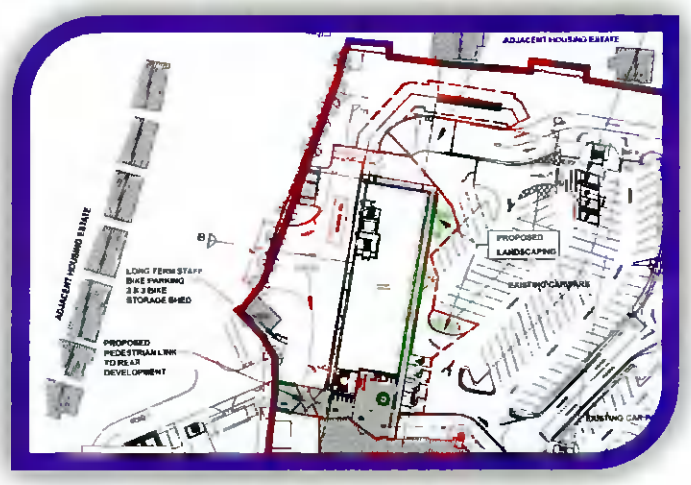
Proposed Development at Lucan Shopping Centre, Lucan, Co. Dublin

For ERF Lucan Investment DAC



TRANSPORT INSIGHTS

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2	Draft TTA Report v1.5	CMcK	26/04/2021
3	Draft Final TTA Report v1.8	CMcK	16/06/2021
4	Revised Draft Final TTA Report v2.0	CMcK	20/01/2022
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2	Final TTA Report v1.9	CMcK	16/06/2021
3	Revised Draft Final TTA Report v2.1	CMcK	26/01/2022
4	Revised Final TTA Report v2.2	CMcK	04/02/2022
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Appendices

1. Introduction

1.1. Overview

Transport Insights has been commissioned by ERF Lucan Investment DAC to provide transport consultancy support and to prepare a Traffic and Transport Assessment (TTA) and Mobility Management Plan (MMP) for a proposed development at Lucan Shopping Centre, Newcastle Road, Lucan, Co. Dublin.

The original TTA submitted at planning (June 2021) has been revised to address Item 6.2 of Additional Information Request (AIR) issued by South Dublin County Council on 16 August 2021. This document forms the revised TTA. The revisions have been applied to the relevant background Saturday traffic flows for Junction D: N4 Junction 4, North in Table 6.2, 6.5 and 6.9 in addition to revising related references within the paragraph following Table 6.9, Figure 6.1 and the Traffic Impact Assessment paragraph in Section 7. Other traffic and transport related AIR items are addressed within a separate AIR Traffic and Transport Response Note.

1.2. Site Location and Overview of Proposed Development

Site Location

Lucan Shopping Centre is a well-established Level 3 District Centre located to the west of Dublin City. The shopping centre is located on R120 (Newcastle Road), which connects the N4 to the north and N7. Figure 1.1 (overleaf) illustrates the site's location with respect to key road infrastructure within its vicinity.

The site is noted to be located ca. 300 metres to the south of the N4 and ca. 1 kilometre to the south of Lucan Village Centre. The site is accessed/ egressed via two locations on Newcastle Road – a four-arm roundabout (to car parking facilities) and a three-arm priority-controlled junction (mainly for deliveries and servicing). A variety of retail related land uses including food retail, café, restaurant, pharmacy and off-licence with a gross floor area (GFA) of ca. 12,192 sqm are currently operating on-site. In addition, Lucan Public Library and a medical practice are also located within the site, to the south side of the existing Shopping Centre building. A total of 702 no. dedicated car parking spaces are provided within the site's surface level (451 no.) and underground (251 no.) car park.

Figure 1.1 Site Location

Overview of Proposed Development

The proposed development comprises a single building extension with two primary units as described below:

- Unit-1: A discount variety retailer with storage facility (ca. 1,056 sqm GFA – 50% retail comparison and 50% retail convenience);
- Unit-2: Commercial unit (option of Gymnasium or Medical Centre envisaged with ca. 518 sqm GFA); and
- removal of 87 no. surface level car parking bays.

The proposed new retail/ commercial floor areas represent a ca. 13% increase over the existing Shopping Centre's GFA. A full description of the proposed development is included within Section 5 of this Report.

1.3. TTA Scoping

Pre-planning correspondence took place with South Dublin County Council's (SDCC's) Land Use Planning and Transportation Department during February and March 2021. Following issue of a Traffic and Transport Assessment Scoping Note to SDCC in relation to the proposed development, a response

was received by email on 12 March 2021. Within the correspondence, SDCC noted the R120 Newcastle Road to be of particular interest to the assessment, given that it accommodates heavy traffic volumes during AM and PM peak times. SDCC requested a number of items to be included as part any application submitted in support of development at site, and these are summarised in the following Table 1.1.

Table 1.1 Local Authority Pre-Planning Scoping Comments and Response

SDCC Comment	How Item Addressed in Report/ Elsewhere
The transport links to Somerton and the Adamstown SDZ have to be addressed. These should include vehicle, pedestrian and cycle links from the Shopping Centre to Adamstown SDZ. Planning Grants within the neighbouring plots to the west of your proposed site have adjoining transport links incorporated in their designs. These links must be joined to your proposal.	A new pedestrian and cycle link between the Shopping Centre and the Somerton site to the west has been incorporated within the proposed layout. Given the moderate scale of the proposed development, incorporating a vehicular link is not deemed to be financially viable.
In general, a mobility plan needs to be completed to encourage Public Transport and Active travel and an effort to reduce car travel and car parking spaces. Cycle links and pedestrian linkages need to be detailed in the plans.	A Mobility Management Plan (MMP) has been prepared and is submitted to SDCC in support of this application.
The receiving road network, particularly the R120, is very busy at peak am and pm times. This congestion has been a long-standing feature of this area in pre-Covid times. Any surveying which is conducted now must be appropriately factored to reflect the normal traffic levels at this location.	Background traffic was factored according to traffic volumes in pre-Covid conditions. This is addressed in Section 6 of this Report.
The TTA shall use appropriate base traffic data.	Base traffic data was informed by the classified junction turning count traffic survey and factored to pre-Covid traffic volumes. A summary of survey results is presented in Section 4 and factored base year traffic data is presented in Section 6 of this Report.
TTA be calculated for base year, year of opening and year of opening +15 years.	Traffic impacts have been calculated for the base year, year of opening and year of opening +15 years. These have been discussed and presented in Section 6 of this Report.

SDCC Comment	How Item Addressed in Report/ Elsewhere
Appropriate TRICS data must be used for the Trip generation of the proposed development. The sites used as the core data must be reflective of a typical shopping centre in the Dublin context.	Appropriate TRICS data has been considered regarding Lucan Shopping Centre's location and the intended of use of the extended building.
Transport permeability for all modes of travel must be considered. The Applicant shall ensure good transport linkages to all desire lines.	Transport permeability has been considered and described in the Mobility Management Plan (MMP).

The scope of the TTA, including traffic impact approach, is consistent with the Transport Infrastructure Ireland's (TII) *Traffic and Transport Assessment Guidelines*, May 2014 and has been agreed in principle with SDCC's Land Use Planning and Transportation Department.

1.4. Report Structure

The remainder of this Report is structured as follows:

- **Chapter 2** provides an overview of the relevant local, regional and national policy;
- **Chapter 3** describes the proposed development's receiving environment;
- **Chapter 4** provides an overview of traffic survey data collection and analysis;
- **Chapter 5** describes the development proposal;
- **Chapter 6** sets out the proposed development's anticipated traffic impacts; and
- **Chapter 7** provides an overall summary and conclusion.

2. Key Policy Review

2.1. Introduction

This section of the Report provides an overview of national, regional and local policy and guidance deemed relevant to the proposed development and its assessment.

2.2. National Policy and Guidance

Transport Infrastructure Ireland (TII) Traffic and Transport Assessment Guidelines (2014)

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

In relation to scoping, the guidance states.

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

In relation to the Assessment:

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

Section 2.1 of the *Guidelines* sets out thresholds for production of a Traffic and Transport Assessment. Where national roads are affected, the following guidance is provided in relation to whether more specific junction capacity analysis may be warranted:

> *"Development traffic exceeds 5% of turning movements at junctions with National Roads if location has potential to become congested or sensitive."*

2.3. Regional Policy and Guidance

Regional Spatial and Economic Strategy (RSES)

The *Regional Spatial and Economic Strategy* (RSES) is a strategic plan to support the implementation of *Project Ireland 2040 – National Planning Framework* and *National Development Plan 2019-2027*. Its

aim is to support the economic policies of the Government by providing a long-term strategic planning and economic framework for the development of the Regions.

