Team visited the site of the proposed measures on the 9th August 2023. Weather conditions during the site visit were dry and the road surface was dry. Traffic volumes during the site visit were low, pedestrian and cyclist volumes were low and traffic speeds were considered to be generally within the posted speed limit.

Where problems are relevant to specific locations these are shown on drawing extracts within the main body of the report and their locations are shown in Appendix B. Where problems are general to the proposals sample drawing extracts are within the main body of the report, where considered necessary.

This Stage 1 Road Safety Audit has been carried out in accordance with the requirements of GE-STY-01024 - Road Safety Audit (December 2017), contained on the Transport Infrastructure Ireland (TII) Publications website.

The scheme has been examined and this report compiled in respect of the consideration of those matters that have an adverse effect on road safety and considers the perspective of all road users. It has not been examined or verified for compliance with any other standards or criteria. The problems identified in this report are considered to require action in order to improve the safety of the scheme and minimise collision occurrence.

If any of the recommendations within this road safety audit report are not accepted, a written response is required, stating reasons for non-acceptance. Comments made within the report under the heading of Observations are intended to be for information only. Written responses to Observations are not required.

1.2 Items Not Submitted for Auditing

Details of the following items were not submitted for audit; therefore no specific problems have been identified at this stage relating to these design elements, however where the absence of this information has given rise to a safety concern it has been commented upon in Section 3: -

- Personal Injury Collision data
- Vehicle swept paths
- Visibility splays

2 Project Description

It is proposed to construct a new student accommodation building in an urban area on Ballybeg Drive, Co. Waterford. The site is bound to the west by Ballybeg Drive, to the north by Cork Road and to the south and east by Lacken Road. Minimal development (student) trips by private car are expected due to the nature of the development (i.e. student accommodation) and the site's proximity to the university campus across the Cork Road.

The proposed works include the following:

- The construction of two 5-storey blocks, one 4-storey block and one 6-storey block
- Provision of a public realm plaza to the north and widening of Cork Road
- Provision of a secondary substation, boundary treatment, and internal courtyard landscaping.
- Provision of a vehicular access point from Ballybeg Drive via a new left-in left-out junction.
- 62 car parking spaces at ground level, including three mobility-impaired parking spaces.
- A set-down area which would be used by refuse vehicles when collecting rubbish. The set-down area would be located adjacent to the bin store.
- Seven two-level bicycle storage shelters, six of which would be located within the internal courtyard.
- Internal green link connecting Ballybeg Drive and Lacken Road.
- Upgrades to Lacken Road to provide cycle lanes on both sides and relocating the transition between the two-way and one-way sections of carriageway and the access to the Kilbarry Civic Amenity Site.

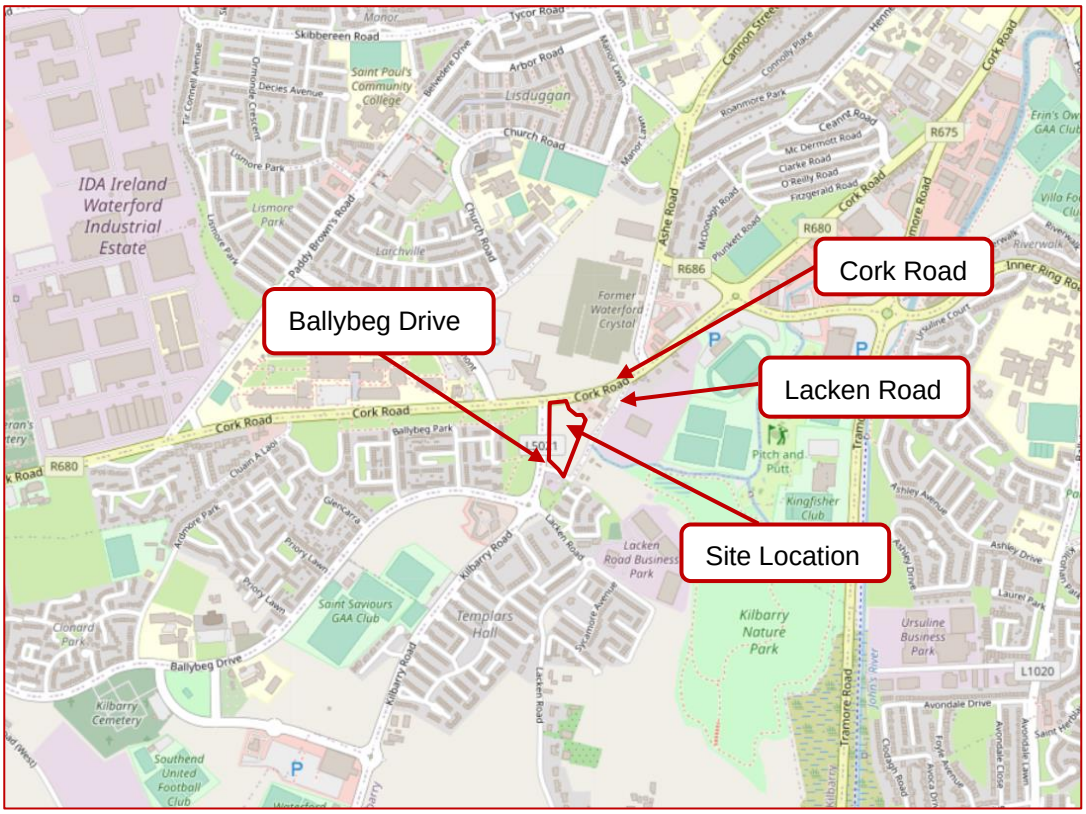


FIGURE 2.1: SITE LOCATION (SOURCE: WWW.OPENSTREETMAP.ORG)

A secured courtyard would be located in the centre of the accommodation blocks and this would be accessible by residents of the proposed student accommodation development, and their guests, only. The courtyard would be accessed by pedestrians and cyclists through the primary access located in Block A, where a reception/security desk would be located. This would be accessed from the internal footpath network within the development's carpark and would then exit to the secure courtyard, to the rear of Block A, onto the 4m wide shared path surrounding the courtyard.

A fire tender access gate is located adjacent to the primary access to Block A however this would only be used during times of an emergency, or for access for maintenance vehicles to the ESB substation, and would remain locked at all other times.

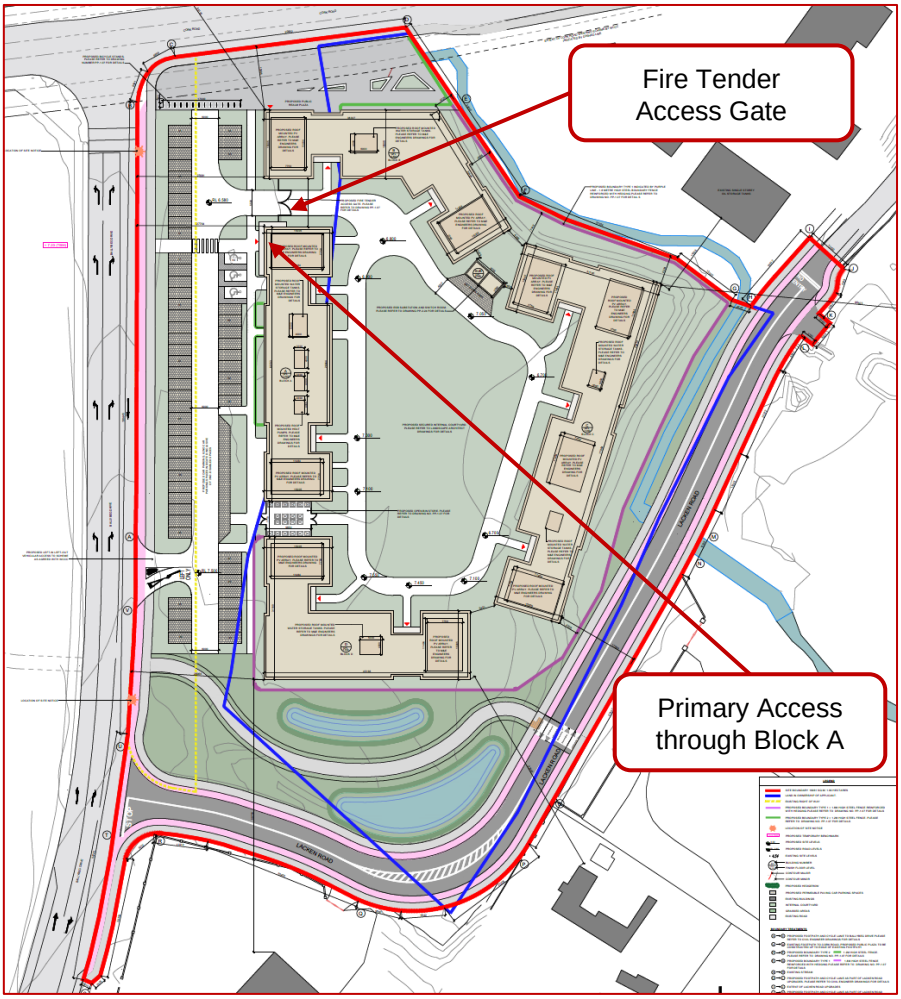


FIGURE 2.2: PROPOSED DEVELOPMENT

When collecting refuse from the proposed development a refuse truck will enter the development via the left-in left-out access junction, enter the set-down area adjacent to the bin store and then perform a turning manoeuvre within the turning head at the access adjacent to the locked fire tender access gate, and leave the development via the left-in left-out access junction.

