22032-02-001

Proposed SHD at Sandyford, Tack Packaging Site

STAGE 1 QUALITY AUDIT

(Incorporating a DMURS Street Design Audit, and Audits of Accessibility, Cycling, Walking and Road Safety)

for

Waterman Moylan

April 2022

ROADPLAN CONSULTING

7, Ormonde Road
Kilkenny.
R95 N4FE

Tel: 056 7795800
info@roadplan.ie

1. INTRODUCTION

1.1 Roadplan Consulting has been commissioned by Waterman Moylan to carry out a Quality Audit of a proposed SHD residential development at a site located between the Carmanhall Rd and Ravens Rock Rd in Sandyford Business District, Dublin 18

1.2 The Scheme consists of an integrated development across 2 separately owned adjacent sites, known as 'Tack Sandyford SHD' to the west of the block and 'Avid Sandyford SHD' to the east of the block.

1.3 The site is in an edge of city centre location but is within easy walking distance of the local shops, schools and other amenities. The site is highly accessible as it is in walking distance of local bus stops and the Green Line Luas Service.

1.4 Figure 1 below contains a Site Location Map of the overall development. The proposed overall development is located between Blackthorn Rd, Carmanhall Rd and Ravens Rock Rd within Sandyford Business District.

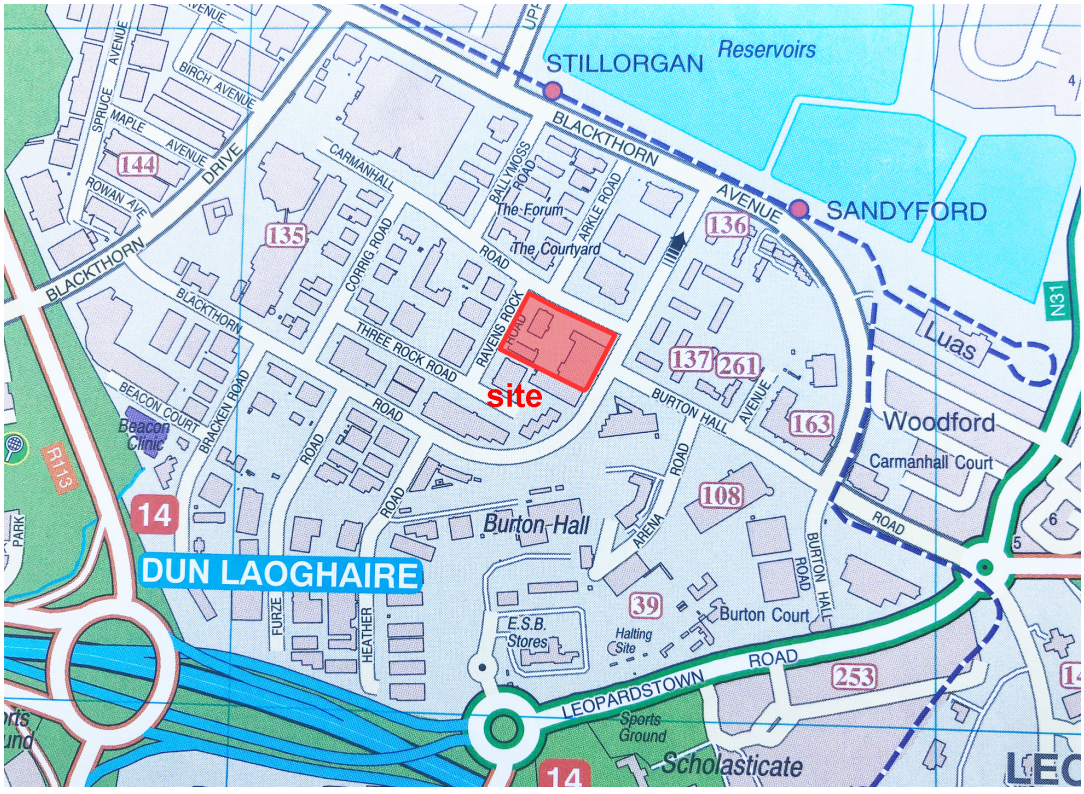


Figure 1 – Overall SHD Site Location Map

1.5 Figure 2 below contains a more detailed Site Location Map showing the stratification of the 2 separate sites. This report is the Quality Audit for the Former Tack Packaging section of the site, with respect to the surrounding area including the Avid Technology section of the site.

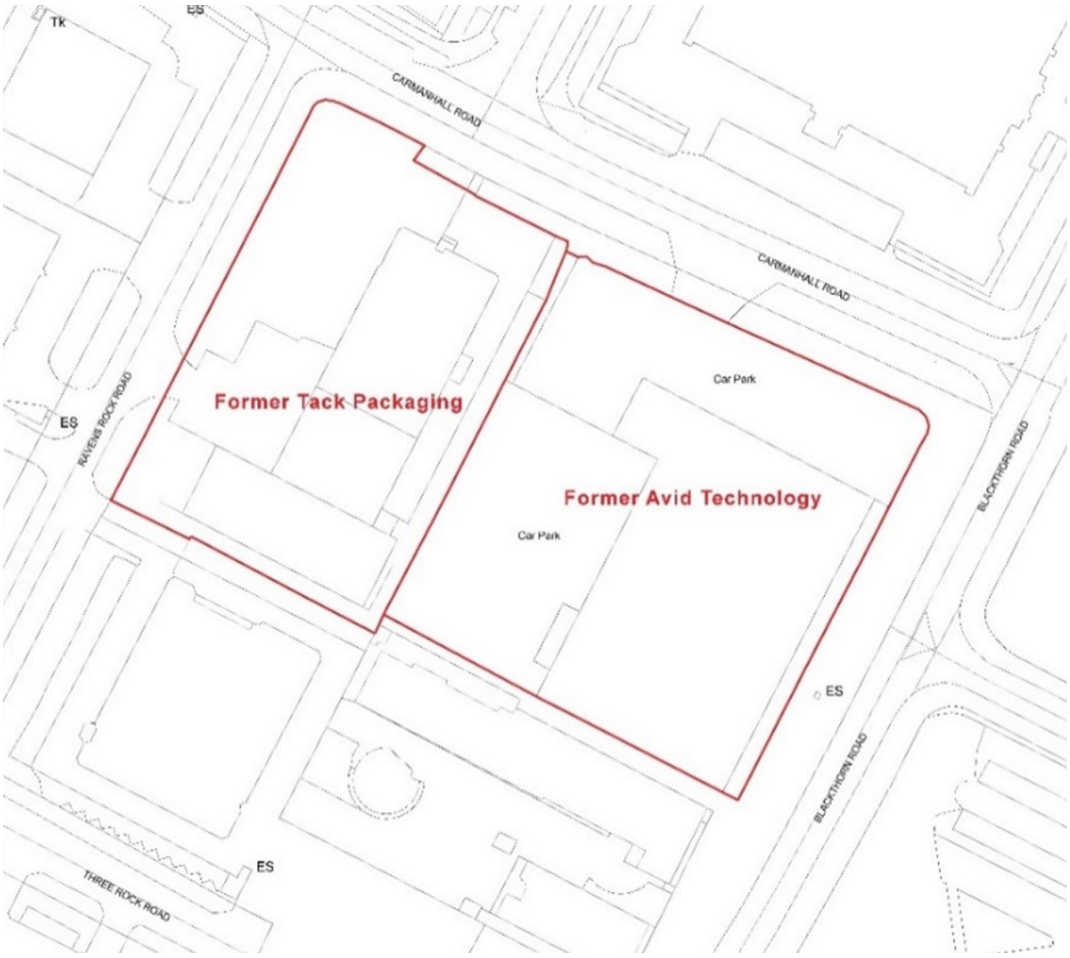


Figure 2 – SHD Site breakdown between Tack Packaging and Avid Technology

1.6 An Analysis of the Road Safety Authority Collision Map 2005-2016 indicates that they were only a small number of minor collisions immediately adjacent to the overall proposed SHD (outlined in red for reference). The 2 minor collisions happened in 2007 and 2012. This is outlined in Figure 3.

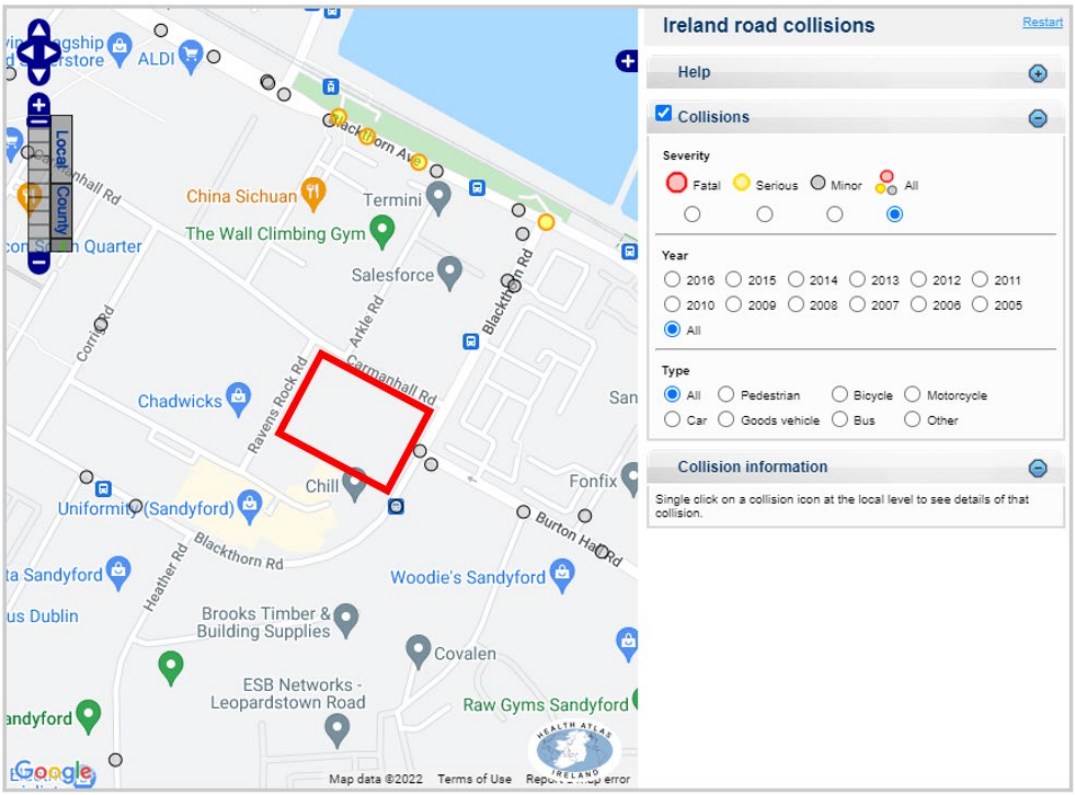


Figure 3 – Road Safety Authority Collision Map 2005-2016 (as observed (6/3/2022).

1.7 The Tack Sandyford SHD scheme consists of 210 residential units spread over 3 different blocks with underground parking provision.

2. QUALITY AUDIT

2.1 Quality Audit is a defined process, independent of, but involving, the design team that, through planning, design, construction and management stages of a project provides a check that high quality places are delivered and maintained by all relevant parties, for the benefit of all end users. Quality Audit is a process, applied to urban roads, traffic management or development schemes, which systematically reviews projects using a series of discrete but linked evaluations and ensures that the broad objectives of place, functionality, maintenance and safety are achieved.

2.2 Quality Audit was introduced in the publication *Design Manual for Urban Roads and Streets* following concerns that in the design of new streets provisions made for motor vehicles frequently led to a poorly-designed public realm. In an urban area there is a high level of competing demand from different classes of road users. A well-balanced street will have minimal visual clutter and obstacles; it will use durable materials and most importantly, will encourage a degree of negotiation between road users as they make their way through it.