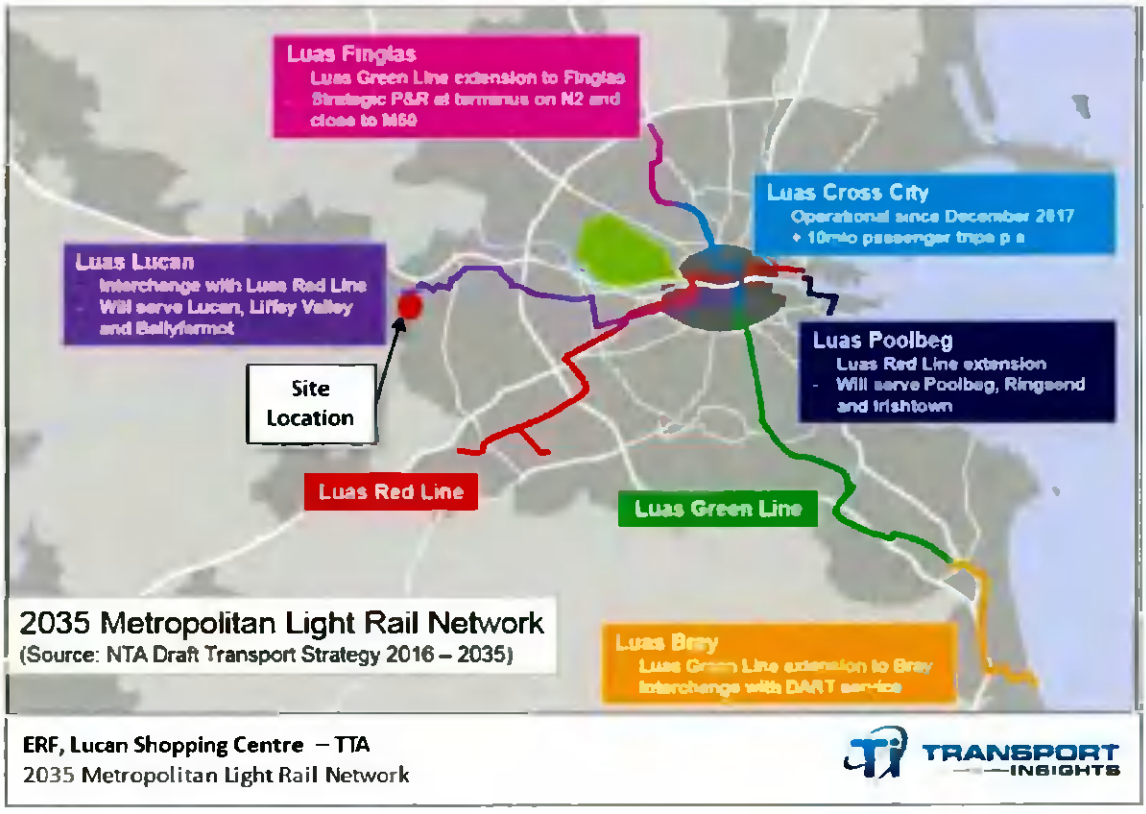
Dublin Metropolitan Area Strategic Plan (MASP)

This RSES includes the *Dublin Metropolitan Area Strategic Plan* (MASP), which provides objectives and guidance for the growth of the Dublin Metropolitan Area, including infrastructure, integrated land use and transportation, green infrastructure and amenities. Strategic development corridors include the South – West Corridor, which comprises new roads and railway bridge, new rail station, DART expansion to Celbridge-Hazelhatch (Adamstown, Clonburris).

Luas Expansion to Lucan 2035

The proposal to develop a new Luas line to Lucan is included in the current *Transport Strategy for Greater Dublin Area 2016-2035* (National Transport Authority, 2016), as illustrated in the following Figure 2.1. The Luas is proposed to serve Lucan, Liffey Valley and Ballyfermot areas, with its indicative alignment passing close to Lucan Shopping Centre.

Figure 2.1 2035 Metropolitan Light Rail Network Illustrating Luas Line to Lucan

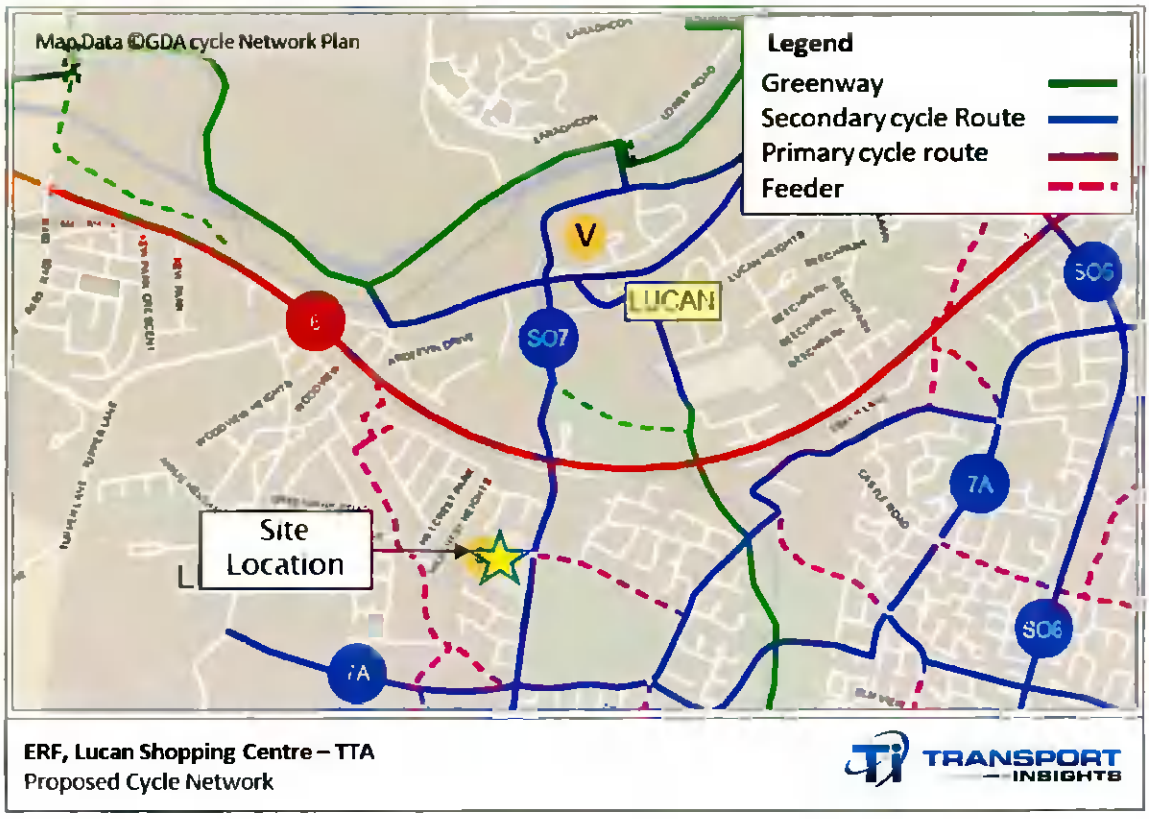


Greater Dublin Area (GDA) Cycle Network Plan 2013

The *Greater Dublin Area Cycle Network Plan*, published by the National Transport Authority in 2013, outlines the existing and proposed primary, secondary, inter-urban and greenway routes for each local

authority within the Greater Dublin Area (GDA), including the SDCC administrative area. The *Plan* sets out a series of enhancements to existing cycle routes, in addition to new cycle routes in vicinity of the application site, as illustrated in the following Figure 2.2.

Figure 2.2 Proposed GDA Cycle Network Plan



BusConnects

The *BusConnects* programme was launched by the National Transport Authority in May 2017, and is described as[1] *"a plan to fundamentally transform Dublin's bus system, so that journeys by bus will be fast, reliable, punctual, convenient and affordable. It will enable more people to travel by bus than ever before, and allow bus commuting to become a viable and attractive choice for employees, students, shoppers and visitors."*

The *BusConnects* programme contains three key elements:

- Dublin Area Bus Network Redesign (New Dublin Area Bus Network) Project;
- fare and ticketing enhancements; and
- better quality bus infrastructure, including Core Bus Corridors identification and enhancement.

[1] https://www.busconnects.ie/about/

Specific bus service plans which have emerged as final outputs of the New Dublin Area Bus Network were published by the National Transport Authority in September 2020 which are of relevance to the application site's sustainable connectivity attributes are presented within Figure 2.3.

Figure 2.3 Proposed Bus Network

As can be seen from the preceding Figure 2.3, the application site is located ca. 400 metres from Spine Routes of C1 and C2, which will provide cumulative frequencies of 15 buses per peak hour. The revised bus network will be implemented by the National Transport Authority on a phased basis over a number of years, commencing in 2021.

2.4. Local Policy and Guidance

South Dublin County Council Development Plan 2016-2022

The *South Dublin County Council Development Plan 2016-2022* provides the overarching planning framework for development within the South Dublin administrative area until 2022. Of primary importance from a traffic and transportation perspective are development car and cycle parking standards, outlined hereunder.

Car Parking Provision

The *South Dublin County Development Plan 2016-2022* sets out maximum car parking rates for non-residential development in Table 11.23. Parking rates are divided into two main categories:

- Zone 1: General rate applicable throughout the County; and
- Zone 2 (Non-Residential): More restrictive rates for application closer to high quality Public transport services – including any proposed services.

The Zone 2 parking standards are more applicable to the proposed Lucan Shopping Centre extension due to the site's close proximity to high-capacity and high-frequency bus routes under *BusConnects* programme (Spine routes C1 and C2 within 400 meters). Therefore, the maximum car parking standards applicable for the proposed development using Zone 2 rates is:

- Retail Convenience: 1 per 25 sqm GFA;
- Retail Comparison: 1 per 35 sqm GFA;
- Clinics and Group Practices: 1.5 per consulting room; and
- Gymnasium: 1 per 40 sqm GFA.