Similarly, during times of an emergency, a fire tender will enter the development via the left-in left-out access junction, enter the private courtyard via the fire tender access gate and traverse the 4m wide path around the courtyard before exiting via the left-in left-out access junction.

3 Existing Road Network

3.1 R680 (Cork Road)

The R680 Regional Road (Cork Road), is a two-way single carriageway road with footpaths on both sides. It runs in an east-west direction to the north of the proposed development with advisory cycle lanes on both sides.

It is approximately 8.6m wide and provides access to Waterford City Centre, Waterford Business Park and the IDA Ireland Industrial Estate. It has a junction with the Waterford Outer Ring Road (R710) at its western extents.

3.2 L5021 (Ballybeg Drive)

The L5021 Local Road (Ballybeg Drive) extends in a predominantly north-south direction and connects with Cork Road at a signalised junction to the northwest of the proposed student accommodation development. In the vicinity of the proposed development it consists of a three-lane carriageway approximately 10m wide with a posted speed limit of 50 kph and footpaths & public lighting on both sides.

3.3 Lacken Road

Lacken Road is located to the east and south of the development and has junctions with the Cork Road at its northern extent and Ballybeg Drive at its southwestern extent. It is a one-way single carriageway road for approximately 200m in a north-south direction extending from its junction with Cork Road to the access to the Kilbarry Civic Amenity Site. To the south of this access Lacken Road transitions to a two-way single carriageway as far as its junction with Ballybeg Drive. A footpath is provided on the northern side of Lacken Road extending over a length of approximately 70m from its junction with Ballybeg Drive.

3.4 Nearby Watercourse

There is an existing stream which runs along the eastern, northeastern, and northern boundaries of the development site.

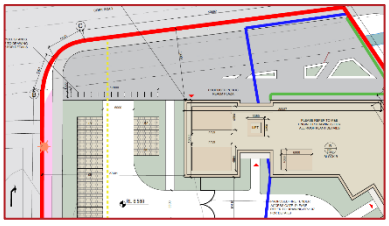
4 Items Arising from the Audit

4.1 Cyclist Access to Bicycle Parking within Public Realm Plaza

Location: *Drawing 22032 PP-1.01*

Summary: *It is unclear how cyclists are intended to access the proposed public realm plaza at the northern boundary of the proposed development.*

A proposed public realm plaza has been indicated to the north of the proposed student accommodation within the southeastern quadrant of the Ballybeg Drive/Cork Road junction. Bicycle parking stands have been indicated within this plaza adjacent to the development's northern boundary. It is unclear, however, how it is intended for cyclists to access this plaza to use the bicycle stands as dropped kerbs or cycle ramps have not been indicated at the edge of either Cork Road or Ballybeg Drive to allow cyclists within the existing/proposed cycle lanes on these roads to enter the plaza. This could lead to cyclists having to mount/dismount full height kerbs when accessing the plaza resulting in an increased risk of loss of control type incidents and falls from their bicycle.



The Audit Team acknowledge that there are existing pedestrian crossings within the junction which contain dropped kerbs however these are currently not Toucan crossings and may not be wide enough to accommodate both pedestrians and cyclists, leading to an increased risk of conflicts between pedestrians and cyclists should cyclists access the plaza via these dropped kerbs.

In addition, the existing signalised pedestrian crossings within the southeastern quadrant of the junction have not been indicated in the amended road layout and it is, therefore, unclear if the existing crossings would be upgraded to Toucan crossings or retained in their current layout.

Recommendation

A route should be identified to/from the bicycle parking and the nearby carriageways along which cyclists would be permitted to travel. This route would, in effect, be a shared area (shared by pedestrians & cyclists) and should be differentiated from the rest of the plaza by contrasting surfacing materials and bounded by appropriate tactile paving to advise the visually-impaired and partially-sighted of the shared area.

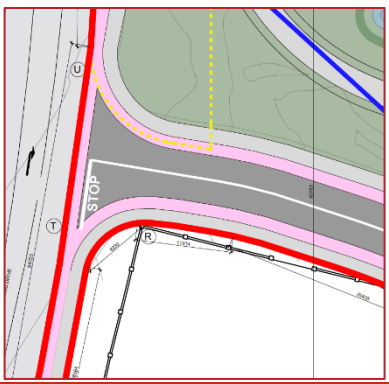
A dropped kerb or ramp should be provided where the shared route meets the Cork Road and/or Ballybeg Drive carriageway(s) to allow cyclists to safely join/leave it. If this dropped kerb or ramp has an upstand less than 25mm, then hazard warning tactile paving should be provided at the interface with the carriageway to advise the visually-impaired and partially-sighted of the carriageway hazard.

If it is intended for the plaza to be shared by pedestrians and cyclists, the existing pedestrian crossings on Ballybeg Drive and the eastern arm of Cork Road should be upgraded to Toucan crossings.

4.2 Cycle Track on Ballybeg Drive and Lacken Road

Location: *Drawing 22032 PP-1.01*

Summary: *It is unclear if the proposed cycle track/lane on Ballybeg Drive and Lacken Road would be segregated from the adjacent footpath and carriageway.*



A proposed cycle track/lane has been indicated on the western side of Ballybeg Drive and on both sides of Lacken Road, denoted by a pink hatch on the drawing provided, and presumably would tie-into the existing facilities on Ballybeg Drive.

It is unclear from the information provided if the new cycle track would have vertical separation between it and the footpath & the carriageway.

If the cycle track is provided adjacent to, and at the same level as, the footpath with no vertical separation there is a risk that visually-impaired pedestrians may inadvertently enter the cycle track resulting in pedestrian-cyclist collisions.

Should the cycle track be on the same level as the carriageway, without separation from the traffic lane, there is a risk of drivers straying into the cycle lane and presenting a hazard to cyclists, or of inappropriate parking within the cycle lane requiring cyclist enter the traffic lane in order to pass the parked vehicles where they are at an increased risk of being struck by a vehicle.

Recommendation

The proposed cycle facilities should be segregated, either vertically or by other means, from both the adjacent footpath and the adjacent carriageway.

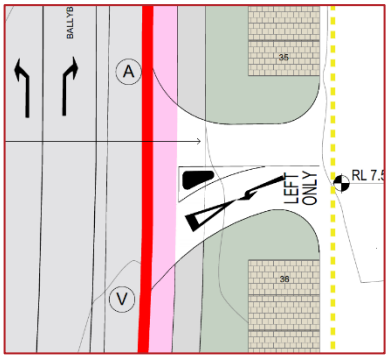
4.3 Pedestrian Crossing of Development Access

Location: *Drawing 22032 PP-1.01*

Summary: *A pedestrian crossing has not been indicated across the proposed development access and it is unclear if the splitter island between the left-in and left-out lanes will be large enough to accommodate pedestrians who cannot complete a crossing in one movement.*

A left-in left-out junction has been indicated at the access to the proposed development on Ballybeg Drive. No pedestrian crossing has been indicated across the access. A failure to provide a crossing with dropped kerbs would lead to pedestrians having to ascend/descend a full height kerb on both sides when crossing the access. This could lead to difficulties for pedestrians, particularly the mobility-impaired, when crossing the access resulting in an increased risk of trips and falls.

In addition, a splitter island has been indicated within the access to delineate the entry and exit lane. It is unclear if this will be a physical island. Whether a physical island, or an area denoted via road markings, it is unclear if it would be large enough to accommodate pedestrians, who cannot complete a crossing of the access in one stage, to take refuge until the downstream lane is free of traffic.



If the island is not able to accommodate pedestrians waiting for a gap in traffic entering/exiting the development, there is a risk that they may encroach into either traffic lane while waiting and be struck by a vehicle.

Recommendation

A continuous footpath should be provided across the access with a dropped kerb arrangement of the minimum 25mm upstand provided to facilitate vehicular access/egress to/from the development.

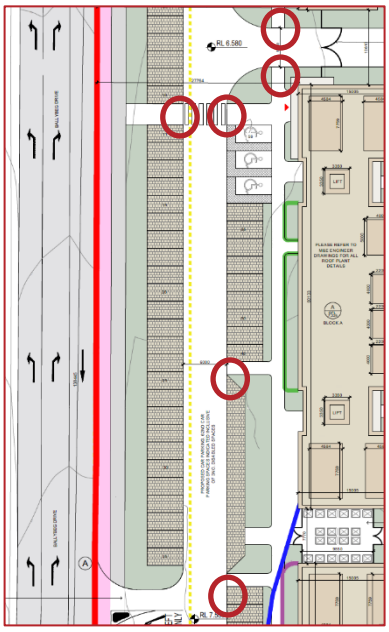
Where a continuous footpath is not provided then a pedestrian crossing, including dropped kerbs and associated tactile paving, should be provided at the development access and the splitter island should be large enough to safely act as a pedestrian refuge (e.g. safely accommodate waiting pedestrians who cannot complete a crossing in a single stage, including wheelchair users or those pushing a pram).