2.3 Quality Audit involves various assessments of the impacts of a street scheme in terms of road safety, visual quality and the use of streets by the community. Access for disabled people, pedestrians, cyclists and drivers of motor vehicles is considered.

2.4 In the context of a Quality Audit, road safety assessment is considered to be an appropriate method of examining road safety issues as it incorporates both the hazard identification techniques used in road safety audit and formal risk assessment techniques. This allows the opportunity at an early stage for road safety issues to be considered in a more dynamic way within the design process, and to ensure that safety issues are considered as part of the design rather than after design work is completed.

2.5 The Quality Audit Team reports findings with suggestions for future action. It should be noted that, in a Quality Audit, it is not the intention that suggestions would be binding on the design team; they are offered for detailed consideration in the design process.

2.6 DMURS states that Quality Audits should consist of the following parts:

- DMURS Street Design Audit
- Individual Design Audits
- Quality Audit Report

In the case of this report the individual design audits comprise an RSA, an Accessibility audit, a Walking audit and a Cycle audit.

3. METHODOLOGY

3.1 The Audit Team was as follows:

- George Frisby BE CEng MIEI
- Glenn Hingerty BEngSc ME CEng MIEI MCIHT

3.2 Road safety, non-motorised users, visual quality, access for disabled and functionality were considered in the Quality Audit. This exercise focused on issues such as:

- the design rationale as it related to vehicle, cycle and pedestrian movements;
- pedestrian desire lines both to and through the site;
- access requirements for all modes of transport;
- access requirements for disabled people and other vulnerable users;
- any road safety concerns associated with the scheme;
- the visual appearance of the scheme as it is experienced by those entering it and moving around within the street, including how this affects road user behaviour; and
- any other issues considered relevant to each constituent element of the Quality Audit process.

3.3 The site visit for this quality audit was carried out on 6/03/2022. The weather was sunny with clear skies. Following a week of dry weather, it was not possible to ascertain the occurrence of ponding of water following rainfall at any location on the visit.

3.4 The documents provided for the audit were:

Drawing number	Rev	Drawing Title
21-118-P101		Proposed Roads Layout
21-118-P170		Swept Path Analysis - Fire Tender
21-118-P172		Swept Path Analysis – Refuse Vehicle-Option B
21-118-P173		Swept Path Analysis – Large Car
21-118-P180		Sightlines
1081-MDO- TS-XX-DR-A-05003		Site Plan – Masterplan
1081-MDO- TS-XX-DR-A-05004		Site Plan – 1:200 Tack Site
1081-MDO		ZZ-08-DR-A-10018
		Avid Sandyford SHD Statement of DMURS Consistency
		Tack Sandyford SHD Traffic and Transport Assessment
		Sandyford Business District Scheme Drawings August 2021

		Sandyford Business District Scheme Report August 2021
		Esb_link_road_part_8_report

Copies of these audited drawings are contained in Appendix A.

3.5 In accordance with DMURS Advice Note No. 4 May 2019 (contained on https://www.dmurs.ie/supplementary-material) a Quality Audit should always contain a DMURS Street Design Audit and Other Design Audits (as required). Section 4 of this report contains the Street Design Audit and Section 5 contains the Other Design Audits (Road Safety, Walking, Cycling, Accessibility). The Street Design Audit is in the format provided as a template on the DMURS website.

4. STREET DESIGN AUDIT

Connectivity		
Key Issues	**Key DMURS Reference**	**Design Suggestion**
Strategic routes/major desire lines been identified and are clearly incorporated into the design.	3.1 – Integrated Street Network 3.2.1 – Movement Function 3.3.1 – Street layouts 3.3.4 - Wayfinding	3.3.4 wayfinding is compromised for cyclists, particularly at main access junctions due to a lack of clear cyclist route for movements entering/exiting the development and how they will join to the external cycle network.
Multiple points of access are provided to the site/place, in particular for sustainable modes.	3.3.1 – Street Layouts 3.3.3 – Retrofitting[1]	3.3.1 – 2 vehicular entrances to the site (1 in and 1 out) are provided, with the entrance on Ravens Rock Road and the exit being shared with the entrance for the Avid Sandyford SHD. It is not clear if these 2 one-way single lane streets in opposite directions through the centre of the street are separated by means of a central reservation or not. A central reservation should be considered to reduce the potential for internal U-turns but should not impede vehicular movements or swept-paths.
Accessibility throughout the site is maximised for pedestrians and cyclists, ensuring route choice.	3.3.1 – Street Layouts 3.3.2 – Block Sizes 3.4.1 – Vehicle Permeability	3.3.1 – Pedestrian permeability has been considered but cyclist permeability has only been somewhat considered. Some cyclist access points have not been fully identified on road layout drawings.

[1] *When connecting with existing communities a detailed analysis and extensive community consultation should be carried out to identify the optimal location for connections (refer also to the NTA Permeability in Existing Urban Areas: Best Practice Guide).*

Through movements by private vehicles on local streets are discouraged by an appropriate level of traffic calming measures.	3.2.1 – Movement Function 3.2.3 – Place Context 3.4.1 – Vehicle Permeability	It is not clear if these 2 one-way single lane streets in opposite directions through the centre of the street are separated by means of a central reservation or not. A central reservation should be considered to reduce the potential for internal U-turns, but should not impede vehicular movements or swept-paths.
Self-Regulating Street Environment		
Key Issues	**Key DMURS Reference.**	**Design Suggestion**
A suitable range of design speeds have been applied with regard to context and function.	3.2.1 – Movement Function. 3.2.3 – Place Context. 4.1.1 – A Balanced Approach to Speed[2]	3.2.1 – Carmanhall Road is an Arterial Road while Ravens Rock Road is a Local Road. 3.2.3 – Place Context: Place context is suburban and industrial with mixed-use zoning. The Arterial Road of the public, adjacent road network speed limit are 50km/h and is considered appropriate
The street environment will facilitate the creation of a traffic clamed environment via the use of 'softer' or passive measures.[3]	4.2.1 – Building Height and Street Width 4.2.2 – Street Trees 4.2.3 – Active Street Edges 4.2.4 – Signage and Line Marking 4.2.7 – Planting 4.4.2 – Carriageway Surfaces 4.4.9 - On-Street Parking Advice Note 1 – Transitions and Gateways	4.2.1 - It is noted that the proposed building heights are in line with those nearby. 4.2.4 – Signage and Line Marking. The STOP sign at the egress fulfils the same function as the STOP road marking. Given the requirement of DMURS to reduce signage clutter in the urban area, the apparent use of one signage pole to facilitate Stop and Clearway signs is useful.

[2] Refer also to the National Speed Limit Guidelines

[3] In retrofit situations a detailed analysis should be carried out to establish what measures exist, what their likely effectiveness is and level of intervention required to achieve the designed design speed.

		4.4.9 – It is noted that on the northern boundary of the Avid Sandyford SHD Site that there are non-standard flexi bollards installed in order to prevent parking.
A suitable range of design standards/measures have been applied that are consistent with the applied design speeds.	4.4.1 - Carriageway Widths 4.4.4 – Forward Visibility 4.4.5 – Visibility Splays 4.4.6 – Alignment and curvature 4.4.7 – Horizontal and Vertical Deflections Advice Note 1 – Transitions and Gateways	4.4.5 – The proposed visibility splays outlined in drawings are of 45 metres, representative of a 50kph speed limit where no bus routes operate (Carmanhall Road) and 49 metres representative of a 50kph speed limit where buses do operate (Blackthorn Road). The proposed Bus Stop/Cage should be removed from the Blackthorn Road visibility splay however as the splay is on the inside of a bend. 4.4.6 – Both Vehicular entrances appear to be proposed for priority movements with adjacent pedestrian crossings. Based on swept path analysis, it is clear that refuse trucks and fire tenders can't enter the development if a stopped vehicular is waiting to exit. The Fire Tender Swept Path Analysis is incomplete (Vehicle does not exit site). Designer should consider full junction signalisation with recessed stop lines on minor arms to maintain 6m cross section.

Pedestrian and Cycling Environment		
Key Issues	**Key DMURS Reference.**	**Design Response**
The built environment contributes to the creation of a safe and comfortable pedestrian environment.	4.2.1 – Building Height and Street Width 4.2.3 – Active Street Edges 4.2.5 – Street Furniture 4.4.9 - On-Street Parking	4.2.1 – no building height restrictions for vehicular movements are provided before vehicles enter the site. No advanced warning of 4m height restriction or opportunity to turn back. 4.2.5 – Street Furniture: While swept path analysis for bin truck movements have been provided, it is not clear where the intended bin storage is and where they are to be stored or left out for collection. Bins could impede pedestrian and vehicular movements where left informally. 4.4.9 – It is noted that opposite the northern boundary of the Tack Sandyford SHD Site that there are non-standard flexi bollards installed in order to prevent parking on the junction with Arkle Road.
Footpaths are continuous and wide enough to cater for the anticipated number of pedestrian movements.	3.2.1 – Movement Function. 3.2.2 – Place Context. 4.2.5 – Street Furniture 4.3.1 - Footways, Verges and Strips 4.3.2 - Pedestrian Crossings	3.2.1 – There is no clear pedestrian movement facilitation throughout the new site itself. 4.3.1 – There is footways adjacent to the internal road network however verges may be useful here as swept-path analysis outlines larger vehicles needed to overhang beyond the kerb line. It is also unclear if footpaths are continuous and of sufficient width throughout.

Pedestrian and Cycling Environment (cont)		
Key Issues	**Key DMURS Reference.**	**Response**
The particular needs of visually and mobility impaired users been identified and incorporated in the design.	4.2.5 - Street Furniture 4.3.1 - Footways, Verges and Strips 4.3.2 - Pedestrian Crossings	4.3.1 - There is also no usage of tactile paving indicating the presence of steps on pedestrian accesses. 4.3.2 – The vehicular accesses don't feature tactile paving for pedestrian movements.
Cycling facilities will cater for cyclists of all ages and abilities.[4]	3.2.1 – Movement Function. 3.2.3 – Place Context. 4.3.5 - Cycle facilities.	4.3.5 – The cycle accesses have not been clearly identified.

[4] *Refer also to the National Cycle Manual (2011)*

Visual Quality		
Key Issues	**Key Considerations and DMURS Ref:**	**Design Response**
The landscape plan responds to the street hierarchy and the value of the place.	3.2.1 – Movement Function. 3.2.2 – Place Context. 4.2.2 – Street Trees 4.2.7 – Planting Advice Note 1 – Transitions and Gateways	4.2.2 – It is noted that there are mature trees around the periphery of the site. It is note clear how many of these will be maintained and protected during construction. An arborist should be recruited to report on maintaining these and how they would fit into a landscape design proposal. It was noted from the site visit that some of these have recently been removed from the Tack Sandyford SHD Site.
Street furniture is orderly placed.	3.2.1 – Movement Function. 3.2.2 – Place Context. 4.2.5 - Street Furniture. 4.3.1 Footways, Verges and Strips	As above
The use of signage and line marking has been minimised.	3.2.1 – Movement Function. 3.2.3 – Place Context. 4.2.4 - Signage and Line Marking.	As above
Materials and finishes used throughout the scheme have been selected from a limited palette and respond to the value of the place?	3.2.1 – Movement Function. 3.2.2 – Place Context. 4.2.6 – Materials and Finishes 4.2.8 – Historic Contexts. 4.3.2 – Pedestrian Crossings 4.4.2 – Carriageway Surfaces Advice Note 2 – Materials and Specifications	No information provided

Additional Comments
Please consider usage of: *Guidance on the use of Tactile Paving Surfaces.*

5. OTHER DESIGN AUDITS

ROAD SAFETY

5.1 Issue:

It is noted that there is a 4-metre height restriction created by the pedestrian overbridge on the central road within the proposed development. There is no advanced warning for large vehicles to avoid this before entering, with no possibility to turn around which may result in large vehicles reversing out into oncoming traffic on public roads.