The parking calculations for Unit-2 has been undertaken on the assumption of Gymnasium within this TTA Report, as such a determination is deemed more conservative.

Cycle Parking Provision

In terms of cycle parking provision, Table 11.22 of the current *Development Plan* sets out a minimum requirement for different land uses. The requirements applicable to this proposed development are:

- Retail Convenience: 1 no. cycle parking per 50 sqm GFA for short-stay and 1 per 5 staff for long-term;
- Retail Comparison: 1 no. cycle parking per 50 sqm GFA for short-stay and 1 per 5 staff for long-term;
- Clinics and Group Practices: 1 no. cycle parking per 0.5 consulting room for short-stay and 1 per 5 staff for long-term; and
- Gymnasium: 1 no. cycle parking per 50 sqm GFA for short-stay and 1 per staff member for long-term.

Akin to the Unit-2 car parking assumption above, the bicycle parking calculation for Unit-2 has also been based on Gymnasium land use within this TTA Report.

3. Site Context

3.1. Introduction

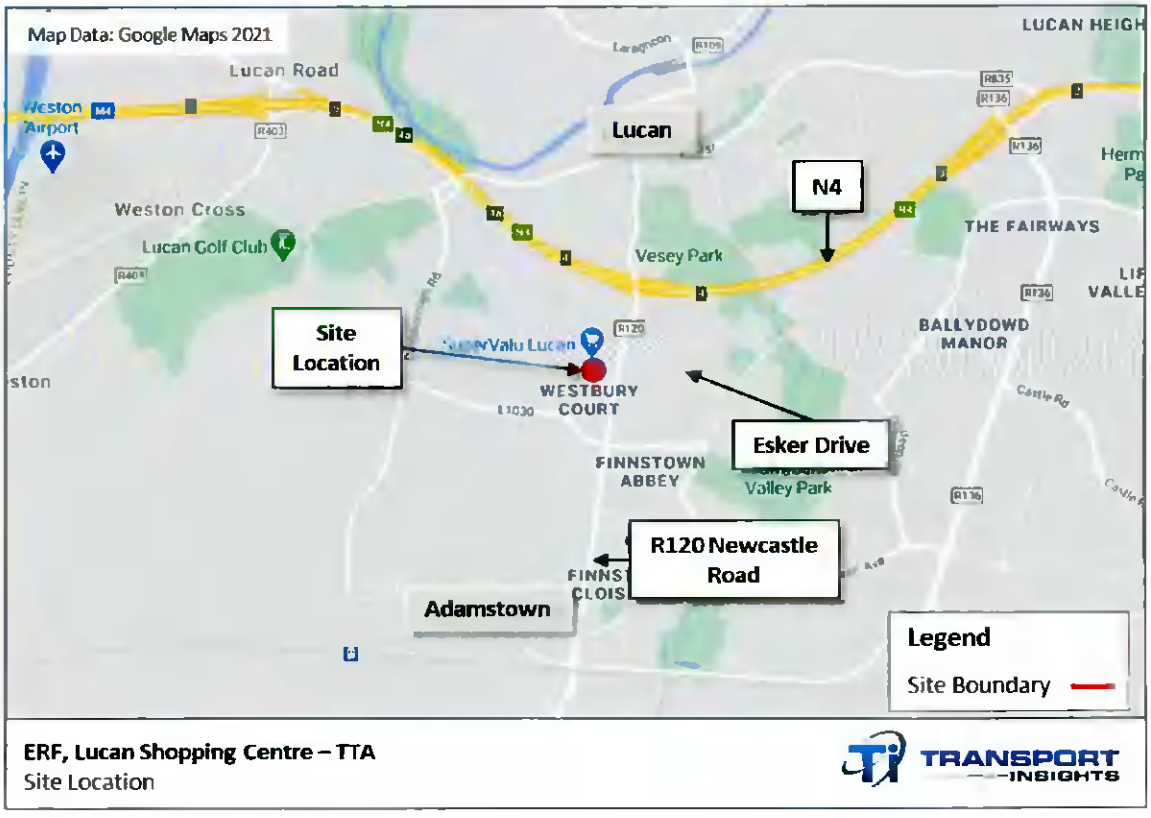
To assess the proposed development's potential impact, an appreciation of the existing situation first needs to be established. This section of the Report describes the existing site layout, access arrangements, the local road network and background traffic conditions. The existing conditions presented here represents an evidence-based review, and have been informed by a high-level desktop review of the study area and its surrounding transport network. It covers pedestrians, cyclists, and public transport infrastructure and service provision.

3.2. Site Location and Access

Site Location

As outlined within Section 1.2 and Figure 1.1 of this Report, the Lucan Shopping Centre site is located to the west of Dublin City, to the south of Lucan Village and to the north of Adamstown. The shopping centre is accessed via R120 (Newcastle Road) through 2 no. site accesses. N4 national road is located ca. 250-metres to the north of the site as shown in the following Figure 3.1.

Figure 3.1 Site Location



Existing Main Site Access (Car Parking)

The main access to the Shopping Centre is through a four-arm roundabout with R120 Newcastle Road and Esker Drive, located to the east of the site. The main site access junction accommodates access and egress for both staff and customers to car parks located on the ground level and basement level.

Existing Secondary Site Access (Goods and Deliveries)

The secondary site access to the site is through a three-arm priority-controlled junction with R120 Newcastle Road, ca. 160-metres to the south of the main site access. The secondary site access junction accommodates both accessing and egressing traffic, mainly for the deliveries and service vehicles but also to/ from the Shopping Centre car park (adjacent to Lucan Public Library).

3.3. Local Road Network and Junctions

R120 Newcastle Road

R120 Newcastle Road is a two-way regional road which connects the N7 national road located ca. 7-kilometres to the south of site to the N4 national road located ca. 300-metres to the north of the site. R120 has a ca. 18-metres wide carriageway in the vicinity of the site, which comprises one general traffic lane in each direction and a separate bus lane in each direction. Footpaths are located along both sides of the road. A 50 km/h speed limit is in place on R120, and street lighting is present.

Esker Drive

Esker Drive is a two-way local road which connects Esker Cottages with R120 Newcastle Road. Traffic calming is provided on Esker Drive in the form of speed ramps, one of which is located ca. 35-metres from the roundabout junction with R120 Newcastle Road.

Footpaths are located along both sides of the road. A 50 km/h speed limit is in place on Esker Drive, and street lighting is present.

N4

N4 is a national primary road located ca. 300-metres to the north of the site and connects M50/ Dublin with Mullingar, Longford, Carrick-on-Shannon and Sligo.

R120 Newcastle Road/ Secondary Site Access Junction

Secondary site access intersects with R120 Newcastle Road via a stop-controlled junction, with R120 Newcastle Road forming the major arm and site access forming a minor arm of the junction.

Stop road markings and a stop sign are located on the minor arm of the junction and yellow box located on major arm of the junction, street lighting is also provided.

Footpaths are located on each side of all arms of the junction. Additionally, dropped kerbs to facilitate pedestrian crossing are provided at the minor arm.

A classified junction turning count traffic survey was undertaken at this junction, with a summary of its results included within Section 4 of this Report.

R120 Newcastle Road/Main Site Access/ Esker Drive Roundabout Junction

the main site access arm and Esker Drive intersect with R120 Newcastle Road to form a four-arm roundabout junction. Yield road markings and yield sign are located on all arms of the junction and a yellow box is provided at the roundabout to Lucan Shopping Centre access and egress arm.

In addition, a signalised pedestrian crossing is present at R120 Newcastle Road arms and Esker Drive arm and street lighting is also provided at the junction.

A classified junction turning count traffic survey was undertaken at this junction, with a summary of its results included within Section 4 of this Report.

N4 – R120 Newcastle Road Interchange

R120 Newcastle Road intersects the N4 via an interchange. The south side of the interchange provides access to and from R120 Newcastle Road to the N4 (towards Sligo) and is located ca. 300-metres to the north of the site.