4.4 Internal Footpath and Pedestrian Crossing Network

Location: *Drawing 22032 PP-1.01*

Summary: *The internal footpath network within the proposed development terminates at the carriageway at a number of locations with no opposing crossing location, and tactile paving has not been indicated at locations where pedestrian crossings have been indicated.*

The footpaths within the proposed development are indicated as terminating at the carriageway at a number of locations where no downstream/opposing crossing point has been indicated. It is assumed that these are intended for access for vehicle occupants however, should only dropped kerbs be provided at these locations, there is a risk that a visually-impaired pedestrian may inadvertently continue into the carriageway where there is an increased risk of being struck by a vehicle.



In addition, where footpaths are indicated as terminating at the edge of the carriageway opposite opposing footpaths, which are assumed to be pedestrian crossings, no dropped kerbs and tactile paving have been indicated. A failure to provide tactile paving at pedestrian crossing locations may lead to visually-impaired pedestrians inadvertently entering the carriageway and being struck by a vehicle.

Recommendation

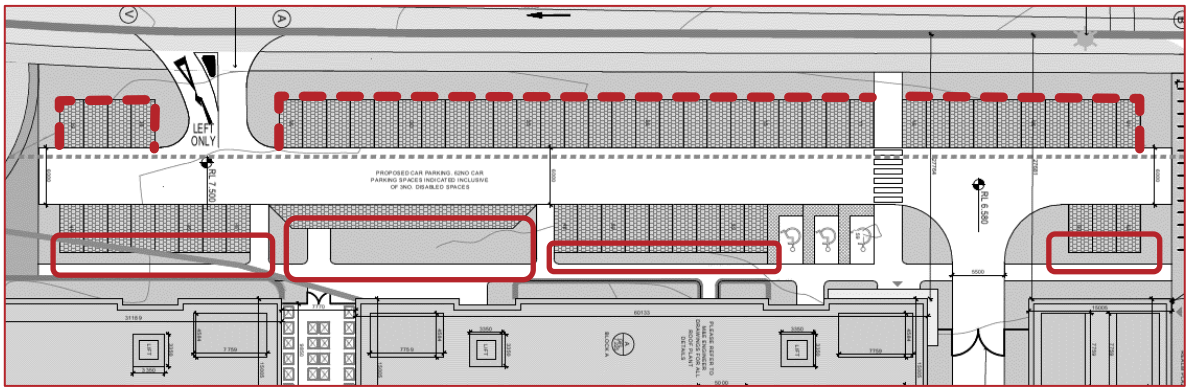
Dropped kerbs, and associated tactile paving, should be provided at footpaths which terminate at the edge of the carriageway, if intended to be used for access by vehicle occupants.

Dropped kerbs, and associated tactile paving, should also be provided on both sides of pedestrian crossings proposed within the development.

4.5 Routes between Parking Spaces/Set-Down Area and Footpaths

Location: *Drawing 22032 PP-1.01*

Summary: *Footpaths have not been indicated directly adjacent to parking spaces and the set-down area within the proposed development which may lead to vehicle occupants travelling within the carriageway, or verge, to reach a footpath.*



Footpaths have not been indicated adjacent to parking spaces, and the set-down area, within the proposed development. This would require vehicle occupants to travel between the accommodation building and their vehicle within the carriageway where there is an increased risk of being struck by a vehicle, or within/through the verge to a suitable pedestrian crossing/footpath where there is a risk of slips and falls, particularly during wet or icy weather.

In addition, parking spaces no. 36 – 39 are isolated from the footpath network within the proposed development which would lead to occupants of vehicles parked in these spaces having to travel further distances within the carriageway increasing the likelihood of being struck by a vehicle.

Recommendation

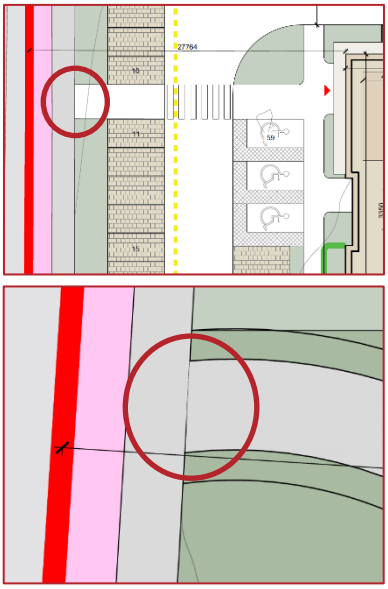
A footpath should be provided directly adjacent to, and throughout the length of, each row of parking spaces to allow pedestrians to access suitable pedestrian crossings.

In addition to providing a footpath at parking spaces no. 36 – 39, a pedestrian crossing should be provided to link these parking spaces to the proposed footpath on the opposite side of the carriageway.

4.6 Transitions between Footpath on Ballybeg Drive and Shared Surfaces

Location: *Drawing 22032 PP-1.01*

Summary: *Warning tactile paving has not been indicated at locations where the pedestrian and cyclist routes within the proposed development transition to the footpath on Ballybeg Drive.*



Two pedestrian and cycle paths have been indicated within the proposed development, one adjacent to the pedestrian crossing at the primary building access and one through the green area to the south of the accommodation building, with both paths exiting onto the existing footpath on the western side of Ballybeg Drive.

Due to the width of these paths, it is assumed that they are intended to be shared by both pedestrians and cyclists. The footpath on Ballybeg Drive is, however, not a shared path. Warning tactile paving has not been indicated at the locations where the shared paths transition to the footpath to advise visually-impaired pedestrians that they are entering/exiting an area shared with cyclists. This could lead to visually-impaired pedestrians being insufficiently aware of cyclists sharing the same space as them increasing the risk of pedestrian-cyclist collisions.

Recommendation

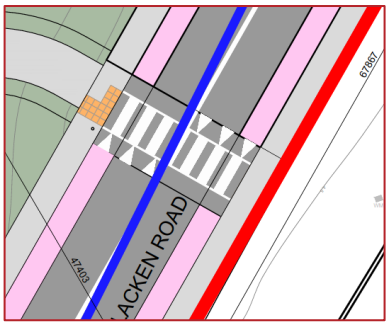
Corduroy hazard warning tactile paving should be provided within the shared paths where they transition to the footpath on Ballybeg Drive. The tactile paving should be comprised of rounded bars running transversely across the direction in which people will be walking (see Figure 16 in “Guidance on the Use of Tactile Paving Surfaces” (2021)).

4.7 Tactile Paving at Zebra Crossing

Location: *Drawing 22032 PP-1.01*

Summary: *The tactile paving indicated on the western side of the proposed Zebra crossing on Lacken Road is the incorrect colour and no tactile paving has been indicated on the eastern side of the crossing.*

A Zebra crossing has been indicated on Lacken Road. Tactile paving has been indicated on the western side of the crossing however none has been indicated on the eastern side. This may lead to visually-impaired pedestrians travelling on the footpath on the eastern side of Lacken Road being unable to detect the tactile paving resulting in them being unable to safely and independently navigate the road layout.



In addition, the tactile paving on the western side of the crossing is not the correct colour for this type of crossing. This could lead to confusion for visually-impaired pedestrians resulting in them being insufficiently aware of the type of crossing.

Recommendation

Red 'L-shaped' tactile paving should be provided on both sides of the proposed Zebra crossing.

4.8 Swept Paths

Location: *Drawing 22032 PP-1.01*

Summary: *Swept path analysis for a refuse truck and fire tender have not been provided.*

When collecting refuse from the proposed development a refuse truck will enter the development via the left-in left-out access junction, enter the set-down area adjacent to the bin store and then perform a turning manoeuvre within the access adjacent to the locked fire tender access gate, and leave the development via the left-in left-out access junction.

Similarly, during times of an emergency, a fire tender will enter the development via the left-in left-out access junction, enter the private courtyard via the fire tender access gate and traverse the 4m wide path around the courtyard before exiting via the left-in left-out access junction.

A swept path analysis, however, for both of these manoeuvres has not been provided to the Audit Team and it is unclear if a refuse truck and fire tender will be able to enter, traverse and exit the proposed development within the space provided. If these vehicles cannot travel through the development within the extents of the carriageway there is a risk of them mounting the kerb and colliding with items of street furniture or parked vehicles, resulting in material damage.

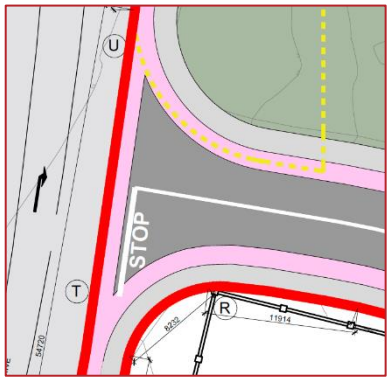
Recommendation

A swept path analysis should be undertaken to confirm that a refuse truck and fire tender can safely enter, traverse, and exit the proposed development without issue.