Suggestion:

Include adequate signage at the entrances. This should be done in conjunction with any access/usage strategy for deliveries and refuse/fire vehicles.

5.2 Issue:

Based on swept-path analyses provided (Figure 4), it is not possible for certain vehicles to enter either the proposed vehicular priority entrance at Ravens Rock Road without appearing to cross the centreline on the main road or internal road (interface with Avid Sandyford SHD Site) posing the risk of sideswipe type collisions. There is also no swept-path analyses for the vehicular movements turning left onto Carmanhall Road and any indication of potential issues to the operation of the adjacent pedestrian crossing.

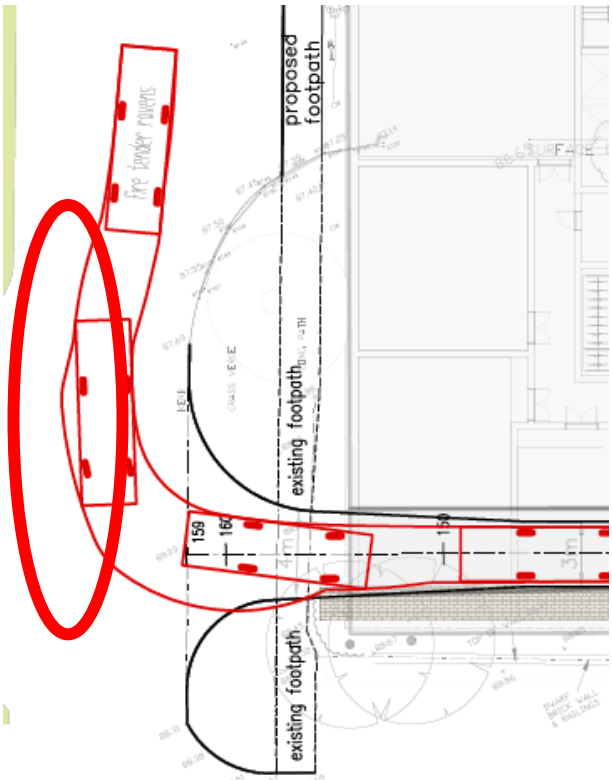


Figure 4 – Swept Path Analysis for Ravens Rock Road Entrance

Suggestion:

Revise the street layout and swept-path analyses to ensure adequacy for all movements of all vehicle types. Consider recessed stop lines and signalisation at this location.

5.3 Issue:

Based on swept-path analyses provided, larger vehicles appear to rely excessively on overhanging and driving over internal pedestrian footways (Figure 5) to make movements, resulting in increased risk of pedestrian injury.

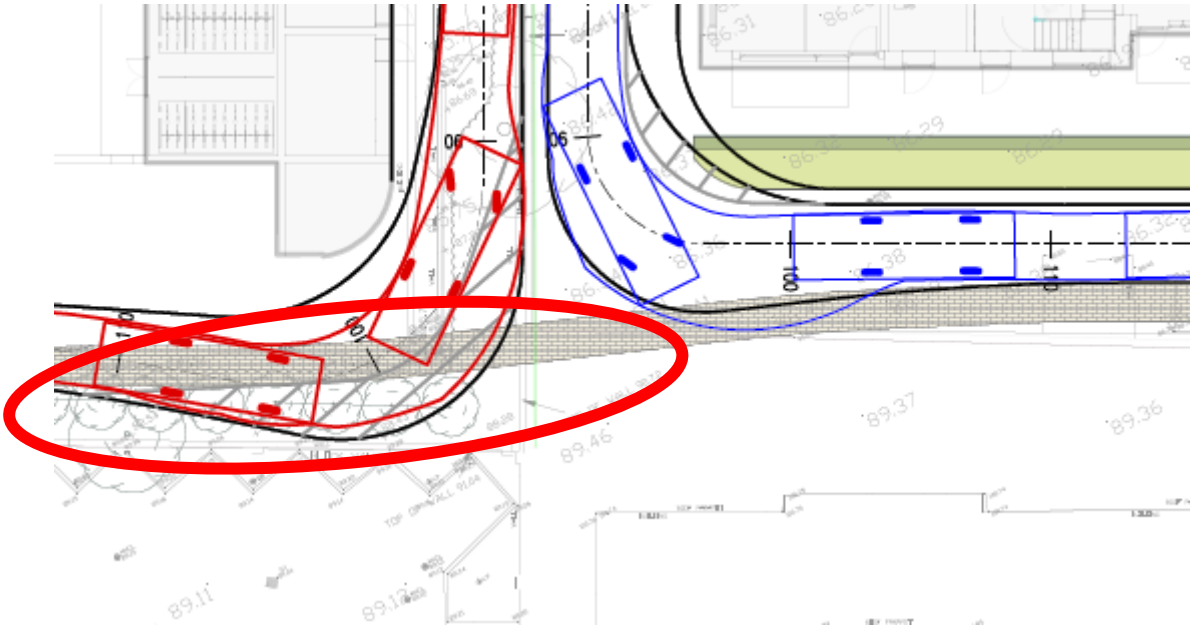


Figure 5 – Swept Path Analysis overhang/movement above footway

Suggestion:

Revise the street layout, footway layout and swept-path analyses to ensure adequacy for all movements and users.

5.4 Issue:

Based on drawings in the 'Avid Sandyford SHD Statement of Consistency on DMURS', it is noted the presence of what appears to be a second vehicular entrance and ramp on Ravens Rock Road. It is not clear if this has been adequately designed for at its interface with the public highway and the Audit Team is concerned that this will increase the risk of collisions or injury here.

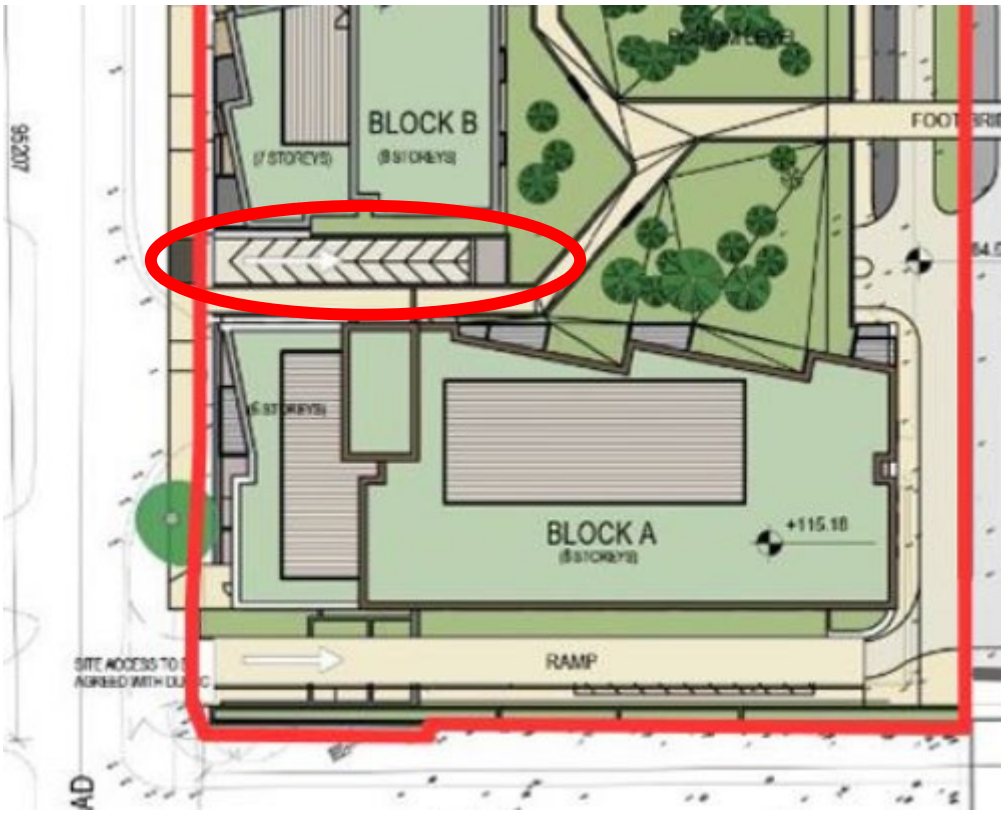


Figure 6 – Secondary Access ramp on Ravens Rock Road

Suggestion:

Revise the street layout at this location to ensure it is fit for intended purpose including Swept-Path Analyses.

5.5 Issue:

There is an abrupt change in direction of the road alignment at the end of the taxi set-down area which may contribute to a loss of control collision at this location.

Suggestion:

Revise the road alignment to remove any unnecessary abrupt changes in direction.

WALKING

5.6 Issue:

The proposed Basement Parking is noted. No passive ventilation grilles appear to have been proposed/incorporated into the designs. It is not clear where these will be located or if an alternative car park ventilation strategy will be adopted but they could pose a tripping hazard at pedestrian interfaces.

Suggestion:

Where passive ventilation grilles will be adopted, they should avoid pedestrian footways and desire lines.

5.7 Issue:

It is noted that no tactile paving has been included in the drawings. The Audit Team is concerned that this may result in Tactile Paving being added to the design at a later/advanced stage, at which point it may overlap with service chamber lids, resulting in compromised tactile paving. The proposed location of the redesigned pedestrian crossing on Carmanhall Road features Service Chamber lids and towers on both sides of the crossing location (Figure 7).

Figure 7 – Service Towers and Chamber lids clashing with proposed pedestrian crossing

Suggestion:

Include Tactile Paving at the earliest stage possible of design and, using Building Information Modelling or similar information management, ensure that there are no clashes with service chamber lids. Relocate pedestrian corssings as required.

5.8 Issue:

Stacked traffic at the signalised crossing adjacent to the Carmanhall Road exit may compromise exiting vehicles resulting in pedestrians weaving around stationary vehicles trying to exit, increasingly the likelihood of an injury.

Suggestion:

Consider signalisation of vehicular interfaces with pedestrians.

5.9 Issue:

Conflicting road layouts were observed on different drawings with respect of the bend to the southeast of Block A. It is not clear here what the exact proposed road arrangement is but the Audit Team is concerned that this will result in confusion and pedestrian injury.

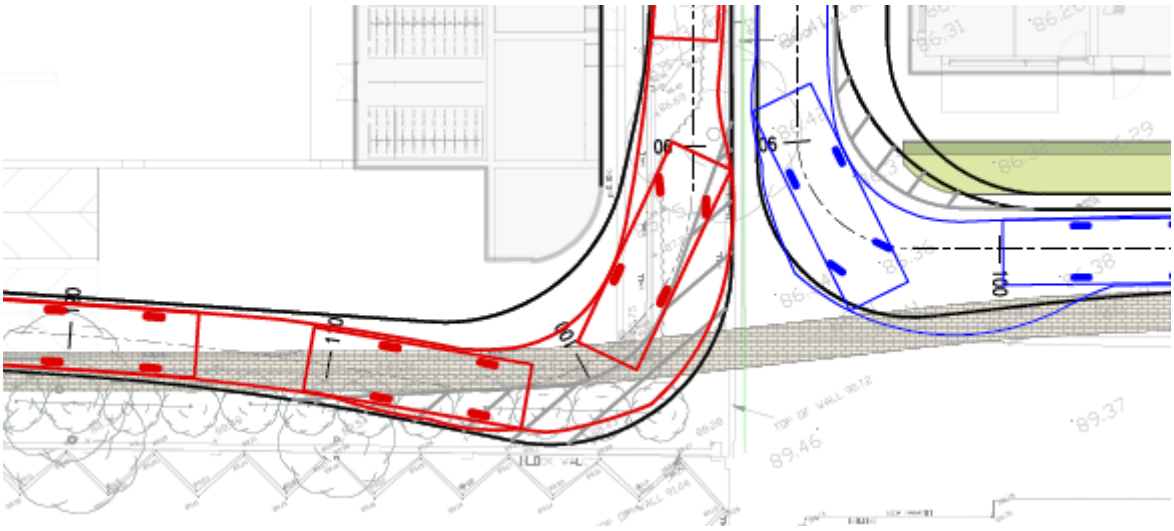


Figure 8 – Swept Path Analyses adjacent to Black A where vehicles are overrunning footways.