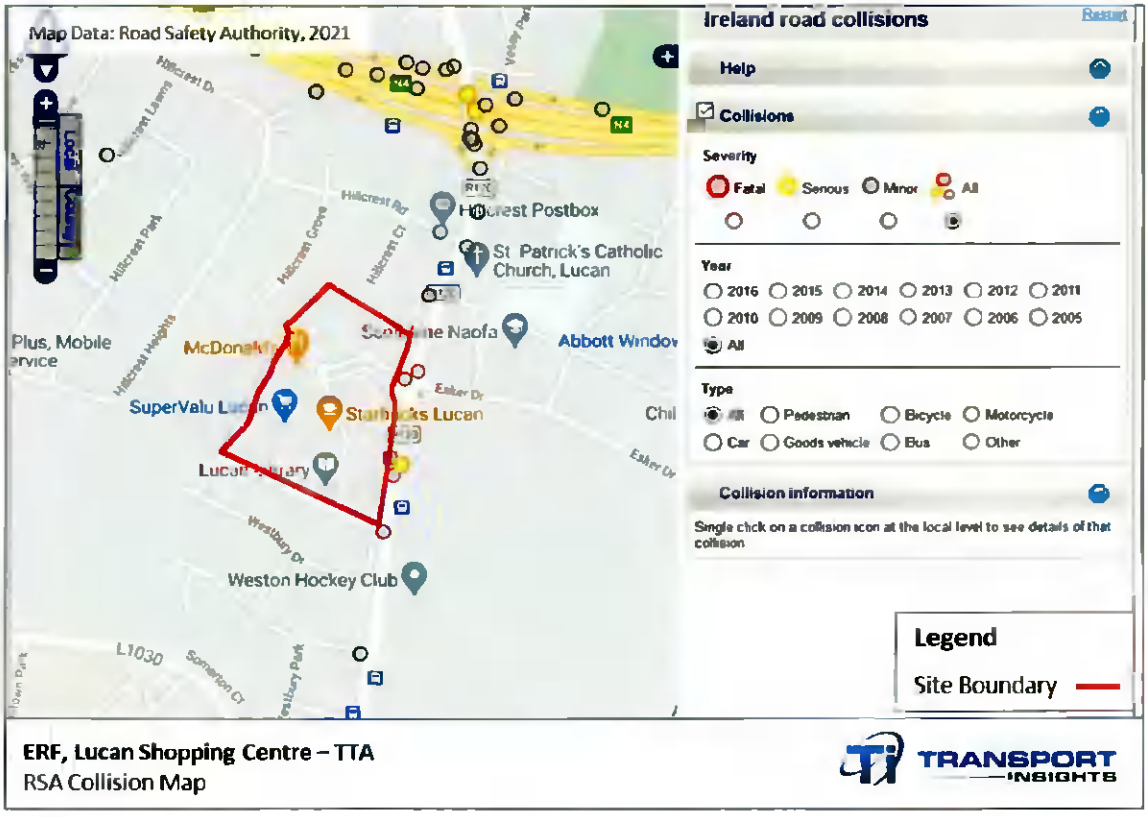
The north side of the interchange provides access to and from R120 Adamstown Road and Versey Park to the N4 (towards M50, Dublin).

A classified junction turning count traffic survey was undertaken at this interchange as part of the assessment with a summary of its results included within Section 4 of this Report.

3.4. Road Traffic Collision Data Analysis

Data from the Road Safety Authority (RSA) collision database was used to assess the safety performance characteristics of the local road network. The database contains information on all reported collisions by severity of injury incurred (i.e. fatal, serious or minor) and by year the collision occurred.

Figure 3.2 Road Collision Data 2005-2016



ERF, Lucan Shopping Centre – TTA
RSA Collision Map

Figure 3.2 illustrates the location of all collisions in the vicinity of the site for the twelve-year period from 2005 to 2016 inclusive. Four minor collisions and one serious collision have been recorded on the road network adjacent to the site. Two minor collisions adjacent to the site access roundabout were recorded in 2015 both of which involved a car, related to a rear end conflict and other circumstances. One minor collision was recorded in 2012 adjacent to the 3-arm site access junction involving a car and a pedestrian. The fourth recorded collision dates from 2011 and it was a rear end conflict. Finally, the serious collision dates from 2005 and it was an undefined vehicle in other circumstances. Given the regional classification of R120 Newcastle Road, the available data indicates that there are no location-specific road safety concerns of relevance to the proposed development.

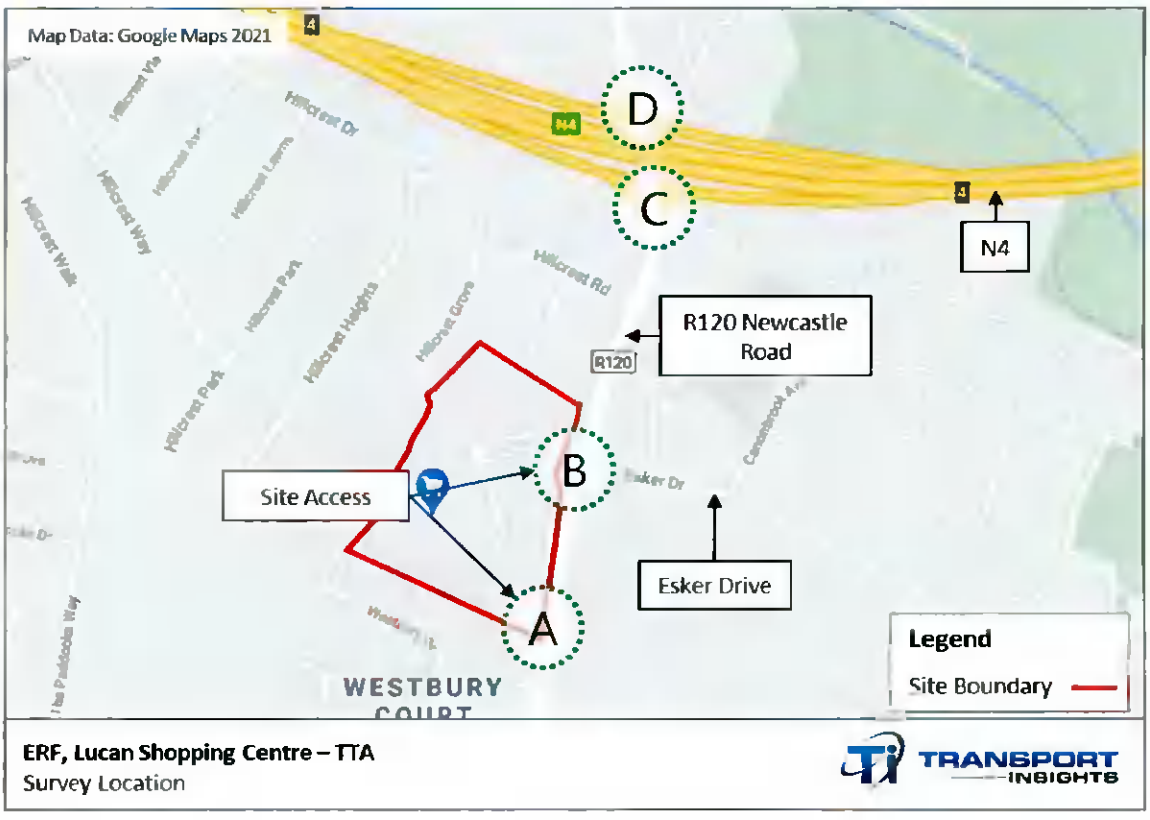
4. Traffic Survey Data Collection and Analysis

4.1 Introduction

In order to determine baseline traffic conditions and provide a basis from which future development traffic impact can be measured, classified Junction Turning Count (JTC) surveys were undertaken at four key junctions in the vicinity of the site, the locations of which are illustrated in Figure 4.1 below. The surveys were undertaken on Friday, 19 March 2021 and Saturday, 20 March 2021 (between 07:00 and 19:00 hours), both of which are considered as peak days for shopping and recreational activities. It allowed not only the peak times for site/ development related traffic to be captured, but also peak time periods for background traffic at the following junctions:

- three-arm Newcastle Road/ ancillary Shopping Centre access priority **junction (A);**
- four-arm Newcastle Road/ Shopping Centre access/ Esker Drive roundabout **junction (B)**; and
- N4 Interchange **(C&D)**, encompassing R120 (north and south of the junction), Vesey Park and on and off ramps to the N4 (mainline carriageway excluded).

Figure 4.1 Traffic Survey Locations



4.2 Summary Traffic Survey (JTC) Results

Following analysis of the traffic survey results, the AM and PM peak period on Friday and Saturday were determined total traffic flow through the junctions:

- **Friday:** 08:00hrs-08:59hrs AM Peak, and 17:00hrs-17:59hrs PM Peak; and
- **Saturday:** 12:15hrs-13:14hrs First peak and 15:45hrs-16:44hrs Second Peak.

The results of the survey for both peak periods on both days are summarised in the following Table 4.1 and Table 4.2.

Table 4.1 Traffic Survey Results Summary (Friday) – Total Approach Flows

Junction Location	AM Peak Hour (08:00hrs-08:59hrs)		PM Peak Hour (17:00hrs-17:59hrs)	
	Total Vehicles	Heavy Vehicles	Total Vehicles	Heavy Vehicles
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	1,180	95	1,255	64
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	1,634	97	1,852	62
Junction C: N4 Junction 4, South	1,582	89	1,602	63
Junction D: N4 Junction 4, North	1,204	60	1,018	32

As can be seen from the preceding Table 4.1, traffic volumes recorded on Friday at Junctions A, B and C during the AM peak (08:00hrs-08:59hrs) are slightly lower than the PM peak period (17:00hrs-17:59hrs) traffic volumes.

The total peak hour traffic volumes at Junction D (north side of N4 interchange) are lower compared to the other three junctions surveyed. Full traffic survey results are included within Appendix A of this Report.

Table 4.2 Traffic Survey Results Summary (Saturday) – Total Approach Flows

Junction Location	First Peak Hour (12:15hrs-13:14hrs)		Second Peak Hour (15:45hrs-16:44hrs)	
	Total Vehicles	Heavy Vehicles	Total Vehicles	Heavy Vehicles
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	1,152	34	1,105	20
Junction B: 4-arm roundabout	1,700	29	1,795	19

Junction Location	First Peak Hour (12:15hrs-13:14hrs)		Second Peak Hour (15:45hrs-16:44hrs)	
	Total Vehicles	Heavy Vehicles	Total Vehicles	Heavy Vehicles
R120 Newcastle Road/ Lucan SC access/ Esker Drive				
Junction C: N4 Junction 4, South	1,477	24	1,442	16
Junction D: N4 Junction 4, North	1,006	21	964	8

As can be seen from the preceding Table 4.2, traffic volumes recorded on Saturday at Junctions A, B and C 12:15hrs-13:14hrs peak hour are similar to the 15:45hrs-16:44hrs peak hour.