4.9 Pedestrian Crossing of Lacken Road

Location: *Drawing 22032 PP-1.01*

Summary: *A pedestrian crossing has not been indicated across Lacken Road at its junction with Ballybeg Drive.*



It is proposed to amend the layout of the junction of Ballybeg Drive and Lacken Road to provide a cycle track/lane on the western side of Ballybeg Drive and on both sides of Lacken Road. There is an existing uncontrolled pedestrian crossing provided across Lacken Road at this junction however this has not been indicated in the revised junction layout. A failure to provide a pedestrian crossing, with dropped kerbs, would lead to pedestrians having to ascend/descend a full height kerb on both sides when crossing Lacken Road. This could lead to difficulties for pedestrians, particularly the mobility-impaired, when crossing the road resulting in an increased risk of trips and falls.

Recommendation

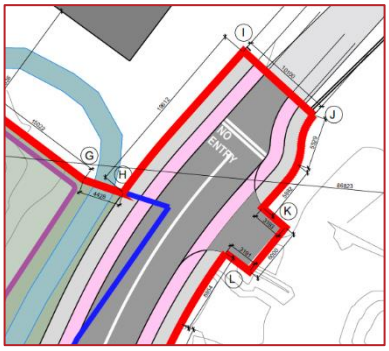
A pedestrian crossing, including dropped kerbs and associated tactile paving, should be provided across Lacken Road at its junction with Ballybeg Drive.

4.10 Exit from One-way Section of Lacken Road

Location: *Drawing 22032 PP-1.01*

Summary: *The proposed road layout at the transition between the two-way and one-way sections of Lacken Road may not be sufficient to advise northbound drivers of the restrictions at this location.*

It is proposed to relocate the exit from the one-way section on Lacken Road further north and extend the two-way section to this location, providing a new access to the Kilbarry Civic Amenity Site adjacent to this transition. The centreline on Lacken Road is indicated as extending as far as the 'No Entry' road markings at the exit from the one-way section. Terminating the centreline at this location may lead to drivers misinterpreting the road layout and, should they use the centreline as a guide, continuing into the one-way section where there is a risk of head-on collisions with southbound vehicles.



In addition, there are currently no 'No Entry' signs at the transition between the one-way and two-way sections on Lacken Road, nor are any indicated as part of the upgraded road layout. This may lead northbound drivers being insufficiently aware of the transition to the one-way section resulting in them failing to turn around at this location further increasing the risk of head-on collisions with southbound vehicles.

Recommendation

The centreline on Lacken Road should be curtailed upstream of the relocated access and amended such that drivers are directed into the access and not straight ahead.

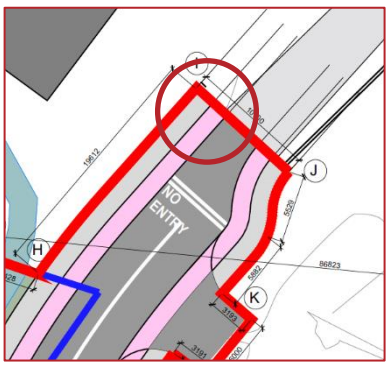
In addition, 'No Entry' signs should be provided on both sides of the road facing northbound drivers at the exit from the one-way section to supplement the road markings indicated.

4.11 Northbound Cycle Track/Lane on Lacken Road

Location: *Drawing 22032 PP-1.01*

Summary: *Northbound cyclists are directed into the path of oncoming southbound vehicles at its termination on Lacken Road.*

It is proposed to upgrade the existing road layout on Lacken Road which would include the provision of cycle tracks/lanes on both sides of the road. The northbound cycle track/lane is indicated as continuing north of the 'No Entry' road markings at the transition between the one-way and two-way sections before terminating downstream of this location. The Audit Team acknowledge that it is proposed to upgrade the section of Lacken Road to the north of this location as part of a separate scheme however, should this development and these upgrades be implemented prior to the upgrades further north on Lacken Road, this would lead to northbound cyclists being directed to enter the carriageway within the one-way section where traffic travels in a north-to-south direction, increasing the risk of head-on collisions with southbound vehicles.



Recommendation

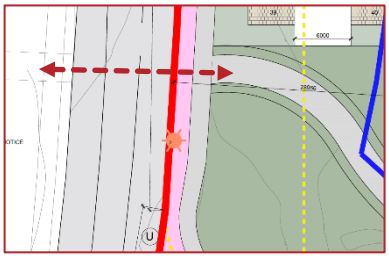
If the proposed upgrades on Lacken Road are implemented prior to the section further north of the site extents being upgraded, the northbound cycle track/lane should be terminated at the Zebra crossing and the northbound cycle track/lane north of this location be provided as part of the future upgrades.

4.12 Pedestrian/Cyclist Desire Line Across Ballybeg Drive

Location: *Drawing 22032 PP-1.01*

Summary: *The pedestrian and cyclist route through the green area to the south of the proposed student accommodation exits onto Ballybeg Drive opposite an existing route to/from Ballybeg Court, where a desire line across Ballybeg Drive is likely to exist, and no measures have been indicated for pedestrians/cyclists to safely cross the carriageway.*

A pedestrian and cyclist path has been indicated through the green space to the south of the proposed student accommodation. The shared path exits onto the footpath on the eastern side of Ballybeg Drive opposite an existing path through the grassed area on the western side of the carriageway which leads to the Ballybeg Court residential development. It is likely that a pedestrian/cyclist desire line would exist across Ballybeg Drive between these two paths, however no crossing of Ballybeg Drive has been indicated at this location. This could lead to pedestrians and cyclists crossing Ballybeg Drive at this location where drivers may be insufficiently prepared to react to a pedestrian/cyclist in the carriageway, resulting in an increased risk of vehicle-pedestrian or vehicle-cyclist collisions.



In addition, should pedestrians and cyclists cross Ballybeg Drive at this location, they would have to ascend/descend full height kerbs where there is a risk of trips and falls for pedestrians or loss of control type incidents for cyclists and falls from their bicycle.

Recommendation

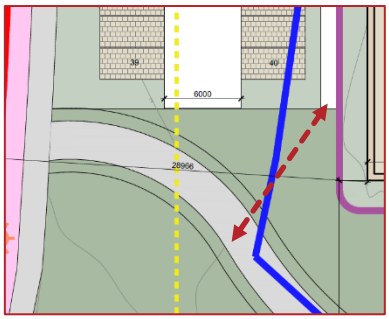
A suitable crossing, that can accommodate both pedestrians and cyclists, should be provided on Ballybeg Drive to cater for this likely desire line.

4.13 Pedestrian Desire Line to the South of the Development

Location: *Drawing 22032 PP-1.01*

Summary: *The likely desire line between the green link to the south of the development and the southern boundary of the development carpark has not been catered for.*

A pedestrian and cyclist path has been indicated through the green space to the south of the proposed student accommodation. The internal footpath within the proposed development terminates at the carpark's southern boundary and it is likely that a desire line would exist for residents of the student accommodation development between the shared pedestrian and cyclist path and the internal footpath network.



If a footpath is not provided between these locations this could lead to pedestrians and cyclists travelling through the grass area between these points where there is a risk of slips and falls, particularly during wet and icy weather.

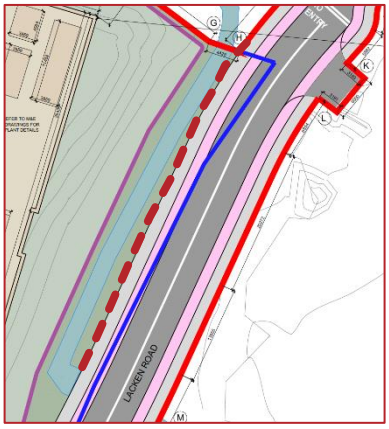
Recommendation

A footpath should be provided through the grass area between shared path and the development's internal footpath network.

4.14 Stream Adjacent to Lacken Road

Location: *Drawing 22032 PP-1.01*

Summary: *Edge protection has not been indicated on the western side of Lacken Road where the existing stream runs adjacent to the upgraded carriageway.*



There is an existing stream which runs adjacent to the eastern boundary of the proposed student accommodation and the western side of Lacken Road. A 1.8m high steel fence, reinforced with hedging, has been indicated throughout the eastern boundary of proposed student accommodation development however no edge protection has been indicated at the edge of the Lacken Road carriageway.

The proposed upgrades on Lacken Road will likely lead to the existing stream being more exposed and there is a risk that, should the embankment adjacent to the stream be steep, an inattentive pedestrian, or young child, may fall from the footpath and enter the stream where there is a risk of drowning.

Recommendation

Edge protection should be provided to the rear of the footpath on Lacken Road throughout the section of the road that runs adjacent to the stream.