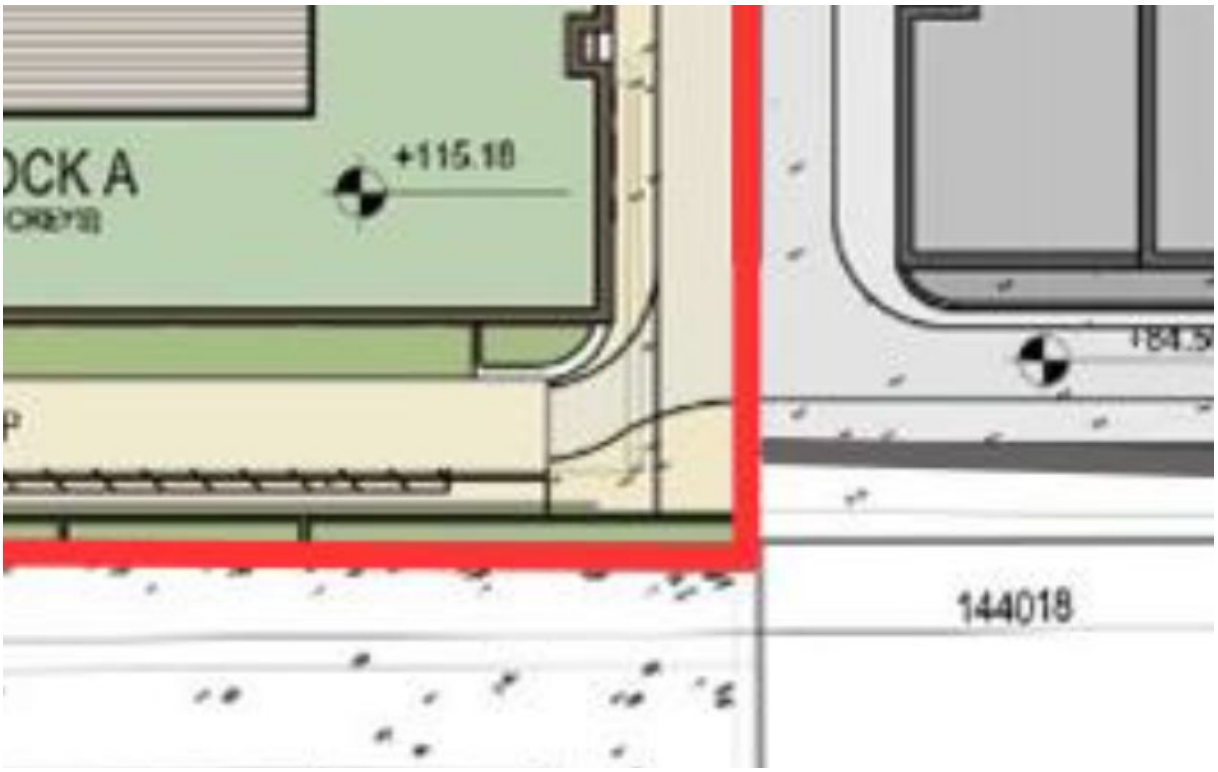


Figure 9 – Kerb Lines shown differently to Figure 8.

Suggestion:
Ensure that adequate pedestrian facilities are provided.

5.10 Issue:

The proposed footpaths in a number of locations appear to be narrow while footpaths are discontinuous in other locations. A lack of adequate footpath facilities may contribute to a pedestrian injury.

Suggestion:
Provide adequate footpaths throughout the entire development.

CYCLING

5.11 Issue:

It is noted that there is no clear entry/exit route to/from existing and proposed adjacent cycling infrastructure for residents/visitors of the proposed residential development at the Carmanhall Road exit. This may result in confusion for cyclists increasing the risk of collisions with pedestrians, vehicles or other cyclists.

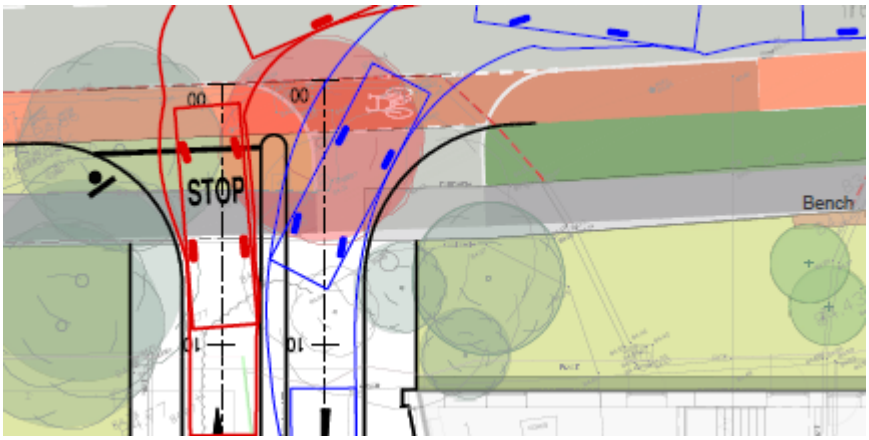


Figure 8 – Confusing entrance arrangement

Suggestion:
Ensure that adequate cycle facilities are provided.

5.12 Issue:

Indicative internal cycleways are identified as being 1.75m wide (a basic 2-way as per NCM), but it is not clear exactly where they will run to or from within the proposed development or where the cycle storage will be located. The Audit Team are concerned that proposed cycling infrastructure will be installed at a more advanced stage of design and may clash with service chamber lids.

Suggestion:
Ensure that cycleways are not interrupted by service chamber lids.

5.13 Issue:

The proposed Basement Parking is noted. No passive ventilation grilles appear to have been proposed/incorporated into the designs. It is not clear where these will be located or if an alternative car park ventilation strategy will be adopted but they could pose a slipping hazard at cycleway interfaces.

Suggestion:

Where passive ventilation grilles will be adopted, they should avoid cycleways and desire lines.

ACCESSIBILITY

5.14 Issue:

Throughout the development it is unclear if adequate width is to allow pedestrians, in particular mobility impaired pedestrians, to access the apartment blocks from the proposed footway network. In addition, bins may be stored

informally on these footways, and it is unclear if adequate width is provided between the bin storage to allow pedestrians to access the house entrance.

Suggestion

Ensure adequate width is provided in all areas throughout the development to allow pedestrians, including mobility impaired pedestrians, to safely access the proposed dwellings. Ensure refuse collection strategies are of an appropriate standard.

5.15 Issue:

It is not clear what the overall inclines or gradients of the internal footway network will look like, including to/from the footbridge to the Avid Sandyford SHD. There is no tactile paving offered to support visually impaired pedestrians at this location to guide visually impaired pedestrians through the entrance. The Audit Team is concerned that this will result in the risk of visually impaired pedestrians getting confused and falling on steps and getting injured.

Suggestion

Consult 'Guidance on the use of Tactile Paving' and ensure that all inclines and gradients are not excessive but are indicated appropriately.

--QUALITY AUDIT FEEDBACK FORM

Scheme: Proposed Tack Sandyford SHD at Sandyford, Dublin 18.

Audit Reference No.: 22032-02-001 Park

Date Audit Completed: 30th March 2022

	To Be Completed By Designer			To Be Completed by Audit Team Leader
Paragraph No. in Safety Audit Report	**Problem accepted (yes/no)**	**Recommended measure 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)**
5.1	Yes	Yes	Height restriction warning signage added at Raven Rock Road entrance.	----------
5.2	Yes	Partially	Both entrances are considered as being in compliance with Section 4.3.3 and Figure 4.43 on Pages 93- 94 of DMURS. We have rerun the autotracking for the entrance from Raven's Rock Road and also to include the left turn exit onto Carmanhall Road (Drg.'s P170 & P172.Whilst the refuse vehicle still shows minimal crossing the road centreline, it is at a location where there is additional road width available at the entrance opposite, and relates to a large vehicle that is likely to only attend on site 2-3 times weekly. This is considered more acceptable than increasing road widths or corner radii to facilitate these infrequent vehicle movements as to do so would be to increase vehicle operating speeds, and pedestrian crossing widths increasing traffic hazard for vulnerable road users.	YES
5.3	Yes	Yes	The proposed footpath on the southern side of the roadway is no longer proposed.	----------
5.4	Yes	Yes	The secondary vehicular access and ramp on Ravens Rock Road has been deleted and as a result Figure 6 has been superseded by Waterman Moylan Drg No 21-118/P101.	----------
5.5	Yes	Yes	The road centreline radius has been amended to 26 m, based on a 30 kph design speed.	----------
5.6	Yes	Yes		----------
5.7	Yes	Yes	Tactile paving provision is now indicated on the Drg No 21-118/P101	----------
5.8	Yes	No	The signalised pedestrian crossing is being relocated away from Carmanhall Road entrance in order to address this matter.	----------

5.9	Yes	Yes	The proposed footpath on the southern side of the roadway is no longer proposed.	----------
5.10	Yes	Yes	All footpaths will be a minimum of 1.8 m as required by DMURS	----------
5.11	Yes	Yes	----------	----------
5.12	Yes	Yes	----------	----------
5.13	Yes	Yes	----------	----------
5.14	Yes	Yes	----------	----------
5.15	Yes	Yes	----------	----------

Signed **……**  **…… Design Team Leader Date …06/04/22……**

Print Name …Ian Worrell……

Quality Audit
Signed off  **…… Audit Team Leader Date ……6/4/22…….**

Print Name ……GEORGE FRISBY……

Please complete and return to:

Roadplan Consulting Ltd.
7, Ormonde Road
Kilkenny
Email: info@roadplan.ie

Appendix A - Drawings

PEDESTRIAN CROSSING TO BE TAKEN AWAY FROM ACCESS

1.75m WIDE CYCLE ACCESS (LOCATION TBC)

1.75m WIDE CYCLE ACCESS (LOCATION TBC)

NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

LEGEND:

- PROPOSED 125mm KERB
- CENTER LINE WITH CHAINAGE
- FFL 85.00 — FINISHED FLOOR LEVELS
- xx.xx — FINISHED ROAD LEVELS
- 1/xx — ROAD GRADIENT
- G — PROPOSED GULLY
- INDICATES EXTENT OF PLANNING APPLICATION BOUNDARY
- INDICATES FUTURE FOOTPATH
- INDICATES FUTURE CYCLETRACK
- INDICATES FUTURE ROAD
- INDICATES FUTURE GRASS VERGE