The total peak hour traffic volumes at Junction D (north side of N4 interchange) are again observed to be lower compared to the other three junctions. Full traffic survey results are included within Appendix A of this Report.

4.3 Summary Traffic Survey (Parking Accumulation) Results

Existing on-site car parking facilities comprise a total 702 no. car parking bays, summarised in the following Table 4.3.

Table 4.3 Car Parking Breakdown

Level	Normal Bays	Disabled	Family	Electric Charging	Click & Collect
Surface Level	433	8	8	2	0
Underground	235	3	11	0	2
				TOTAL	**702**

In order to determine and establish the car park accumulation profile during the store opening times, a traffic count survey was undertaken at both site accesses to record the vehicles accessing and egressing the site. Due to an error in undertaking the traffic surveys summarised in Tables 4.1 and 4.2 (with the car park's occupancy at the start of the survey period not recorded), the surveys of site access junctions were undertaken on Friday, 02 April 2021 and Saturday, 03 April 2021, coinciding with start of the Easter weekend.

Data was collected over two days period and analysed at 15-minute intervals. The car park occupancy status prior to the survey commencing (before 07:00 hours) were duly noted and factored into the

accumulation analysis. The following Table 4.4 presents average and peak occupancy levels within the car park across the survey period on both days, i.e. 07:00-18:59hrs.

Table 4.4 Lucan Shopping Centre – Survey Results Overview (07:00 – 18:59hrs)

	Friday (02 April 2021)	Saturday (03 April 2021)	Average
Initial no. parked light vehicles (before 07:00hrs)	58	43	-
Total no. light vehicles accessing the site (07:00hrs – 18:59hrs)	5,024	5,143	5,084
Average no. parked light vehicles (07:00hrs – 18:59hrs)	277	268	272
Average % occupancy (07:00hrs – 18:59hrs)	40%	38%	39%
Peak % occupancy (and time recorded)	56% (12:45hrs and 13:00hrs)	53% (14:15hrs)	-

Full traffic survey results are included within Appendix A of this Report.

Notwithstanding the temporary impacts of Covid-19, it is observed that the car park at Lucan Shopping Centre is currently operating well below its theoretical operating capacity threshold (85-90% occupancy). It can therefore be concluded that the existing car park has latent capacity to accommodate moderate levels of increased demand generated by the proposed development and a reduction in on-site car parking provision.

The submitted Mobility Management Plan (MMP) will further assist in prompting use of active and sustainable modes of travel, thereby reducing car use among staff and customers of the expanded Shopping Centre, and in doing so reduce car parking demand.

5. Description of Proposed Development

5.1 Introduction

This section of the TTA describes key physical attributes of the proposed development including internal site layout characteristics, proposed car and cycle parking provision and provision of links for other modes.

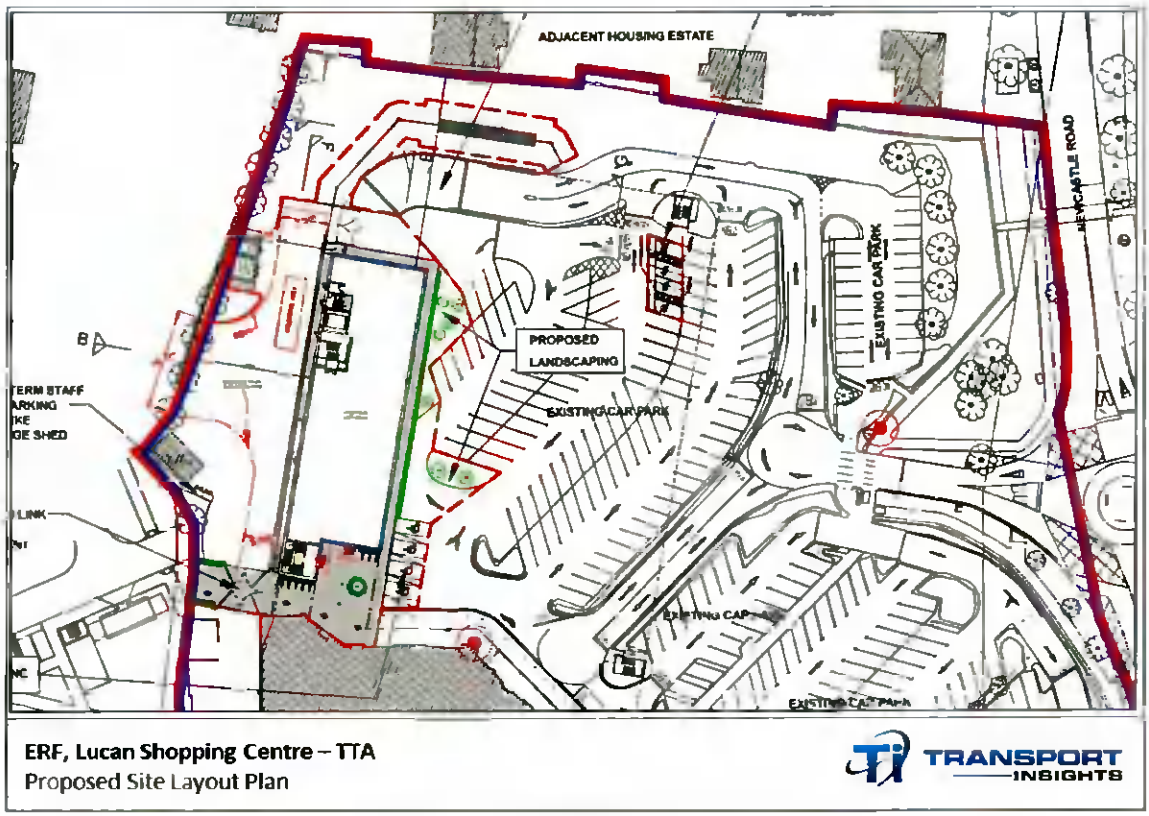
5.2 Proposed Development

As outlined within Section 1.2, the proposed development comprises of a single building extension with two primary units as described below:

- Unit-1: A discount variety retailer with storage facility (ca. 1,056 sqm GFA – 50% retail comparison and 50% retail convenience);
- Unit-2: Commercial unit (option of Gymnasium or Medical Centre envisaged with ca. 518 sqm GFA); and
- removal of 87 no. surface level car parking bays.

The above retail/ commercial floor areas represent a ca. 13% increase over the existing Shopping Centre's GFA. The proposed site layout is presented in Figure 5.1 (overleaf).

Figure 5.1 Proposed Site Layout Plan (Drawing Reference: 210611 Lucan SC Extension - Planning-PL02 Site Layout)



Car Parking

Lucan Shopping Centre currently has 702 no. car parking bays at surface and basement levels, and the development of the new extension is expected to result in a loss of 87 no. car parking bays at surface level, resulting in a total of 615 no. bays. Lucan Shopping Centre is deemed to fall under Zone-2 parking standards of the current *South Dublin County Council Development Plan* due to the site's close proximity to high-quality Spine bus routes of C1 and C2 emerging from the New Dublin Area Bus Network Project (see Section 2.3 of this Report). These two high quality public transport corridors warrant a more restricted car parking requirement for the new extension and overall Lucan Shopping Centre site.

As can be seen from the following Table 5.1, there is ample existing car parking at the site and owing to reduced car parking requirement, it is anticipated that new extension shall not need any new parking provision, with a residual surplus car parking of ca. 84 no. bays determined for the overall site.

Table 5.1 Car Parking Requirement Analysis

	No. Parking Spaces	Maximum Parking No. Parking Spaces: As per Zone-2
Existing built-up Area	702 (A)	482 (B)

	No. Parking Spaces	Maximum Parking No. Parking Spaces: As per Zone-2
Proposed Extension (Unit-1)	-	36 (D1)[2]
Proposed Extension (Unit-2)	-	13 (D2)
Expected loss of car spaces	87 (C)	-
Total Surplus Parking Spaces = A – (B + C + D1 + D2) = 84		

The existing car parking layout has been retained as much as possible with unchanged parking widths. The car parking spaces affected by the new extension have either been incorporated into landscape design or circulation areas.

Electric Vehicle Parking:

The current *South Dublin County Council Development Plan* requires all new developments to have up to 10.0% of total car parking spaces to be facilitated for electric charging with the remainder of parking spaces to be capable of accommodating future charging points. Therefore, the total electric vehicle parking requirement for new extension at 10.0% of 49 (D1 + D2) is five spaces, but owing to electric substation load issues, only four spaces have been provided. These are optimally located close to the substation and the new extension building.

Disabled Parking:

The current *South Dublin County Council Development Plan* recommends using standards contained within *Building Regulations Ireland 2010*, which suggest that a minimum of 5.0% of the total parking spaces be designated disabled parking spaces. Therefore, the total disabled parking requirement for new extension at 5.0% of 49 (D1 + D2) is three spaces, however four spaces with dimensions of 6.0 metres * 2.4 metres are provided very close to the new extension building entrance.