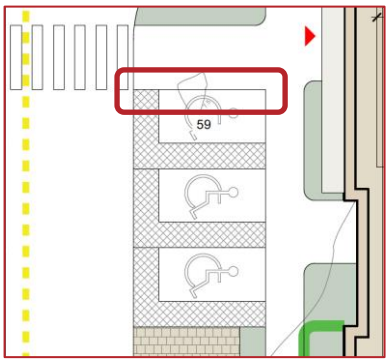
5 Observations

5.1 At this early stage in the design development, information regarding kerb types, drainage, public lighting and traffic signs have yet to be fully considered. These key design elements should be fully considered as part of the detailed design process, and included throughout the proposed development, as necessary, in the construction drawings.

5.2 Electric Vehicle (EV) parking spaces have not been indicated within the proposed development and it is therefore unclear if these will be provided. Most of the proposed parking spaces within the development appear to have similar dimensions, with the exception of mobility-impaired parking spaces, which do not appear to make allowance for the larger dimensions often required for EV parking spaces. There is a risk, therefore, that parking spaces intended to accommodate EV infrastructure will be insufficiently sized.

Sufficient space should be provided at future EV parking spaces in accordance with the Traffic Signs Manual.

5.3 The northernmost mobility parking space within the proposed development's carpark does not include a buffer zone on its northern side. Mobility parking spaces typically require a buffer zone on both sides of the parking space. A failure to provide a buffer zone on the northern side of the northernmost space may lead to mobility-impaired vehicle occupants having insufficient space adajcent to the parking space to enter/exit their vehicles. Buffer zones should be provided on both sides of all mobility parking spaces as indicated in Figure 7.27 in the Traffic Signs Manual.



In addition, the provision of dropped kerbs and associated tactile paving adjacent to mobility-impaired parking spaces should be considered during the detailed design stage.

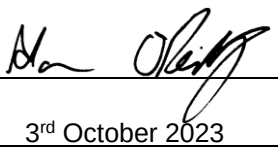
6 Audit Team Statement

We certify that we have examined the drawings referred to in this report. The examination has been carried out with the sole purpose of identifying any features of the design that could be removed or modified in order to improve the safety of the scheme.

The problems identified have been noted in this report together with associated safety improvement suggestions, which we would recommend should be studied for implementation.

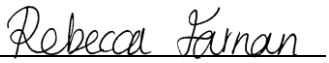
No one on the Road Safety Audit Team has been involved with the design of the scheme.

ROAD SAFETY AUDIT TEAM LEADER

Alan O'Reilly Signed: 

Dated: 3rd October 2023

ROAD SAFETY AUDIT TEAM MEMBER

Rebecca Farnan Signed: 

Dated: 3rd October 2023

7 Road Safety Audit Feedback Form

Road Safety Audit Feedback Form

Scheme: Proposed Student Accommodation, Ballybeg Road, Co. Waterford

Route No.: R680, L5021, Lacken Road

Audit Stage: 1 **Date Audit Completed:** 14th August 2023

	To be Completed by Designer			To be Completed by Audit Team Leader
Paragraph No. in Safety Audit Report	**Problem Accepted (Yes/No)**	**Recommended Measure(s) Accepted (Yes/No)**	**Describe Alternative Measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted**	**Alternative Measures or Reasons Accepted by Auditors (Yes/No)**
4.1	Y	Y		
4.2	Y	Y		
4.3	Y	Y		
4.4	Y	Y		
4.5	Y	Y		
4.6	Y	Y		
4.7	Y	Y		
4.8	Y	Y		
4.9	Y	Y		
4.10	Y	Y		
4.11	Y	Y		
4.12	Y	Y		
4.13	Y	Y		
4.14	Y	Y		

Signed: Darragh O'Neill Designer **Date** 3/10/2023

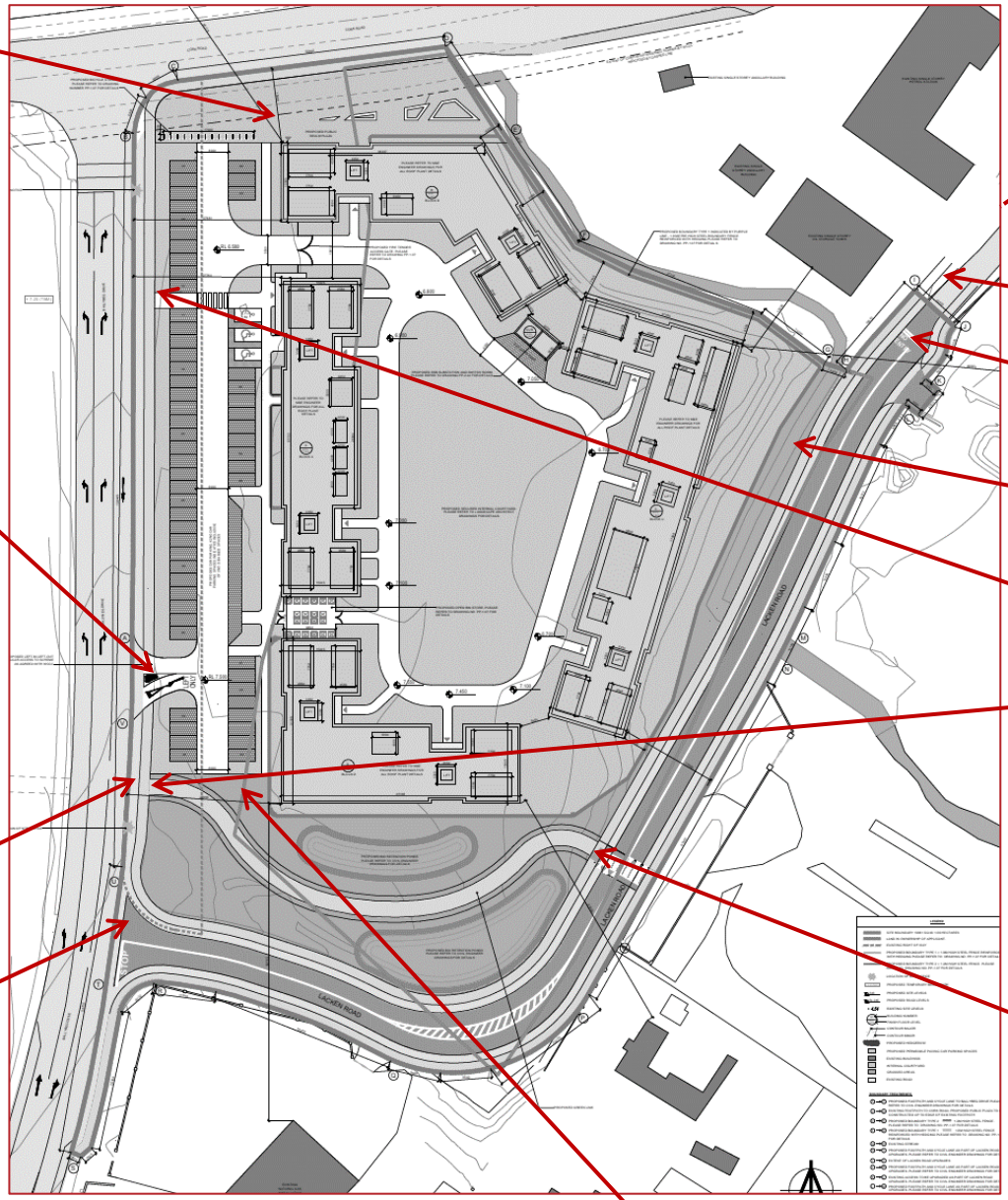
Signed: Audit Team Leader **Date** 3/10/2023