1:250 0 5.0 10.0 15.0 20.0 25.0m
1:1 0 10 20 30 40 50 60 70 80 90 100

REV.	DATE	AMENDMENT	DRN	APPD

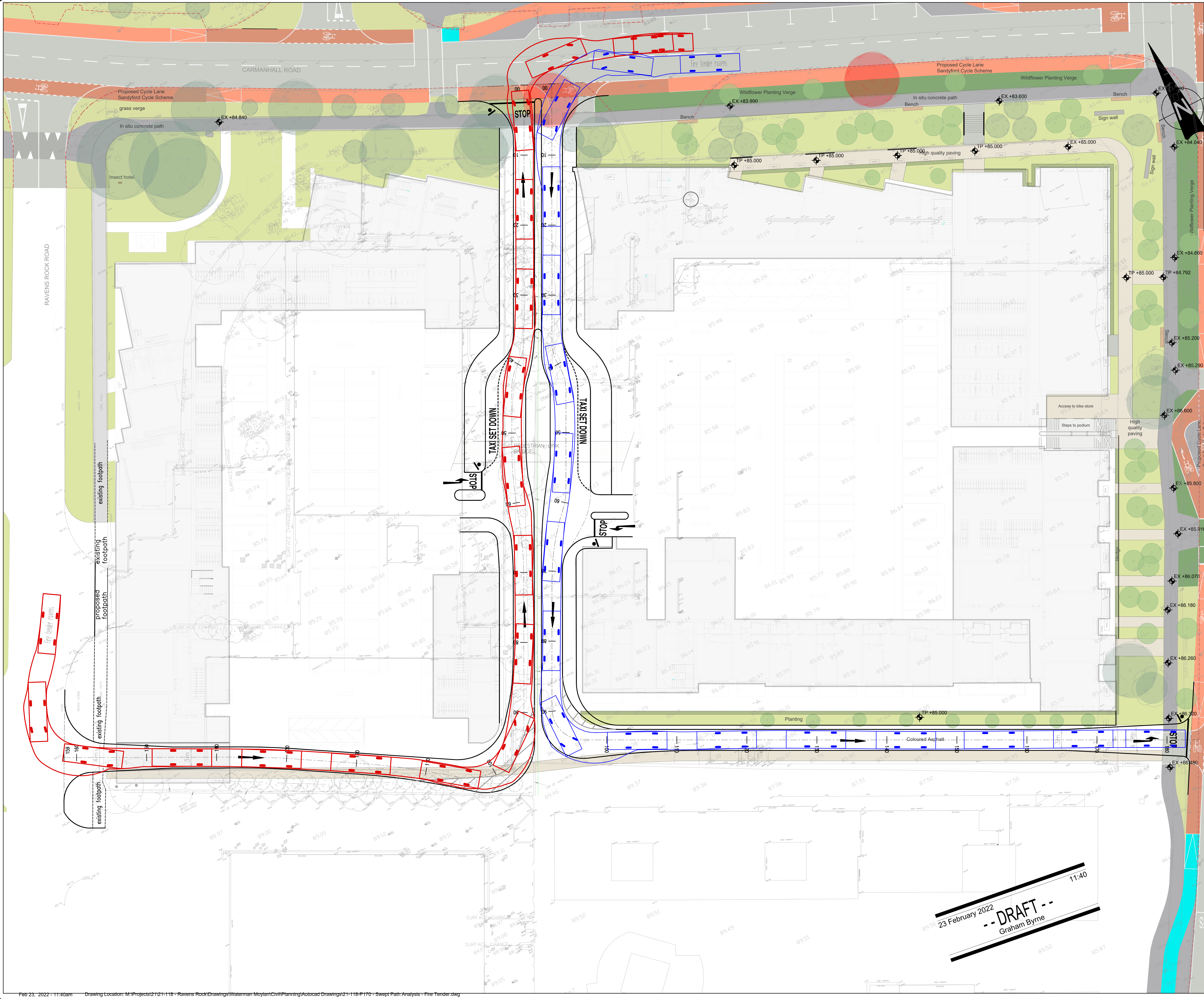
STATUS **FOR PLANNING ONLY NOT FOR CONSTRUCTION**

Waterman Moylan
Engineering Consultants
BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD, DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

CLIENT	SANDYFORD ENVIRONMENTAL CONSTRUCTON LTD AND ATLAS GP LTD.
ARCHITECT	MC CAULEY DAYE O'CONNELL
PROJECT	AVID–TACK SANDYFORD LRD
TITLE	PROPOSED ROADS LAYOUT

DRAWN	DESIGNED	APPROVED	DATE
G.Byrne	BMC	JG	DEC. '21
SCALE	JOB NO.	DRG. NO.	REVISION
1:250 @A1	21–118	P101	

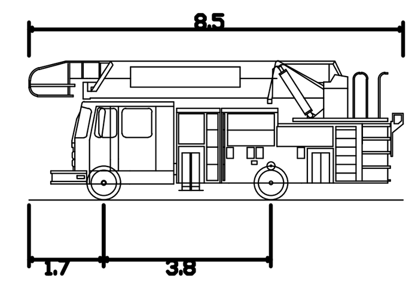
23 February 2022 08:31 - - DRAFT - - Graham Byrne



NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

LEGEND:



fire tender ravens	
Overall Length	8.500m
Overall Width	2.500m
Overall Body Height	3.500m
Min Body Ground Clearance	0.221m
Track Width	2.200m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	8.000m

1:250 0 5.0 10.0 15.0 20.0 25.0m

1:1 0 10 20 30 40 50 60 70 80 90 100

REV.	DATE	AMENDMENT	DRN	APPD

STATUS **FOR PLANNING ONLY NOT FOR CONSTRUCTION**

Waterman Moylan
Engineering Consultants
BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD, DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

CLIENT SANDYFORD ENVIRONMENTAL CONSTRUCTON LTD AND ATLAS GP LTD.

ARCHITECT MC CAULEY DAYE O'CONNELL

PROJECT AVID-TACK SANDYFORD LRD

TITLE SWEPT PATH ANALYSIS – FIRE TENDER

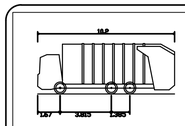
DRAWN	DESIGNED	APPROVED	DATE
G.Byrne	BMC	JG	DEC. '21
SCALE	JOB NO.	DRG. NO.	REVISION
1:250 @A1	21-118	P170	

Feb 23, 2022 - 11:40am Drawing Location: M:\Projects\21\21-118 - Ravens Rock\Drawings\Waterman Moylan\Civil\Planning\Autocad Drawings\21-118-P170 - Swept Path Analysis - Fire Tender.dwg

NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

LEGEND:



Phoenix 2 Duo (P2-12W with Elite 6x4 chassis)

Overall Length	10.200m
Overall Width	2.550m
Overall Body Height	3.735m
Min Body Ground Clearance	0.304m
Track Width	2.500m
Lock-to-lock the Curb to Curb Turning Radius	4.005 7.800m

CARMANHALL ROAD

RAVENS ROCK ROAD

Proposed Cycle Lane Sandyford Cycle Scheme

grass verge

In situ concrete path

EX +84.840

Insect hotel

existing footpath

proposed footpath

existing footpath

existing footpath

R6m

R4.1m

R5.5m

R6m

R7m

R8m

STOP

TAXI SET DOWN

4.00 m

PEDESTRIAN LINK BRIDGE

Phoenix 2 Duo (P2-12W with Elite 6x4 chassis)

Wildflower Planting Verge

EX +83.890

Bench

In situ concrete path

EX +83.600

Sign wall

EX +85.000

TP +85.000

High quality paving

EX +84.040

EX +84.660

TP +84.792

EX +85.200

EX +85.290

Access to bike store

Steps to podium

High quality paving

EX +86.600

EX +85.800

EX +85.910

EX +86.070

EX +86.180

EX +86.260

EX +86.350

EX +86.480

Planting

Coloured Asphalt

SN18

23 February 2022 08:33

- - DRAFT - -

Graham Byrne

1:250 0 5.0 10.0 15.0 20.0 25.0m

1:1 0 10 20 30 40 50 60 70 80 90 100

REV.	DATE	AMENDMENT	DRN	APPD

STATUS **FOR PLANNING ONLY NOT FOR CONSTRUCTION**

Waterman Moylan
Engineering Consultants
BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD, DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

CLIENT SANDYFORD ENVIRONMENTAL CONSTRUCTON LTD AND ATLAS GP LTD.

ARCHITECT MC CAULEY DAYE O'CONNELL

PROJECT AVID-TACK SANDYFORD LRD

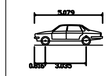
TITLE SWEPT PATH ANALYSIS - REFUSE VEHICLE OPTION B

DRAWN	DESIGNED	APPROVED	DATE
G.Byrne	BMC	JG	DEC. '21
SCALE	JOB NO.	DRG. NO.	REVISION
1:250 @A1	21-118	P172	

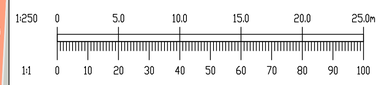
NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

LEGEND:



Large Car (2006)	
Overall Length	5.079m
Overall Width	2.000m
Overall Body Height	1.525m
Min Body Ground Clearance	0.310m
Max Track Width	2.050m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.900m



REV.	DATE	AMENDMENT	DRN	APPD

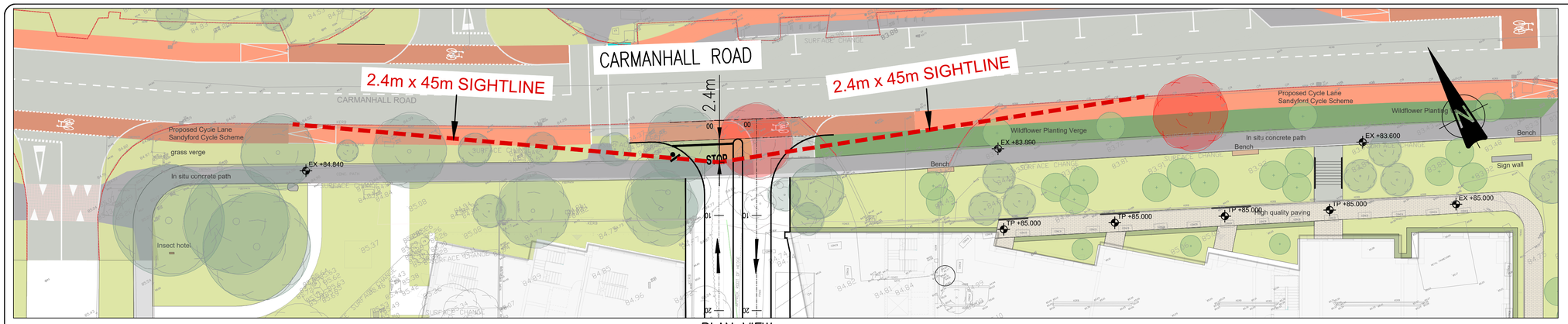
STATUS **FOR PLANNING ONLY NOT FOR CONSTRUCTION**

Waterman Moylan
Engineering Consultants
BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD, DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