Service Vehicle Turning Area

The delivery and service vehicles of all sizes currently use the south-western corner of the site to turn and egress from the site. As sufficient space exists to the west of the new building, a turning head is proposed to be installed facilitate turning of commercial vehicles. A swept path analysis has been undertaken to demonstrate the suitability of the proposed layout in accommodating the largest operational vehicle (a 16.5-metres-long articulated truck) as part of a conservative approach. Other service and delivery vehicles such as large refuse vehicle (11.4 metres), a large rigid truck (10.0 metres),

[2] Based on assumed 50% retail comparison and 50% retail convenience.

and a fire tender (12.0 metres) have also been tested for access, circulation and turning within the area.

Appendix B presents a to-scale version of the swept path analysis outputs for the proposed development site. The analysis has confirmed the proposed site layout to be satisfactory in accommodating the needs of these vehicles.

Cycle Parking

Currently, there is parking capacity for as many as 20 bicycles on the site. The current *South Dublin County Council Development Plan* recommends minimum cycle parking standards with a distinction drawn between short-stay and long-term parking. The long-term parking is relevant and applicable for the employees expected to work within the new extension, and is provided at a secure, protected and well-lit place behind the new extension building, near existing electric substation. The short-stay parking is most appropriate for the general public and is located in a highly visible area close to the entrance of the new extension, providing easy to access.

Both short-stay and long-term parking are relevant to the new extension, and a summary of the total additional cycle parking is presented in Table 5.2 below.

Table 5.2 Cycle Parking Requirement Analysis

	Short-Stay Cycle Parking	Long-Term Cycle Parking
Existing Cycle parking	20 (A)	-
Unit-1	21 (B)	2 (E)
Unit-2	10 (C)	1 (F)
Extra spaces due to Somerton development	9 (D)	-
Total Short Stay Cycle Parking Spaces = A + (B + C + D) = 60		
Total Long Term Cycle Parking Spaces = E + F = 3		

The total minimum short-stay cycle parking required for the new extension, as per the current *South Dublin County Council Development Plan* is 31 no. spaces, however 32 no. spaces have been provided, split into two separate locations that are very close to the entrance of the new extension building. These are located in a highly visible areas that are easy to access and provided in the form of standard cycle stands.

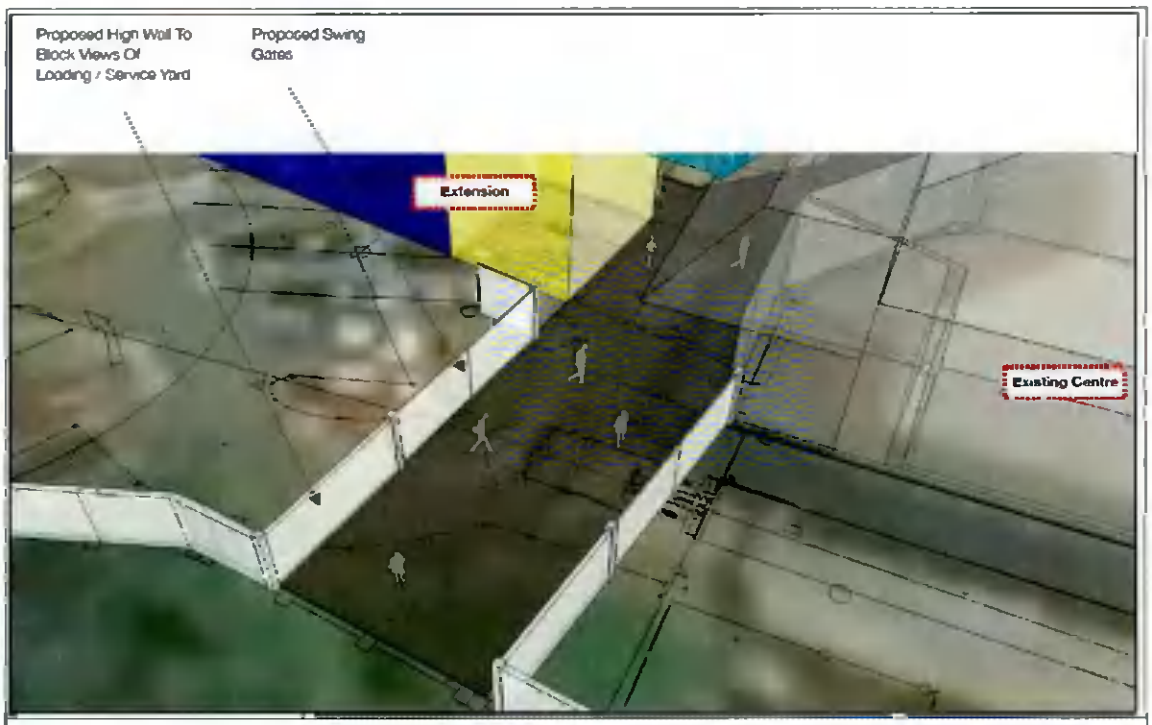
The total minimum long-term cycle parking required for the new extension, as per the current *Development Plan* is three, however six spaces have been provided in the form of secure and lockable bike storage sheds (2 no. 3 bike storage sheds) to promote commuting to work by cycling.

Pedestrian Facilities

All site entrances and entry points are connected to the new extension by a pedestrian link of appropriate width facilitating direct connection. The pedestrian footpath is 1.8-metres wide to accommodate two wheelchairs to pass each other. Pedestrian crossing has been provided at critical points internally within the site, in the form of well-lit zebra crossings.

A pedestrian and cycle connection will also be provided to and from adjacent Somerton development. This access intersects the service road to the rear of the site and therefore a system of access control has been proposed by using swing gates as shown in the following Figure 5.2. The gates will by default allow pedestrians and cyclists access from Somerton, however will be temporarily closed when any delivery vehicles have to pass, and opened immediately afterwards.

Figure 5.2 Proposed Access Control



ERF, Lucan Shopping Centre – TTA
Proposed Pedestrian Access Control from Somerton Site

6. Traffic Impact

6.1 Introduction

This section of the TTA sets out the approach pursued and assumptions underpinning the estimation of traffic in both scenarios of 'without development' and 'with-development'. It will cover all junctions under assessment and how the 'with development' traffic is assigned to the local road network. The assumed year of opening for the proposed development is 2022. Two peak time periods are considered on each day:

- the AM peak hour (08:00-08:59hrs) and the PM peak hour (17:00-17:59hrs) on Friday; and
- the two peak hours, namely 12:15hrs-13:14hrs and 15:45hrs-16:44hrs on Saturday.

It is noteworthy that the background traffic peak periods differ from the car parking peak times of 12:00-13:00hrs on Friday, and 11:00-12:00hrs on Saturday.

6.2 Background Traffic

At the time of the traffic surveys, the country was under Level-5 travel restrictions due to the on-going Covid-19 pandemic. In order to account for any potential impact this may have on traffic volumes, the traffic survey data was factored based on a comparison of pre Covid-19 to post Covid-19 traffic volumes from the closest TII Traffic Monitoring Unit (TMU) permanent traffic counter on the N4. This site is ca. 1.0-kilometres to the northeast of the development site. The equivalent Friday in 2019 (15 March 2019, representing pre-pandemic travel conditions) has been compared with counterpart date in 2021 (19 March 2021). Similarly, equivalent Saturday in 2019 (16 March 2019, representing pre-pandemic travel conditions) has been compared with counterpart date in 2021 (20 March 2021) to arrive at the factor for the recently undertaken traffic survey data.

Based on the TII dataset, the adjustment factor for a typical Friday was achieved by using the total traffic volumes recorded between 07:00hrs and 18:59hrs on 15 March 2019 and dividing it by total traffic volumes recorded on 19 March 2021, i.e. 70,288/ 54,888 (=1.28). Similarly, the adjustment factor for a typical Saturday was achieved by using the total traffic volumes recorded on 16 March 2019 and dividing it by traffic volumes recorded on 20 March 2021, i.e. 55,134/ 33,373 (=1.65). The factored background traffic data is presented in Table 6.1 (Friday) and Table 6.2 (Saturday) [both overleaf].

Table 6.1 Factored Background Traffic (Friday) – Total Approach Flows

Junction Location	AM Peak Hour (08:00hrs-08:59hrs)		PM Peak Hour (17:00hrs-17:59hrs)	
	Total Vehicles	Heavy Vehicles	Total Vehicles	Heavy Vehicles
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	1,512	122	1,608	82
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	2,093	124	2,372	80
Junction C: N4 Junction 4, South	2,025	113	2,052	81
Junction D: N4 Junction 4, North	1,541	75	1,304	41

Table 6.2 Factored Background Traffic (Saturday) – Total Approach Flows

Junction Location	First Peak Hour (12:15hrs-13:14hrs)		Second Peak Hour (15:45hrs-16:44hrs)	
	Total Vehicles	Heavy Vehicles	Total Vehicles	Heavy Vehicles
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	1,903	56	1,826	32
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	2,808	48	2,966	32
Junction C: N4 Junction 4, South	2,440	40	2,382	27
Junction D: N4 Junction 4, North	1,663	35	1,593	14

6.3 Do-Nothing (Without Development) Traffic Growth Forecasting

In order to understand the impact of the development proposals on the local road network, it is first necessary to establish the 'without development' or do-nothing scenario for the base year (2021), the year of opening (YoO, 2022), and the year of opening + 15 years (YoO+15, 2037). Traffic levels in the do-nothing scenario comprise forecast background traffic flows, which is assumed to grow organically over the assessment period.