Signed: _____ Employer **Date** _____

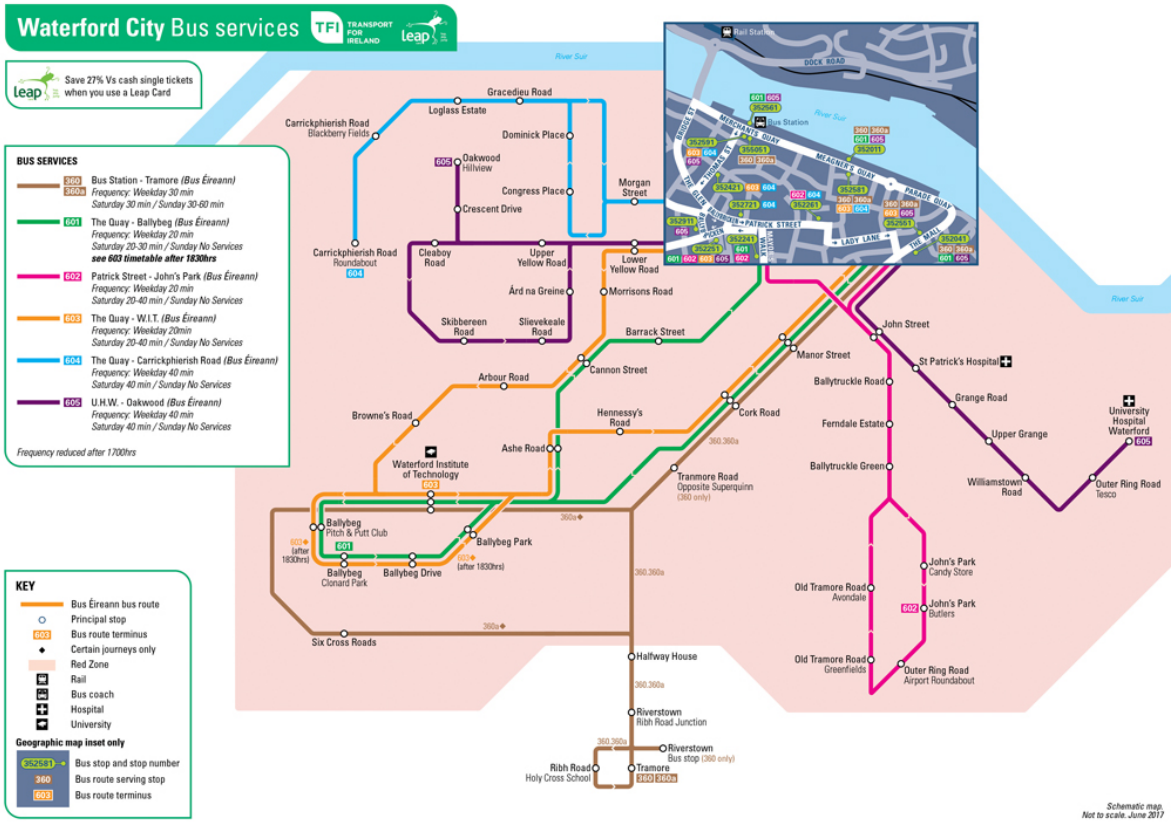
Appendix A – Documents Submitted to the Road Safety Audit Team

DOCUMENT/DRAWING TITLE	DOCUMENT/DRAWING NO.	REVISION
Proposed Site Layout	22032 PP-1.01	-
For Information		
Pre-Planning Package	-	-

Appendix B – Problem Locations


Problem 4.1
Problem 4.3
Problem 4.12
Problem 4.9
Problem 4.13
General Problem 4.2
General Problem 4.4
General Problem 4.5
General Problem 4.8
Problem 4.11
Problem 4.10
Problem 4.14
Problem 4.6
Problem 4.7
LACKEN ROAD
ACCESS ROAD

Appendix C – Public Transport Information



Appendix D – TRICS Trip Rates

TRIP RATE for Land Use 03 - RESIDENTIAL/G - STUDENT ACCOMMODATION
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 1 RESIDE
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00	1	241	0.000	1	241	0.000	1	241	0.000
07:00 - 08:00	5	177	0.003	5	177	0.007	5	177	0.010
08:00 - 09:00	5	177	0.018	**5**	**177**	**0.206**	5	177	0.224
09:00 - 10:00	5	177	0.019	5	177	0.123	5	177	0.142
10:00 - 11:00	5	177	0.070	5	177	0.139	5	177	0.209
11:00 - 12:00	5	177	0.051	5	177	0.107	5	177	0.158
12:00 - 13:00	5	177	0.084	5	177	0.079	5	177	0.163
13:00 - 14:00	5	177	0.107	5	177	0.082	5	177	0.189
14:00 - 15:00	5	177	0.132	5	177	0.092	5	177	0.224
15:00 - 16:00	5	177	0.164	5	177	0.086	5	177	0.250
16:00 - 17:00	**5**	**177**	**0.197**	5	177	0.095	**5**	**177**	**0.292**
17:00 - 18:00	5	177	0.181	5	177	0.093	5	177	0.274
18:00 - 19:00	5	177	0.165	5	177	0.106	5	177	0.271
19:00 - 20:00	2	219	0.053	2	219	0.059	2	219	0.112
20:00 - 21:00	2	219	0.098	2	219	0.080	2	219	0.178
21:00 - 22:00	2	219	0.048	2	219	0.037	2	219	0.085
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.390			1.391			2.781

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Appendix E – Key Junction Capacity Outputs

Full outputs available on Request.

Site Access Priority 'T' Junction on Ballybeg Drive (Left out ONLY - No right turn out)

```
 RUN TITLE
 *********
 Ballybeg AM 2040 with dev


.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
 ***************************************

 INPUT DATA
 ----------

                    MAJOR ROAD (ARM C) ---------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)

 ARM A IS Ballybeg Dr North
 ARM B IS Site Access
 ARM C IS Ballybeg Dr South


GEOMETRIC DATA
--------------


-----------------------------------------------------------------
I                DATA ITEM                I   MINOR ROAD B    I
-----------------------------------------------------------------
I  TOTAL MAJOR ROAD CARRIAGEWAY WIDTH     I ( W  )  9.00 M.   I
I  CENTRAL RESERVE WIDTH                  I (WCR )  0.00 M.   I
I                                         I                   I
I  MAJOR ROAD RIGHT TURN - WIDTH          I (WC-B)  3.00 M.   I
I                        - VISIBILITY     I (VC-B) 100.0 M.   I
I                        - BLOCKS TRAFFIC I          NO       I
I                                         I                   I
I  MINOR ROAD - VISIBILITY TO LEFT        I (VB-C)  50.0 M.   I
I             - VISIBILITY TO RIGHT       I (VB-A)  50.0 M.   I
I             - LANE 1 WIDTH              I (WB-C)  3.00 M.   I
I             - LANE 2 WIDTH              I (WB-A)  0.00 M.   I
-----------------------------------------------------------------
```

AM Peak hour 2040 with development traffic (private car trips)

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-AC	0.05	9.07	0.006		0.0	0.0	0.1	
C-A	18.59							
C-B	0.00	9.51	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	3.89							

PM Peak hour 2040 with development traffic (private car trips)

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-AC	0.02	8.13	0.002		0.0	0.0	0.0	
C-A	10.27							
C-B	0.00	8.51	0.000		0.0	0.0	0.0	
A-B	0.04							
A-C	8.15							

Existing Signal Junction of R680 Cork Rad and Ballybeg Drive

```
TRAFFIC SIGNAL JUNCTION ANALYSIS
********************************

INPUT DATA
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```

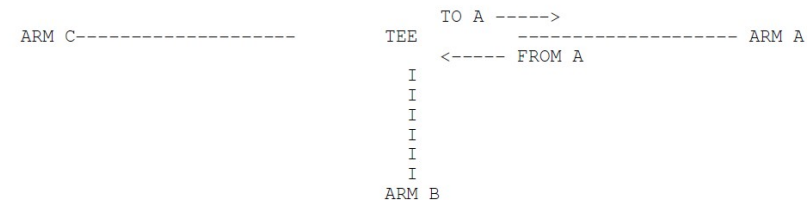