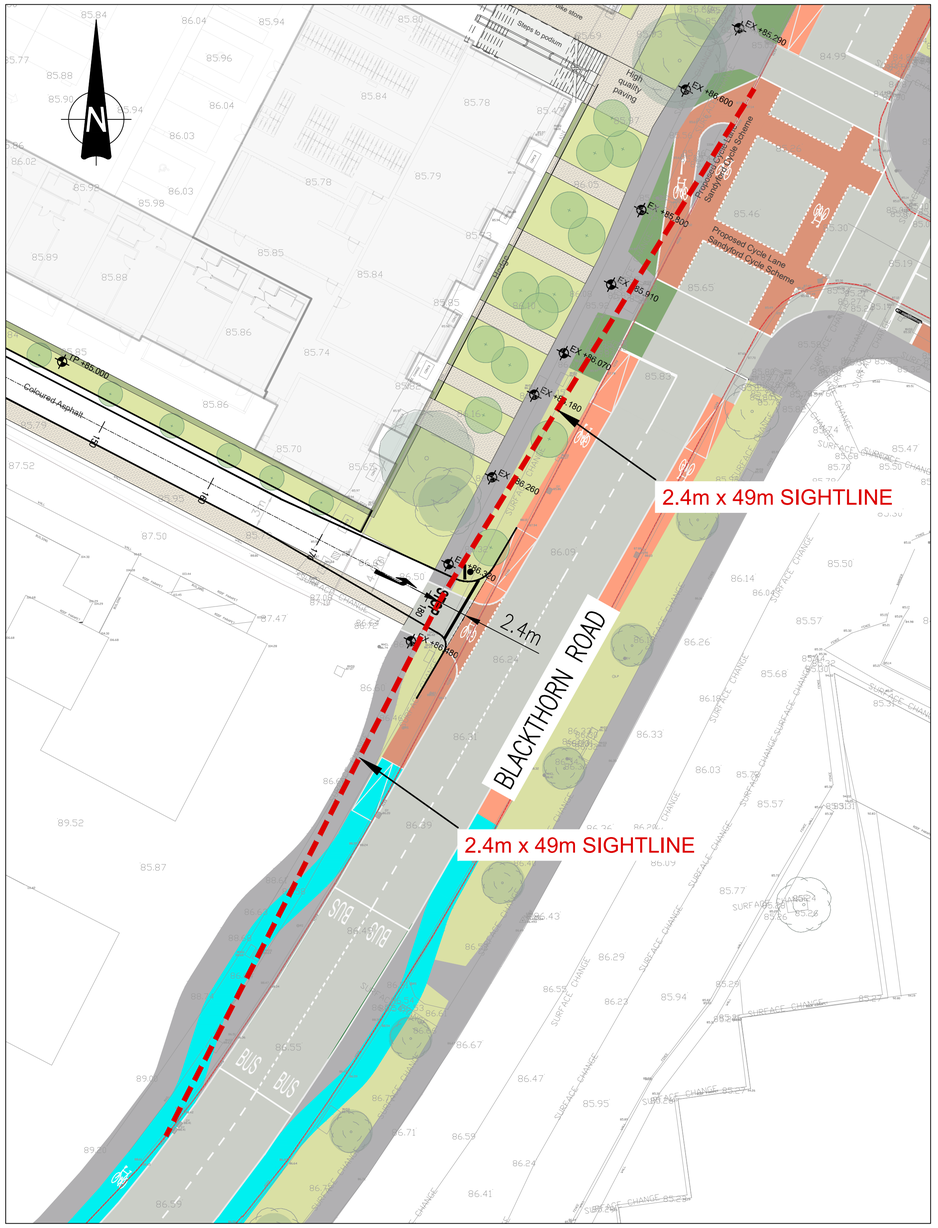
CLIENT	SANDYFORD ENVIRONMENTAL CONSTRUCTON LTD AND ATLAS GP LTD.
ARCHITECT	MC CAULEY DAYE O'CONNELL
PROJECT	AVID-TACK SANDYFORD LRD
TITLE	SWEPT PATH ANALYSIS – LARGE CAR

DRAWN	DESIGNED	APPROVED	DATE
G.Byrne	BMC	JG	DEC. '21
SCALE	JOB NO.	DRG. NO.	REVISION
1:250 @A1	21-118	P173	

23 February 2022 08:34
- - DRAFT - -
Graham Byrne



PLAN VIEW
PROPOSED SIGHTLINES – CARMANHALL ROAD



PLAN VIEW
PROPOSED SIGHTLINES – BLACKTHORN ROAD

NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

LEGEND:

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 DESIGN MANUAL FOR URBAN ROADS AND STREETS

1:250 0 5.0 10.0 15.0 20.0 25.0m

1:1 0 10 20 30 40 50 60 70 80 90 100

REV.	DATE	AMENDMENT	DRN	APPD

STATUS **FOR PLANNING ONLY NOT FOR CONSTRUCTION**

Waterman Moylan
Engineering Consultants
BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD,
DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

CLIENT SANDYFORD ENVIRONMENTAL CONSTRUCTON LTD AND ATLAS GP LTD.

ARCHITECT MC CAULEY DAYE O'CONNELL

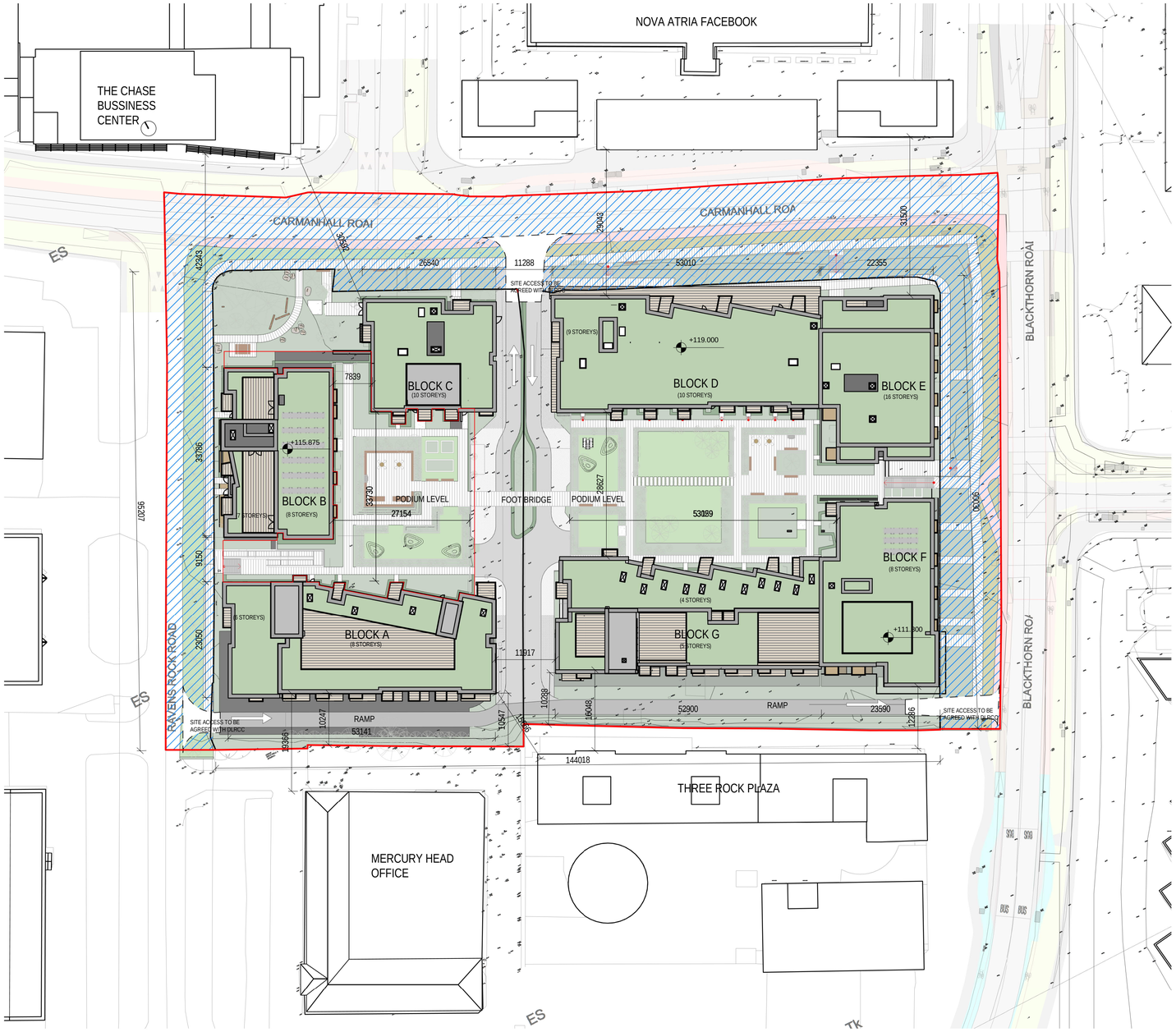
PROJECT AVID–TACK SANDYFORD LRD

TITLE SIGHTLINES

DRAWN	DESIGNED	APPROVED	DATE
G.Byrne	BMC	JG	FEB. 22
SCALE	JOB NO.	DRG. NO.	REVISION
1:250 @A1	21–118	P180	

23 February 2022 09:20
- - DRAFT - -
Graham Byrne

A1



1 05000 - SITE PLAN - MASTERPLSN
Scale: 1 : 500

DRAFT

REV	DATE	DESCRIPTION	BY
1	15/12/2021	PAC	AT
2	25/02/2022	DRAFT	AT

DO NOT SCALE | USE FIGURED DIMENSIONS ONLY | NOTIFY THE ARCHITECTS OF ANY DISCREPENCIES ON THE DRAWING PRIOR TO WORK PROCEEDING | THIS DRAWING IS COPYRIGHT OF MCCAULEY DAYE O'CONNELL ARCHITECTS

SITE LEGEND

SITE BOUNDARY

LEGAL INTEREST BOUNDARY

DLRCC LAND 2071.66 m2

NORTH POINT

ONLY FOR REFERENCE WITH PLAN DRAWINGS

APPROVED BY
Sallen

25/02/2022 16:29:12

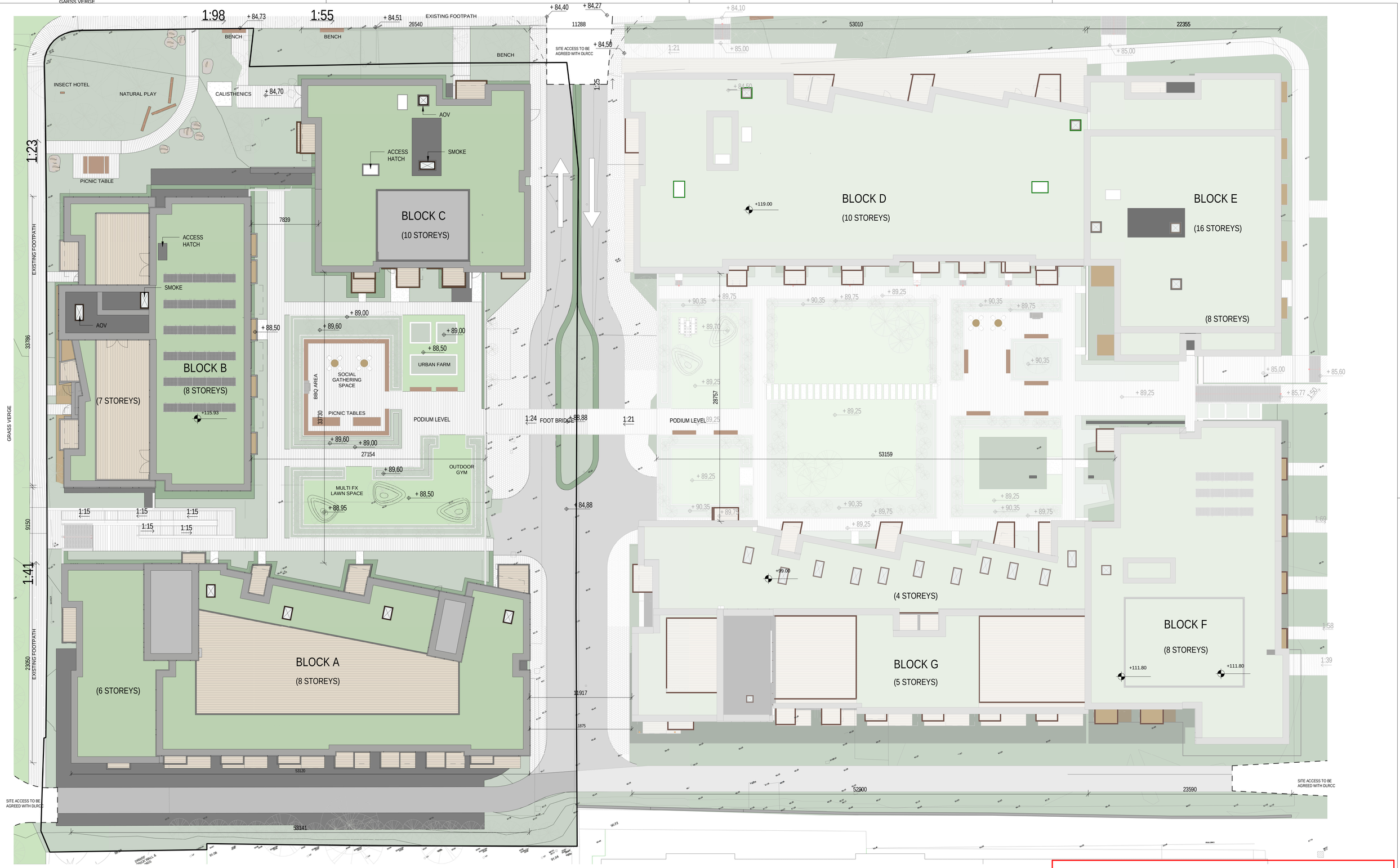
Client: Sandyford Environmental Construction Ltd & Atlas GP Ltd
Project: AVID-TACK SANDYFORD SHD
Title: SITE PLAN - MASTERPLAN