Forecast Background Traffic Flows

Factored (as per Tables 6.1 and 6.2) traffic flows on the surrounding road network as determined via surveys undertaken in 2021 have been adjusted through application of appropriate growth factors to determine YoO and YoO+15 traffic flows. For this assessment, growth factors were determined from the Transport Infrastructure Ireland (TII) *Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections*, October 2016. Information within these guidelines is provided for the Region Dublin Metropolitan from 2016-2030 and from 2030-2040 for low, medium and high growth scenarios.

This information is provided for both heavy and light vehicles and was used to determine the future year do-nothing traffic flows. Medium growth factors were assumed for this assessment to determine future year background traffic flows on the surrounding road network. These factors for light vehicles (LVs) and heavy vehicles (HVs), are set out in Table 6.3 below.

Table 6.3 TII Traffic Growth Factors (Central) – Region Dublin Metropolitan

Year	Annual Growth Factor – LV	Annual Growth Factor – HV
2016-2030	1.0162	1.0295
2030-2040	1.0051	1.0136

Based on the TII medium growth factors in the preceding Table 6.3, 2021 traffic volumes from Tables 6.1 and 6.2 have been factored to YoO (2022) and YoO +15 years (2037) levels, to determine the future traffic volumes without the proposed development in place. The following Tables 6.4 (below) and Table 6.5 (overleaf) provide an overview of do-nothing peak period traffic volumes on Friday and Saturday respectively.

Table 6.4 Do-Nothing Friday (Total Approach Flows)

Junction Location	AM Peak Hour (08:00hrs-08:59hrs)		
	Base Year (2021)	YoO (2022)	YoO+15 (2037)
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	1,512	1,538	1,839
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	2,093	2,129	2,535
Junction C: N4 Junction 4, South	2,025	2,059	2,451
Junction D: N4 Junction 4, North	1,541	1,567	1,863

Junction Location	AM Peak Hour (08:00hrs-08:59hrs)		
	Base Year (2021)	YoO (2022)	YoO+15 (2037)
Junction Location	**PM Peak Hour (17:00hrs-17:59hrs)**		
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	1,608	1,635	1,944
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	2,372	2,411	2,859
Junction C: N4 Junction 4, South	2,052	2,086	2,476
Junction D: N4 Junction 4, North	1,304	1,326	1,571

Table 6.5 Do-Nothing Saturday (Total Approach Flows)

Junction Location	First Peak Hour (12:15hrs-13:15hrs)		
	Base Year (2021)	YoO (2022)	YoO+15 (2037)
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	1,903	1,935	2,292
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	2,808	2,854	3,374
Junction C: N4 Junction 4, South	2,440	2,480	2,931
Junction D*: N4 Junction 4, North	1,663	1,690	2,000
Junction Location	**Second Peak Hour (15:45hrs-16:44hrs)**		
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	1,826	1,856	2,194
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	2,966	3,014	3,559
Junction C: N4 Junction 4, South	2,382	2,421	2,859
Junction D: N4 Junction 4, North	1,593	1,619	1,911

Committed Developments

No committed developments have been identified in the vicinity of the application site, nor were any identified for inclusion in the analysis during the initial discussion with SDCC noted in Section 1.3.

6.4 Do-Something Traffic Generation

The 'with development' or do-something scenario represents the summation of future year background traffic and traffic associated with the proposed development.

Traffic Generation Analysis

The proposed development is expected to generate additional traffic on the local road network and as such an estimate of its trip generation potential is deemed essential. Traffic generation data has been derived from the industry standard TRICS database for suburban/ edge of town locations, as follows:

- Retail/K - Retail Park - Excluding Food for the 1,056 sqm designated to Unit 1 (50% retail comparison and 50% retail convenience), which is envisaged to be used as retail store.
- Health/G - GP Surgeries for the 518 sqm which could be used as a medical centre designated to Unit 2.
- Leisure/K - Fitness Club (Private) for the 518 sqm which could be used as a gymnasium designated to Unit 2.

The land use of Unit 1 is set to be a retail store however, land use of Unit 2 is yet to be confirmed. In this situation, a robust assessment was undertaken by using the highest combination of the traffic generation, to provide the most conservative basis for determining the proposed development's traffic impact. The following Table 6.6 presents the forecast AM and PM peak hour development traffic trip generation outputs for Friday and Saturday.

Table 6.6 Traffic Generation Rates and Number of Trips

Peak Periods		Friday		Saturday	
		AM Peak (08:00hrs-08:59hrs)	PM Peak (17:00hrs-17:59hrs)	First Peak Hour (12:15hrs-13:14hrs)	Second Peak Hour (15:45hrs-16:44hrs)
Retail and Medical Centre					
Retail - Retail Park - Excluding Food	*Trip Rate (per unit)*	*0.844*	*3.879*	*6.229*	*5.934*
	Number of Trips (1,056 sqm)	9	41	66	63
Health - GP Surgeries	*Trip Rate (per unit)*	*6.116*	*4.615*	*6.212*	*7.24*
	Number of Trips (518 sqm)	32	24	32	37
Total Two-Way Trips		**41**	**65**	**98**	**100**
Retail and Gymnasium					
Retail - Retail Park -	*Trip Rate (per unit)*	*0.844*	*3.879*	*6.229*	*5.934*

Peak Periods		Friday		Saturday	
		AM Peak (08:00hrs-08:59hrs)	PM Peak (17:00hrs-17:59hrs)	First Peak Hour (12:15hrs-13:14hrs)	Second Peak Hour (15:45hrs-16:44hrs)
Excluding Food	Number of Trips (1,056 sqm)	9	41	66	63
Leisure/K - Fitness Club (Private)	*Trip Rate (per unit)*	*0.008*	*0.022*	*0.009*	*0.010*
	Number of Trips (518 sqm)	4	11	5	5
Total Two-Way Trips		**13**	**52**	**70**	**67**

As can be seen from the preceding Table 6.6, the traffic generation estimates for the Retail and Medical Centre are consistently higher in all peak periods on both weekday and weekend, as compared to the Retail and Gymnasium. The Retail and Medical Centre is expected to generate 41 additional two-way vehicle trips during the weekday AM peak hour; and 65 additional two-way vehicle trips during the weekday PM peak hour. For the weekend, the proposed development would generate 98 additional two-way vehicle trips during AM peak hour and 100 additional two-way vehicle trips during the PM peak hour.

Full TRICS trip generation data has been included as Appendix C.

It is noted that as the proposed development represents an expansion of the existing Lucan Shopping Centre, a proportion of trips associated with the extension would be linked to existing on-site land uses. To provide a conservative basis for traffic impact analysis purposes, such linked trips have not been factored into a reduction in the overall trip generation data set out in Table 6.6.

Trip Distribution and Assignment

The traffic trip distribution and assignment has been undertaken only for the highest traffic generation case of Retail and Medical Centre. It is assumed that the development related traffic will follow the existing distribution pattern identified by the junction turning count surveys. This has been reflected in the assumed traffic distribution at the R120 Newcastle Road/ Lucan SC access junction, R120 Newcastle Road/ Lucan SC access/ Esker Drive roundabout junction, and 2 no. N4 junctions. The development traffic has been distributed proportionally to the background traffic patterns.

Key assumptions underpinning the subsequent traffic forecasting are as follows:

- Due to the proposed extension's location in the north-western part of the site, it is anticipated that northbound development-related traffic (61% in the AM peak and 67% in the PM peak on Friday, and 68% in the first peak and 73% in the second peak on Saturday) will approach from/

depart to the northeast access at the R120 Newcastle Road/ Lucan SC access/ Esker Drive roundabout junction, with southbound traffic (39% in the AM peak and 33% in the PM peak on Friday, 32% in the first peak and 27% in the second peak on Saturday) approaching from/ departing to the southeast access at the R120/ Site Access junction. This distribution follows the existing observed distribution patterns.

- The proposed development traffic in the northbound direction was distributed accordingly to the existing traffic distribution throughout the N4 interchange. As such, 61% in the AM peak and 67% in the PM peak on Friday, and 68% in the first peak and 73% in the second peak on Saturday on N4 junction south, and 44% in the AM peak and 39% in the PM peak on Friday, 43% in the first peak and 45% in the second peak on Saturday on N4 junction north.

The development traffic has been proportionally distributed among the four junctions as per the following Table 6.7.

Table 6.7 Developement Traffic Trip Distribution

Junction Location	Friday		Saturday	
	AM Peak Hour (08:00hrs-08:59hrs)	PM Peak Hour (17:00hrs-17:59hrs)	First Peak Hour (12:15hrs-13:14hrs)	Second Peak Hour (15:45hrs-16:44hrs)
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	16	22	32	27
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	25	43	66	73
Junction C: N4 Junction 4, South	25	43	66	73
Junction D: N4 Junction 4, North	18	25	42	45

Do-Something Traffic Flows

The following Tables 6.8 (Friday) and 6.9 (Saturday) provide an overview of year of opening AM and PM peak period do-something traffic flows through analysed junctions.