```
ARM A IS R680 Cork Road East
ARM B IS Ballybeg Drive
ARM C IS R680 Cork Road West
```

AM Peak hour 2040 without development traffic (private car trips)

ARM	TIME LANES	MOVEMENT	DEMAND EXCL 2-WHEEL (VEHS/MIN)	CAPACITY (VEHS/MIN)	DEGREE OF SAT (RFC)	QUEUE AT END OF SEGMENT MEAN (PHASE AVERAGED) (VEHS/LANE)	QUEUE AT END OF SEGMENT MAXIMUM (END OF RED) (VEHS/LANE)	QUEUEING DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
A	1	L S	10.86	12.65	0.859	7.4	12.8	113.1
B	1	L	8.04	13.59	0.592	2.7	6.7	40.2
	2	R	10.49	12.08	0.869	7.7	13.0	117.5
C	1	S	11.26	17.41	0.647	3.7	9.1	56.0
	2	R	2.25	3.65	0.617	1.2	2.3	17.7

AM Peak hour 2040 with development traffic (private car trips)

ARM	TIME LANES	MOVEMENT	DEMAND EXCL 2-WHEEL (VEHS/MIN)	CAPACITY (VEHS/MIN)	DEGREE OF SAT (RFC)	QUEUE AT END OF SEGMENT MEAN (PHASE AVERAGED) (VEHS/LANE)	QUEUE AT END OF SEGMENT MAXIMUM (END OF RED) (VEHS/LANE)	QUEUEING DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
A	1	L S	10.86	12.64	0.859	7.4	12.8	113.2
B	1	L	8.10	13.59	0.596	2.7	6.7	40.7
	2	R	10.49	12.08	0.869	7.7	13.0	117.4
C	1	S	11.26	17.41	0.647	3.7	9.1	56.0
	2	R	2.25	3.65	0.617	1.2	2.3	17.7

PM Peak hour 2040 without development traffic (private car trips)

ARM	TIME LANES	MOVEMENT	DEMAND EXCL 2-WHEEL (VEHS/MIN)	CAPACITY (VEHS/MIN)	DEGREE OF SAT (RFC)	QUEUE AT END OF SEGMENT MEAN (PHASE AVERAGED) (VEHS/LANE)	QUEUE AT END OF SEGMENT MAXIMUM (END OF RED) (VEHS/LANE)	QUEUEING DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
A	1	L S	11.86	15.41	0.770	4.8	9.6	71.9
B	1	L	3.16	10.70	0.296	1.0	2.8	14.8
	2	R	7.09	8.49	0.836	5.7	9.6	87.7
C	1	S	11.30	21.00	0.538	2.0	6.2	29.9
	2	R	4.63	5.73	0.807	2.8	4.3	42.7

PM Peak hour 2040 with development traffic (private car trips)

ARM	TIME LANES	MOVEMENT	DEMAND EXCL 2-WHEEL (VEHS/MIN)	CAPACITY (VEHS/MIN)	DEGREE OF SAT (RFC)	QUEUE AT END OF SEGMENT MEAN (PHASE AVERAGED) (VEHS/LANE)	QUEUE AT END OF SEGMENT MAXIMUM (END OF RED) (VEHS/LANE)	QUEUEING DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
A	1	L S	11.88	15.45	0.769	4.8	9.6	71.9
B	1	L	3.18	10.68	0.298	1.0	2.8	15.0
	2	R	7.09	8.48	0.836	5.8	9.6	88.2
C	1	S	11.30	21.01	0.538	2.0	6.2	29.9
	2	R	4.64	5.74	0.809	2.8	4.3	43.3

Appendix F – DMURS Compliance Statement

COAKLEY
CONSULTING ENGINEERS

Proposed Student Accommodation Development, Ballybeg, Waterford,
Frisby Construction Ltd.
DMURS Compliance Statement

Coakley Consulting Engineers
January 2024

DOCUMENT CONTROL SHEET

Client	Noel Frisby Construction Ltd.					
Project Title	Proposed Student Village Development, Cork Road, Waterford					
Document Title	DMURS Compliance Statement					
Document No.	CCE0365Rp002					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	1	8	-	-	-

Rev.	Status	Author	Issue Date
D01	Draft	Brian Coakley, BE MEngSc HDipGIS MIEI	10.08.23
D02	Draft	Brian Coakley	11.10.23
F01	Final		19.01.24

Table of Contents

1 DMURS COMPLIANCE STATEMENT 1

1.1 GENERAL 1
1.1 DMURS OBJECTIVES 2
1.2 INTERACTION BETWEEN PEOPLE AND VEHICLES 2
1.3 THE DMURS USER HIERARCHY 2
1.4 DMURS DESIGN PRINCIPALS 2
1.5 DMURS COMPLIANCE AND KEY DESIGN ELEMENTS 3

1 DMURS Compliance Statement

1.1 General

Coakley Consulting Engineers (CCE) have been commissioned by Noel Frisby Construction Ltd. to prepare a DMURS Compliance Statement to support the Large-Scale Residential Development (LRD) application for a proposed Student Village Development, Cork Road, Waterford.

Coakley Consulting Engineers (CCE) are traffic and transport consultants based in Tralee, Co. Kerry. This report should be read in conjunction with all other documents and information submitted as part of this planning application. Brian Coakley of CCE is a TII approved Road Safety Audit team member. The project scope and proposed site access has been discussed with a Waterford City and County Council Roads Department Engineers prior to submission.

This document provides a review of the proposed development with regard to compliance with guidelines in the Design Manual for Urban Roads and Streets (DMURS). The overarching principals of DMURS are addressed initially and followed by compliance with specific DMURS design elements.

As outlined below, Coakley Consulting Engineers has reviewed and made reference to several drawings and documents in preparation of this report. In particular, this report is complemented by the *independent* DMURS Quality Audit (QA) report prepared as part of the design process. Therefore, is it critical that this report be read in conjunction with Quality Audit (QA) report submitted as part of this planning application submission, in addition to the site layout and other drawings at original scale.

A Quality Audit (QA) is a defined process, independent of, but involving, the design team that provides a check that high quality places are delivered and maintained by all relevant parties, for the benefit of all end users. The QA systematically reviews a project design by undertaking a series of individual but overlapping audit assessments to develop high-quality places where objectives of place, functionality, maintenance and safety are achieved. These audits include:

1. Visual Quality
2. Audit of How Street may be Used
3. Place Check Audit
4. Community Street Audit (in existing streets)
5. *Road Safety Audit (RSA) to formal TII standards*
6. Access Audit
7. Walking Audit
8. Non-Motorised User Audit
9. Cycle Audit

The DMURS Quality Audit (QA) report was undertaken by 2no. Transport Infrastructure Ireland (TII) approved independent auditors (audit team). The audit comprised a formal site visit by the audit team, a detailed review of design drawings and the preparation of a Quality Audit (QA) report. The recommendations made by both the Road Safety Audit and Quality Audit report have been reviewed and accepted in full by the design team and these recommendations will be addressed and incorporated into the final site layout drawings at application stage.

1.1 DMURS Objectives

DMURS seeks to balance the needs of all users, creating well-designed streets at the heart of communities. It states that 'Well designed streets can create connected physical, social and transport networks that promote real alternatives to car journeys, namely walking, cycling or public transport'.

DMURS also seeks to create sustainable neighbourhoods: 'compact and energy efficient development … prioritising sustainable modes of transport … [and] provision of a good range of amenities and services within easy and safe walking distance of homes'.

1.2 Interaction between People and Vehicles

DMURS outlines four distinct models for interaction between cars and people, where:

1 Traffic and people are segregated, and the car is dominant.

2 The car and people are segregated from each other.

3 Traffic and people mix, although on a more equitable basis; and,

4 The car is excluded altogether.

In the proposed development, the second and third model predominates, with all roads having shared surfaces except the east-west road from the site access and the north-south central spine road.

1.3 The DMURS User Hierarchy

As outlined below, DMURS outlines a user hierarchy that designers must follow when preparing schemes. The site layout is considered consistent with applying a user hierarchy.

1.4 DMURS Design Principals

DMURS includes four overarching design principals which are implemented through adherence to recommendations in relation to individual design elements. Compliance with these elements is summarised in the table below.

The DMURS four overarching design principals are as follows:

1. To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
2. The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment.
3. The quality of the street is measured by the quality of the pedestrian environment; and,
4. Greater communication and co-operation between design professionals through the promotion of a plan-led, multidisciplinary approach to design.

1.5 DMURS Compliance and Key Design Elements

It is CCE's opinion that the proposed development is DMURS compliant and was designed to take into account the overarching guidelines and principles of DMURS, placing greater importance on the safe movement of vulnerable road users (VRU's) throughout the development also introducing measures to reduce traffic flows, vehicle speeds and turning movements within the site.

DMURS uses a hierarchy system to classify the movement function of a street. This system classifies streets into the following categories:

- Arterial Streets
- Link Streets
- Local Streets (applies to the subject development)

The following section outlies the specific Local Street DMURS key design features that have been incorporated within the proposed residential scheme with the objective of delivering a design that is in compliance with DMURS.

- In terms of DMURS Movement Function, Place Function and Street Layout, the vehicular routes throughout the site align with the 'local streets' category in DMURS and strike the right balance between the different functions of the street for VRU's and vehicles. As DMURS looks to 'limiting the use of cul-de-sacs', the proposed development adopts a circular road layout which is easy to navigate and encourages low speeds and minimal turning movements.
- Vehicle Speed: In accordance with DMURS Table 4.1 below, the developments internal roads have been designed for a vehicular traffic speed of 10-30km/h, in order to prioritise the movement of pedestrians and other vulnerable road users. DMURS highlights that traffic calming features should be provided 'on longer straights where there is more than 70m between junctions'. No straight road section within the development exceeds 70m and therefore no formal traffic calming measures area required.

PEDESTRIAN PRIORITY VEHICLE PRIORITY

FUNCTION	CENTRE	N'HOOD	SUBURBAN	BUSINESS/ INDUSTRIAL	RURAL FRINGE
ARTERIAL	30-40 KM/H	40-50 KM/H	40-50 KM/H	50-60 KM/H	60-80 KM/H
LINK	30 KM/H	30-50 KM/H	30-50 KM/H	50-60 KM/H	60-80 KM/H
LOCAL	10-30 KM/H	10-30 KM/H	10-30 KM/H	30-50 KM/H	60 KM/H

CONTEXT

Table 4.1: Design speed selection matrix indicating the links between place, movement and speed that need to be taken into account in order to achieve effective and balanced design solutions.

- Taking on board the 'self-regulating street' approach outlined in Section 4.1.2 of the DMURS, the following contributing design elements impact and encourage lower speeds:
    - the small scale of the proposed site layout and internal road length
    - reduced horizontal road alignment and corner radii with short 'straight' road sections
    - reduced carriageway width of 5.5m and 6.0m where required.
    - on-street parking
    - landscaping

Design Element	**Compliance Review**
Movement Function	The proposed vehicular access and car park have been designed to ensure ease of access, slow vehicle speeds and minimal conflicts. The layout therefore aligns with the "local streets" category in DMURS, the main function of the routes being to provide access within the development. The "local streets" category is appropriate in terms of the shared-space and placemaking elements of the design strategy.
Place Function	The design of internal car park strikes the right balance between the different functions of the street, including a sense of place. The development has included measures to ensure satisfactory standards of personal safety and traffic safety. The recommendations made by both the Road Safety Audit and Quality Audit report have been reviewed and accepted in full by the design team and these recommendations are incorporated into the final site layout drawings. These include frequent and appropriately located crossing points matching key desire lines at junctions and more, vertical and horizontal deflections, narrow carriageways, minimised signage and road markings, reduced visibility splays, on-street parking, tighter corner radii and shared surfaces.
Street Layout	The proposed development layout adopts an orthogonal layout with ease of access, connectivity, permeability and legibility throughout which complies with DMURS where 'all streets lead to other streets, limiting the use of cul-de-sacs that provide no through access and maximise the number of walkable/cyclable routes between destinations'.
Block Sizes	To ensure compliance with DMURS, the proposed layout and size of accommodation blocks makes sure that the street network and pedestrian routes within the development provide permeability and connectivity with key locations within and outside the development whilst also ensuring overall security for the scheme.

Design Element	Compliance Review
Wayfinding	The proposed development layout ensures DMURS compliance in terms of wayfinding, whereby the proposed simple orthogonal street layout promotes straightforward legible routes where people can easily orientate themselves, find their way around and through the site and won't encounter any 'road blocks' (Cul de Sacs) on their journey through and within the site.
Permeability	The proposed development layout has been designed with a largely "open network" providing permeability and connectivity where required to ensure compliance with DMURS with only a few essential restrictions on permeability. As accepted by the independent DMURS Quality Audit team, one of the key requirements for successful student accommodation is the need for secure access and egress (i.e. everyone entering and leaving the site have to pass the reception/security desk). Therefore, the internal site within the blocks is limited in terms of accessibility and permeability.
Traffic	In terms of DMURS compliance, the traffic modelling contained within the Traffic and Transport Assessment (TTA) report clearly demonstrates that the application, in terms of roads, traffic and junction capacity, would operate in a safe and efficient manner, with minimal impact on other road users and on the capacity of local road network well into the future. The nature of the development will generate minimal traffic flows by private car and the layout will encourage traffic calming and slower vehicle speeds.
Speed	Adopting an approach in compliance with DMURS "where vehicle movement priorities are low, such as on local streets, lower speed limits should be applied (30km/h)", the proposed speed limit (design speed) within the proposed development will be 30km/h through the use of design measures such as reduce radii, raised tables, slow zone signage and more. This will place vulnerable road users and their needs over those of motorists, change driver behaviour and enhance quality of life within the development. These lower speed limits of 30km/h are a requirement of Action 16 of Smarter Travel (2009) within urban areas.
Street Trees, Planting & Street Furniture	A comprehensive landscape plan has been prepared by Cunnane Stratton Reynolds for the development which adopts a DMURS compliance approach whereby proposed landscaping and street furniture measures will complement the proposed geometric design of the internal roads and encourage lower speeds and more. The proposed layout including landscaping elements has also been subjected to an independent DMURS Quality Audit.

Design Element	Compliance Review
Active Street Edges	DMURS promotes the use of minimal setbacks between the edge of the carriageway (and car parking) and back of the footway and building line. The setbacks to the blocks have been reduced to increase a sense of urban enclosure and strengthen the block corners.
Signage/Road Marking	To ensure DMURS compliance, minimal signage is proposed and required on local streets (car park) due to the low-speed nature and low movement function. Signage and line markings have be raised in the independent Quality Audit and will be addressed in the final layout design.
Lighting	The lighting guidelines in DMURS have been superseded due to the rapid development of LED lighting technology. Appropriate lighting will be provided in accordance with the current Waterford City and County Council Public Lighting Specifications.
Materials/Finishes	Although DMURS provides limited guidance on the use of different materials and finishes for local streets, it does state that designers should use 'contrasting materials and textures to inform pedestrians of changes to the function of space (i.e. to demarcate verges, footway, strips, cycle paths) and in particular to guide the visually impaired'. As per the site layout design and landscaping drawings, the range of proposed materials and locations are compliant with the requirements of DMURS.
Footpaths	In compliance with DMURS, the typical footway width within the development is 2.0m and in certain areas up to 4m in width (around internal courtyard area).
Pedestrian Crossings	In compliance with DMURS, pedestrian crossing points including dropped kerbs and tactile paving are proposed at several locations throughout the development to match the likely desire lines of pedestrians. All pedestrian crossings have been subjected to an independent DMURS Quality Audit and Road Safety Audit, the recommendations of which have been accommodated into the final layout design. DMURS considers pedestrian crossings to be 'one of the most important aspects of street design as it is at this location that most interactions between pedestrians, cyclists and motor vehicles occur'. A 'Raised' Pedestrian / Cycle Combined Zebra crossing is proposed on Lacken Road to serve the proposed Green Corridor/Link. This controlled crossing has been designed taking into account the TL605 layout specification contained in the recently published Cycle Design Manual guidelines. Please refer to MORCE drawings for additional detail. In excess of

Design Element	Compliance Review
	the required DMURS forward stopping sight distances (sightlines) are available for drivers on Lacken Road approaching crossing and vice versa. DMURS clearly sets out that the provision of forward sightlines (stopping sight distances) in excess of the required sightlines for a specific design speed can be counterproductive and encourage increased vehicles speeds. Therefore, the design team have provided the required sightlines only where possible.
Corner Radii	In compliance with DMURS, the kerb radii within the proposed car park (at internal 'Local Street' junctions) have been restricted to a maximum of 4.5m. This serves to encourage lower vehicle speeds, while also allowing for the occasional circulation and turning of large vehicles such as refuse collection trucks, delivery vehicles and fire tenders.
Cycle Facilities	The scheme has also taken in account the recent publication of the Cycle Design Manual. In compliance with DMURS, which references the National Cycle Manual (NCM) in terms of the provision of cycling facilities, the proposed development includes a range of new cycle infrastructure and facilities matching key desire lines including new cycle lanes (both on and off-road) on Ballybeg Drive and Lacken Road, controlled crossing facilities, appropriate tactile paving, cycle parking (safe, secure, and sheltered) and connections with other existing cycle facilities.
Carriageway Width	In compliance with DMURS, the width of the road (local street) through the car park (approx. 120m long) has a required aisle width of 6.0m which facilitates safe movement into and out of the perpendicular car parking immediately adjacent to the street.
Carriageway Surface	As per the site layout design and landscaping drawings, the surfaces and materials used for the carriageway, footpath and pedestrian area are compliant with the requirements of DMURS whereby various surfaces will be contrasting colours and/or texture to encourage increased visibility and slower vehicle speeds.
Junction Design	In compliance with DMURS, the junctions within the development will be priority (stop) controlled consistent with the anticipated traffic flows for junctions between local streets, and between local streets with link streets.
Visibility / Sightlines	In compliance with DMURS, the required clear and unobstructed visibility splays and forward sight distances on both the horizontal and vertical planes have been provided for all junctions, crossings and other locations for a design speed of between 30-50km/h.

Design Element	Compliance Review
Traffic Calming	In compliance with DMURS, all road widths, horizontal alignment, corner radii, pedestrian and cyclist facilities, kerbs, boundary treatments, landscaping, forward sight distances and visibility splays have been designed to ensure maximum traffic calming within the site.
Kerbs	In compliance with DMURS, the proposed kerb height is 75mm. DMURS provides indicative kerbs heights of between 50-75mm or less for Local streets with lower design speeds.
Parking / Loading	In compliance with DMURS, the proposed car park includes a combination of perpendicular and parallel parking on both sides, mobility impaired spaces and a loading (set down) area to encourage lower speeds.
Vehicle Swept Path	In compliance with DMURS and in response to the Quality and Road Safety Audit, an assessment was undertaken during the site layout design process to ensure that multiple vehicle types including car, refuse, emergency, service and delivery vehicles can access, egress, park and safely negotiate the internal road layout.
Multi-disciplinary Design Team	In compliance with DMURS, the design of the development has been prepared by a multi-disciplinary design team, including but not limited to 1. Architects: Fewer Harrington and Partners Architects 2. Civil Engineers: Malone O'Regan Consulting Engineers 3. Traffic Engineers: Coakley Consulting Engineers 4. Road Safety Engineers: PMCE Consulting Engineers 5. Planners: McCutcheon Halley Planning Consultants 6. Landscape Architects: Cunnane Stratton Reynolds 7. Public Lighting: Lawler Consulting 8. NIS/Ecology: Russell Environmental 9. Others.
DMURS Quality Audit and Road Safety Audit	In compliance with DMURS, independent Quality Audit (QA) report of the proposed site layout was undertaken by a TII approved independent audit team and is contained in Appendix B of the Traffic and Transport Assessment (TTA) report submitted for planning. The Quality Audit Report combines a range of DMURS audit elements into one single report including a community street audit, formal Road Safety Audit

Design Element	Compliance Review
	(RSA) to TII standards, Access Audit, Walking Audit, Non-Motorised User Audit and Cycle Audit. The recommendations made by both the Road Safety Audit and Quality Audit report have been reviewed and accepted in full by the design team and these recommendations have been addressed and incorporated into the final site layout drawings submitted for planning.