Table 6.8 Do-Something (Friday) – Total Approach Flows

Junction Location	AM Peak Hour (08:00hrs-08:59hrs)		
	Base Year (2021)	YoO (2022)	YoO+15 (2037)
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	-	1,554	1,855

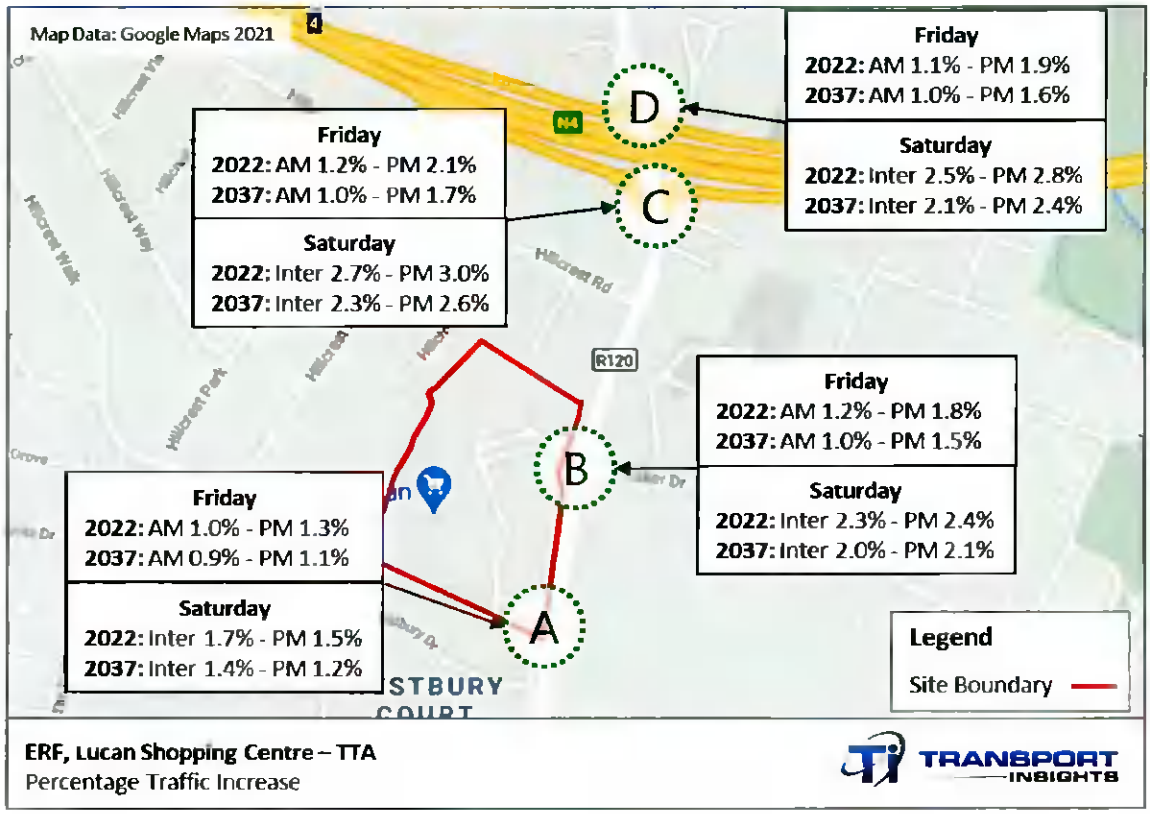
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	-	2,154	2,560
Junction C: N4 Junction 4, South	-	2,084	2,476
Junction D: N4 Junction 4, North	-	1,585	1,881
Junction Location	**PM Peak Hour (17:00hrs-17:59hrs)**		
	Base Year (2021)	**YoO (2022)**	**YoO+15 (2037)**
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	-	1,657	1,966
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	-	2,454	2,902
Junction C: N4 Junction 4, South	-	2,129	2,519
Junction D: N4 Junction 4, North	-	1,351	1,596

Table 6.9 Do-Something (Saturday) Total Approach Flows

Junction Location	**First Peak Hour (12:15hrs-13:15hrs)**		
	Base Year (2021)	**YoO (2022)**	**YoO+15 (2037)**
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	-	1,967	2,324
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	-	2,920	3,440
Junction C: N4 Junction 4, South	-	2,546	2,997
Junction D: N4 Junction 4, North	-	1,732	2,042
Junction Location	**Second Peak Hour (15:45hrs-16:44hrs)**		
Junction A: 3-arm junction R120 Newcastle Road/ Lucan SC access	-	1,883	2,221
Junction B: 4-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive	-	3,086	3,631
Junction C: N4 Junction 4, South	-	2,493	2,931
Junction D: N4 Junction 4, North	-	1,664	1,956

As it can be seen from the following Figure 6.1, the N4 Junction 4, South (Junction C[3]) is expected to experience the greatest percentage traffic increase in the do-something scenario when compared to the other junctions. For the year of opening (2022), traffic through this junction on a Saturday is forecast to increase by 2.7% in the first peak hour and 3.0% in the second peak hour. The equivalent weekday increase in traffic through this junction is considerably lower however, at 1.2% and 2.1% in the AM and PM peak hours respectively. The percentage traffic increase for the remaining junctions ranges between 1% and 3% during both days and both peak periods.

Figure 6.1 Percentage Traffic Increase Resulting from Proposed Development



It is noted that the analysis has conservatively assumed no trip linkage between existing on-site land uses and the proposed development. Furthermore, it has been assumed that the medical centre component of development is operational on a Saturday, which is considered unlikely.

Notwithstanding the conservative assumptions underpinning the analysis, as the threshold for additional turning movements at junctions (5% according to TTA Guidelines at junctions with national roads, described within Section 2.2 of this Report) has not been exceeded for any junction within the

[3] The submitted TTA noted N4 Junction 4, South (Junction D) may experience the greatest percentage increase, however, it has now been revised to Junction C North of the N4 junction due to revised background flows. Nevertheless, the overall material impact at Junction 4 remain unchanged.

vicinity of the site including N4 Junction 4 to the north, **the proposed development can be concluded to have no material impact on the operation of the adjoining road network.**

7. Summary and Conclusion

7.1 Summary

Transport Insights has been commissioned by ERF Lucan Investment DAC to provide transport consultancy support and to prepare a Traffic and Transport Assessment (TTA) for a proposed development at Lucan Shopping Centre, Newcastle Road, Lucan, Co. Dublin. The proposed development comprises of a single building extension with two primary units as described below:

- Unit-1: A discount variety retailer with storage facility (ca. 1,056 sqm GFA – 50% retail comparison and 50% retail convenience);
- Unit-2: Commercial unit (option of Gymnasium or Medical Centre envisaged with ca. 518 sqm GFA); and
- removal of 87 no. surface level car parking bays.

The above retail/ commercial floor areas represent a ca. 13% increase over the existing Shopping Centre's GFA.

Proposed Site Layout

To accommodate the servicing needs of the proposed development, a new turning area to the rear of the building will be installed. Furthermore, a new pedestrian/ cycling links to/ from the adjacent Somerton development will also be provided. The proposed development will also result in the removal of 87 no. car parking bays within the Shopping Centre's car park, reducing total parking capacity from 702 no. bays to 615 no. bays. The total required car parking spaces for the existing development is 482 no. bays and for the new extension is 49 no. bays under more restrictive Zone-2 maximum car parking standards of the current *South Dublin County Council Development Plan*, implying a surplus of 84 no. car parking bays following completion of the proposed development.

Traffic Impact Assessment

The worst-case scenario for traffic generation is found to be the combination of Retail and Medical Centre and therefore this scenario has been considered to ensure a robust determination of the proposed development's traffic impact. Peak traffic conditions on the surrounding road network have been determined via traffic surveys of four junctions in the vicinity of the site to be 08:00-08:59hrs and 17:00-17:59hrs on Friday, and 12:15-13:14hrs and 15:45-16:44hrs on Saturday.

The traffic impact on the four identified junctions arising from the proposed development is summarised as follows:

- **Three-arm junction of R120 Newcastle Road/ Lucan SC access** – 1.0% additional traffic during the AM peak and 1.3% additional traffic during the PM peak in the development's assumed YoO (2022)

on Friday; with 1.7% additional traffic during the first peak and 1.5% during the second peak on Saturday.

- **Four-arm roundabout R120 Newcastle Road/ Lucan SC access/ Esker Drive** – 1.2% additional traffic during the AM peak and 1.8% additional traffic during the PM peak in the YoO on Friday; with 2.3% additional traffic during the first peak and 2.4% during the second peak on Saturday.
- **N4 Junction 4, south interchange** – 1.2% additional traffic during the AM peak and 2.1% additional traffic during the PM peak in the YoO on Friday; with 2.7% additional traffic during the first peak and 3.0% during the second peak on Saturday.
- **N4 Junction 4, north interchange** – 1.1% additional traffic during AM peak and 1.9% additional traffic during the PM peak in the YoO on Friday; with 2.5% additional traffic during the first peak and 2.8% during the second peak on Saturday.

7.2 Overall Conclusions

The proposed extension at Lucan Shopping Centre has been subject to a comprehensive Traffic and Transport Assessment in accordance with guidance contained with TII's *Traffic and Transport Assessment Guidelines* (May 2014).

The assessment of the proposed development's traffic and transport impacts has been underpinned by comprehensive traffic survey data collection, trip generation analysis using the TRICS database, and comprehensive traffic modelling. **The assessment has demonstrated that the proposed development will have a limited impact on the performance of the road network within the site's vicinity including N4 Junction 4 to the north, which will continue to operate in a satisfactory manner in all assessment years, days and time periods analysed.**