Sheet No.: 1081-MDO-TS-XX-DR-A-05003
Scale as: As indicated @ A1 Current Rev.: 2 Project No.: 1081

MC CAULEY DAYE O'CONNELL
A R C H I T E C T S
11 Merrion Square, Dublin 2, Ireland
Telephone: +353 (0)1 400 4171
info@mdo.ie | www.mdo.ie

E:\RVT\1081-MDO-ZZ-XX-M3-A-70001-Central_atyrrellTCC28.rvt

A1



1 05000 - SITE PLAN - 1 200 - TACK SITE

1 : 200

DRAFT

REV	DATE	DESCRIPTION	BY
1	15/12/2021	PAC	AT
2	25/02/2022	DRAFT	AT

SITE LEGEND

SITE BOUNDARY

LEGAL INTEREST BOUNDARY

NORTH POINT

ONLY FOR REFERENCE WITH PLAN DRAWINGS

APPROVED BY

Sallan

25/02/2022 14:01:30

Client: SANDYFORD ENVIRONMENTAL CONSTRUCTION LIMITED

Project: TACK SANDYFORD SHD

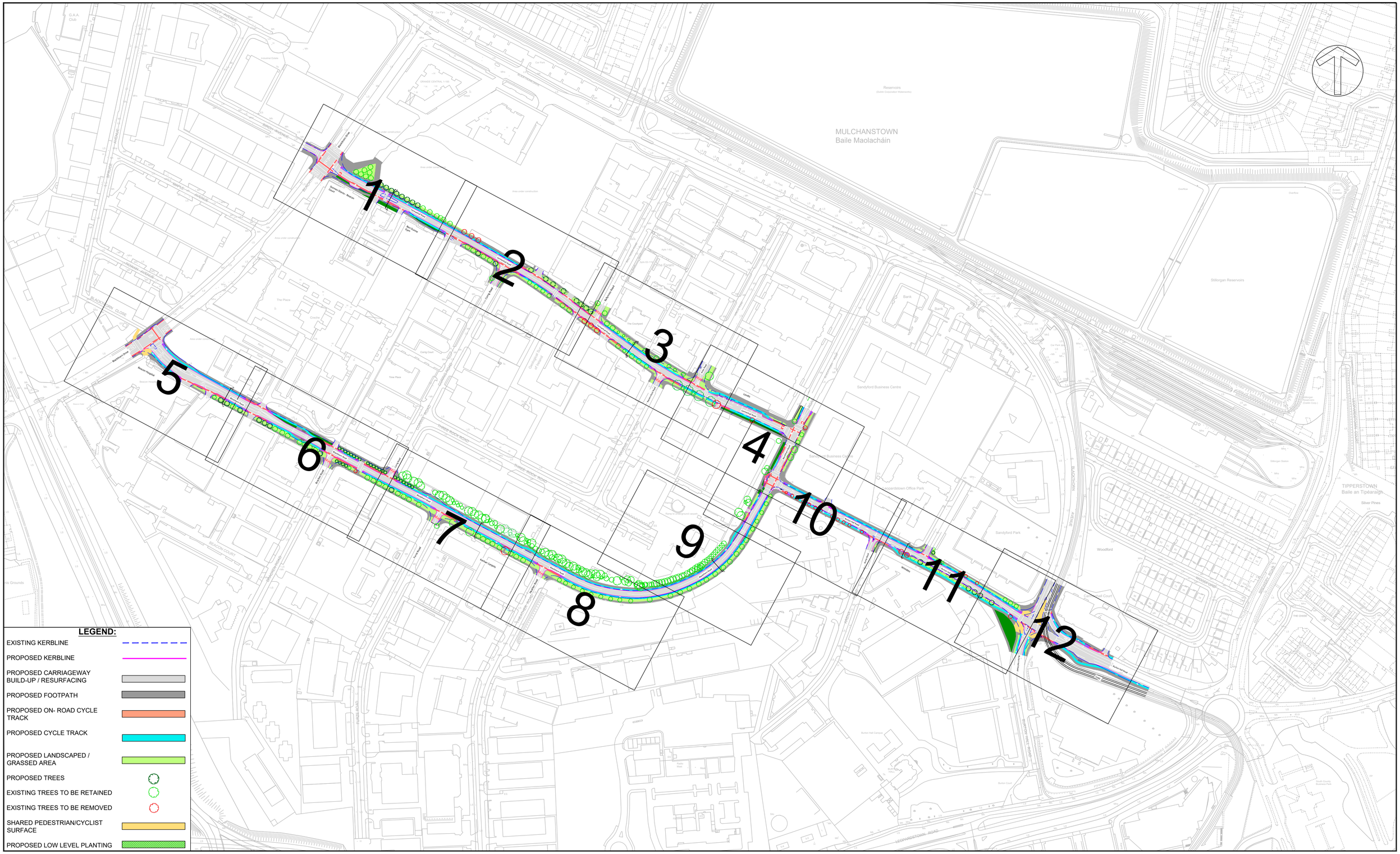
Title: SITE PLAN - 1 200 - TACK SITE

Sheet No.: 1081-MDO-TS-XX-DR-A-05004

Scale as: 1 : 200 @ A1 Current Rev.: 2 Project No.: 1081

MC CAULEY DAYE O'CONNELL
A R C H I T E C T S
11 Merrion Square, Dublin 2, Ireland
Telephone: +353 (0)1 400 4171
info@mdo.ie | www.mdo.ie

E:\RVT\1081-MDO-ZZ-XX-M3-A-70001-Central_stayrelTCC28.rvt



LEGEND:

EXISTING KERBLINE	– – – –
PROPOSED KERBLINE	───
PROPOSED CARRIAGEWAY BUILD-UP / RESURFACING	▭
PROPOSED FOOTPATH	▬
PROPOSED ON- ROAD CYCLE TRACK	🟧
PROPOSED CYCLE TRACK	🟦
PROPOSED LANDSCAPED / GRASSED AREA	🟩
PROPOSED TREES	○
EXISTING TREES TO BE RETAINED	○
EXISTING TREES TO BE REMOVED	○
SHARED PEDESTRIAN/CYCLIST SURFACE	🟨
PROPOSED LOW LEVEL PLANTING	▨

dlr
Comhairle Contae County Council

Údarás Náisiúnta Iompair
National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

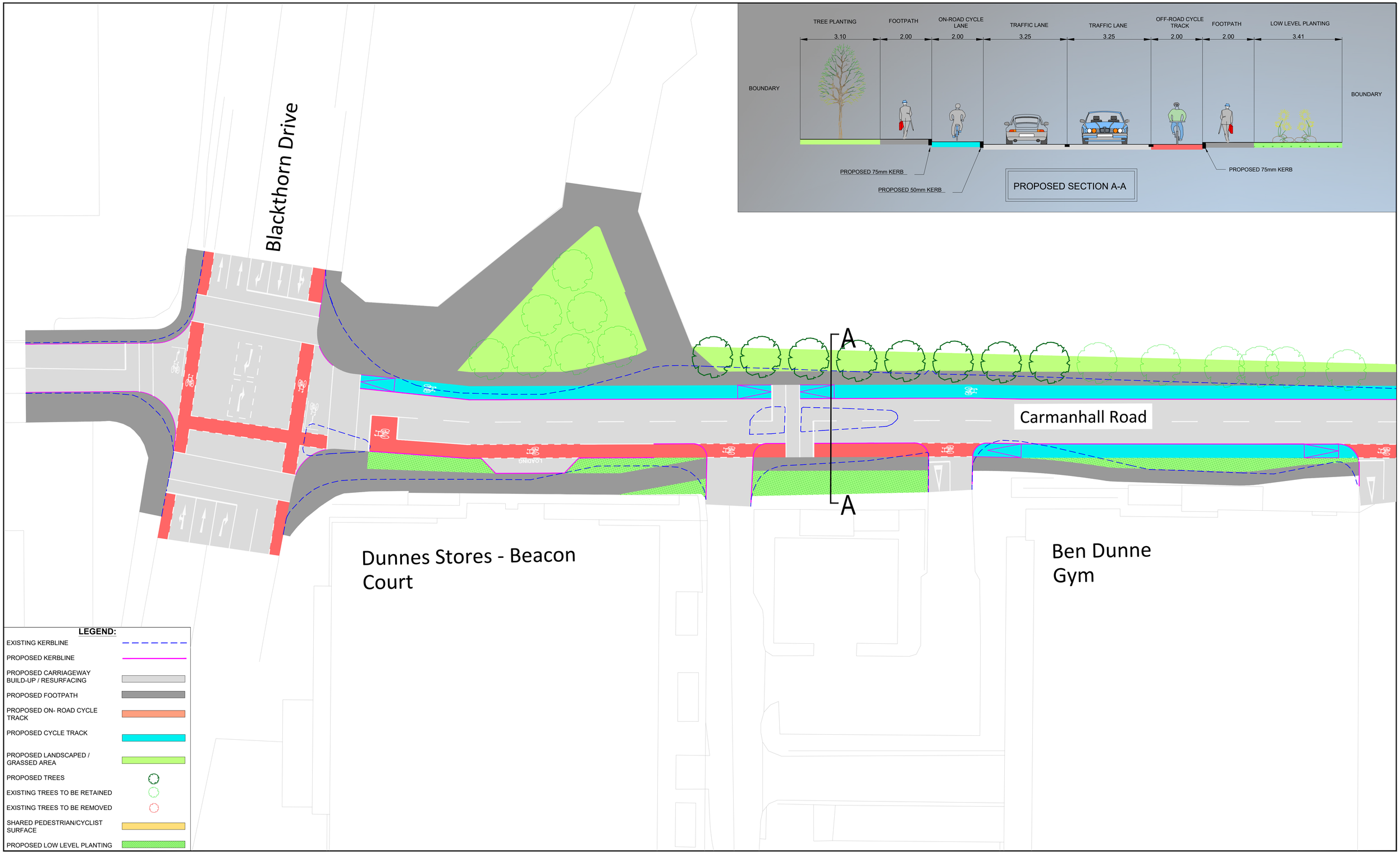
Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme		Status: S1
Drawing Title:	General Layout - Sheet 00		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1:		
Checked: RC	Date: May 2021		



LEGEND:

- EXISTING KERBLINE
- PROPOSED KERBLINE
- PROPOSED CARRIAGEWAY BUILD-UP / RESURFACING
- PROPOSED FOOTPATH
- PROPOSED ON- ROAD CYCLE TRACK
- PROPOSED CYCLE TRACK
- PROPOSED LANDSCAPED / GRASSED AREA
- PROPOSED TREES
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- SHARED PEDESTRIAN/CYCLIST SURFACE
- PROPOSED LOW LEVEL PLANTING

dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

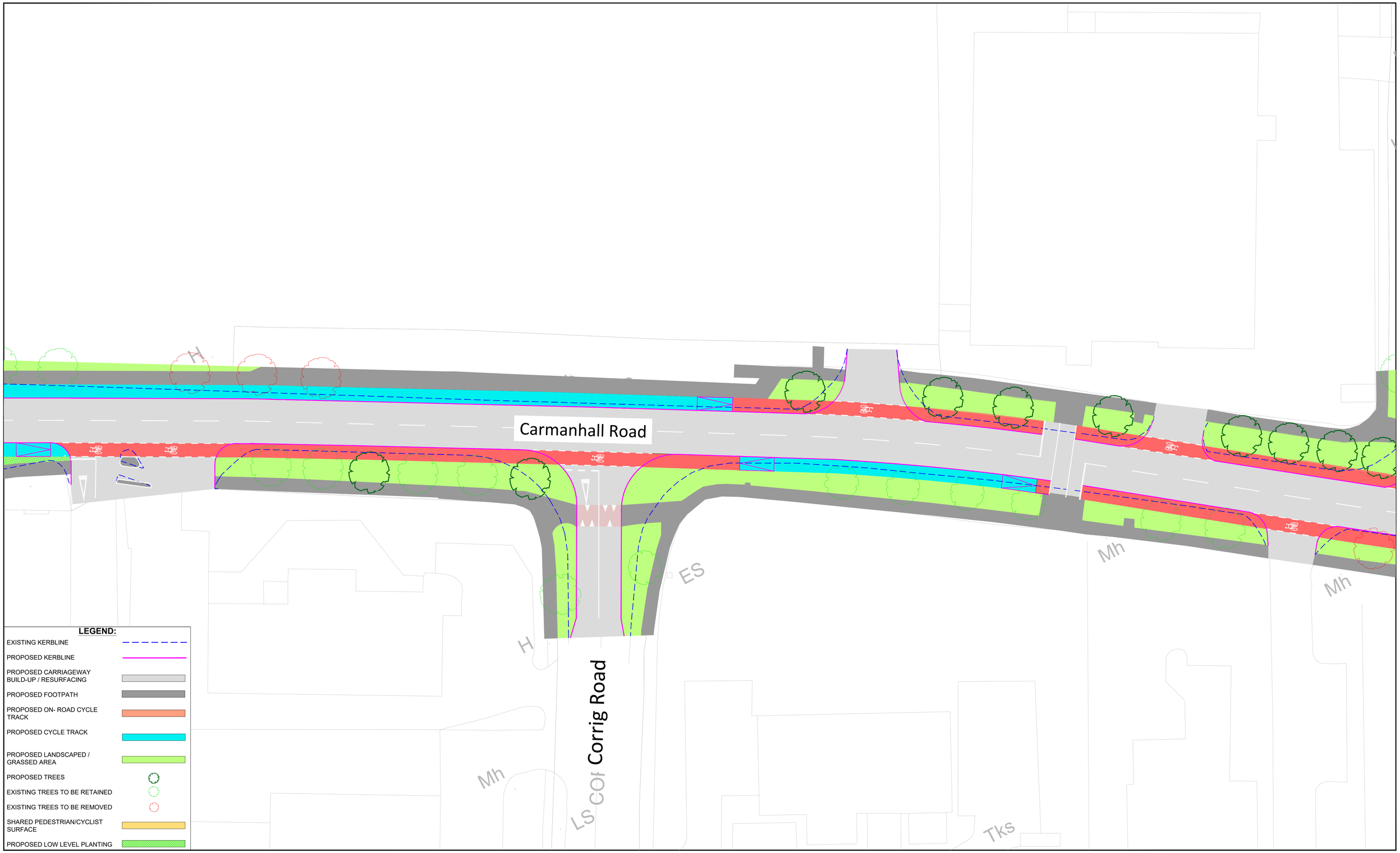
BARRY TRANSPORTATION
Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland
Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme		Status: S1
Drawing Title:	General Layout - Sheet 01		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		



dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

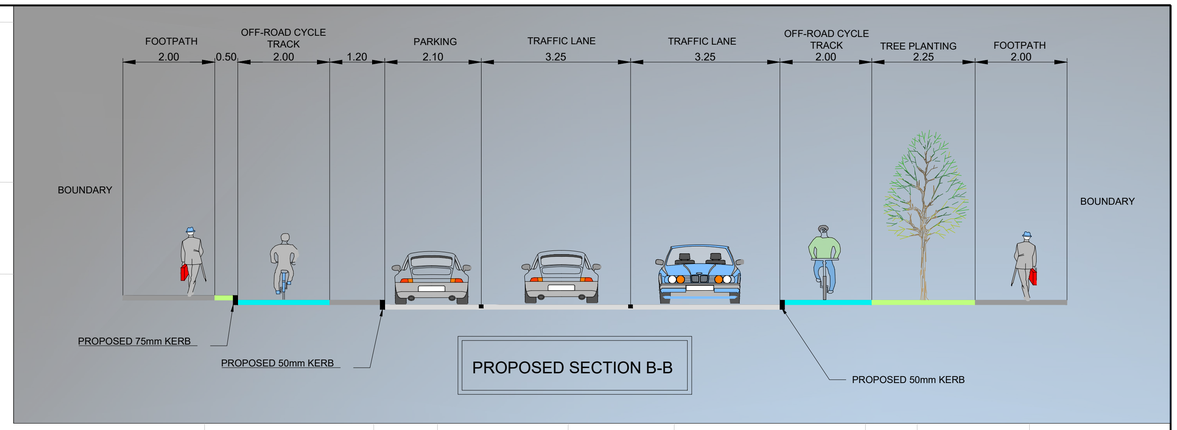
Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme		Status:
Drawing Title:	General Layout - Sheet 2		S1
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		



PROPOSED SECTION B-B

Ballymoss Road

Carmanhall Road

Arkle Road

Ravens Rock Road

B

B

LEGEND:

- EXISTING KERBLINE
- PROPOSED KERBLINE
- PROPOSED CARRIAGEWAY BUILD-UP / RESURFACING
- PROPOSED FOOTPATH
- PROPOSED ON- ROAD CYCLE TRACK
- PROPOSED CYCLE TRACK
- PROPOSED LANDSCAPED / GRASSED AREA
- PROPOSED TREES
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- SHARED PEDESTRIAN/CYCLIST SURFACE
- PROPOSED LOW LEVEL PLANTING

dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme	Status:	S1
Drawing Title:	General Layout - Sheet 3		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		

Arkle Road

Londis

Carmanhall Road

Blackthorn Road

Sandyford Business Cen

LEGEND:

- EXISTING KERBLINE
- PROPOSED KERBLINE
- PROPOSED CARRIAGEWAY BUILD-UP / RESURFACING
- PROPOSED FOOTPATH
- PROPOSED ON- ROAD CYCLE TRACK
- PROPOSED CYCLE TRACK
- PROPOSED LANDSCAPED / GRASSED AREA
- PROPOSED TREES
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- SHARED PEDESTRIAN/CYCLIST SURFACE
- PROPOSED LOW LEVEL PLANTING

dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

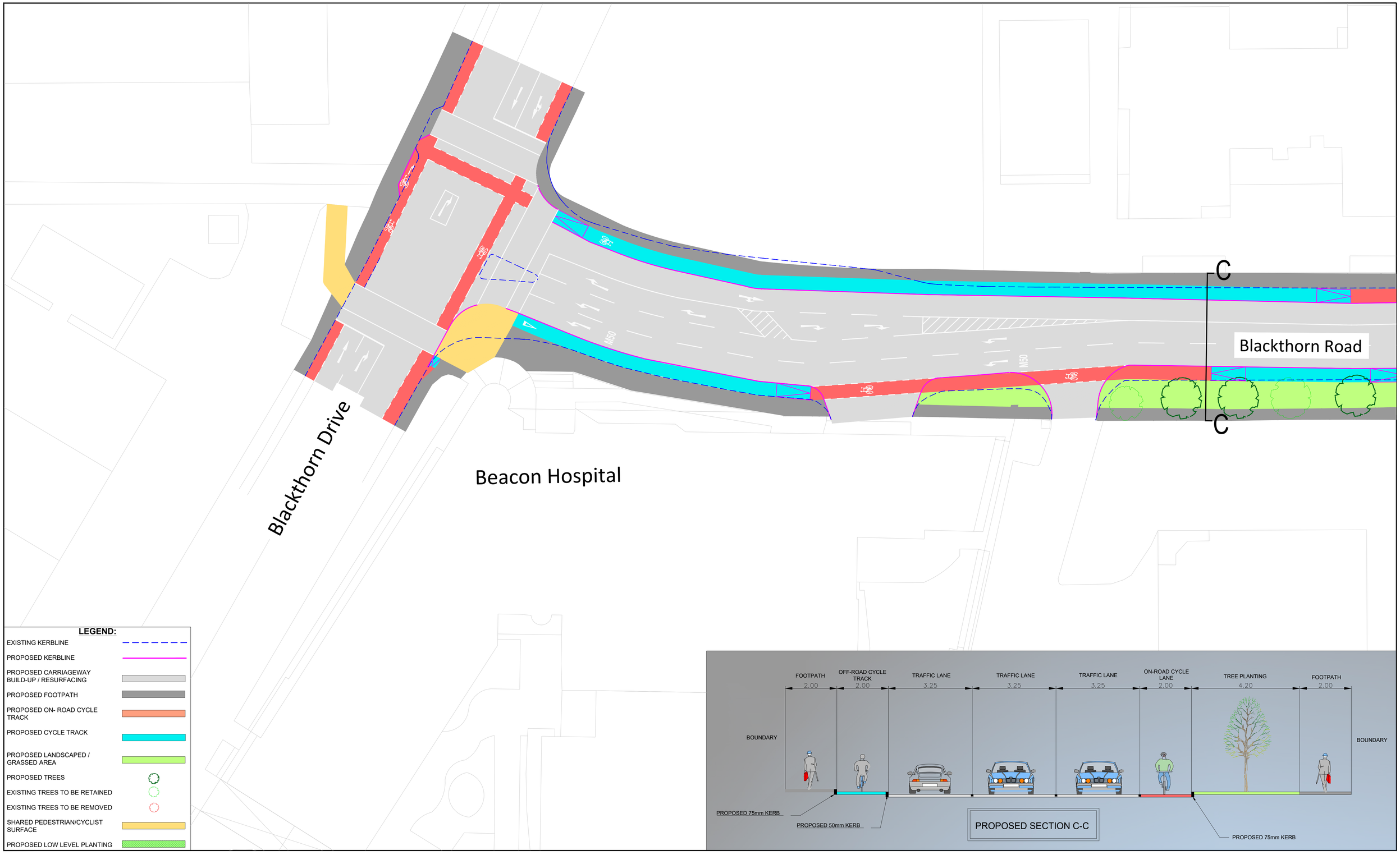
Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme		Status: S1
Drawing Title:	General Layout - Sheet 04		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		



LEGEND:

- EXISTING KERBLINE
- PROPOSED KERBLINE
- PROPOSED CARRIAGEWAY BUILD-UP / RESURFACING
- PROPOSED FOOTPATH
- PROPOSED ON- ROAD CYCLE TRACK
- PROPOSED CYCLE TRACK
- PROPOSED LANDSCAPED / GRASSED AREA
- PROPOSED TREES
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- SHARED PEDESTRIAN/CYCLIST SURFACE
- PROPOSED LOW LEVEL PLANTING

PROPOSED SECTION C-C

dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

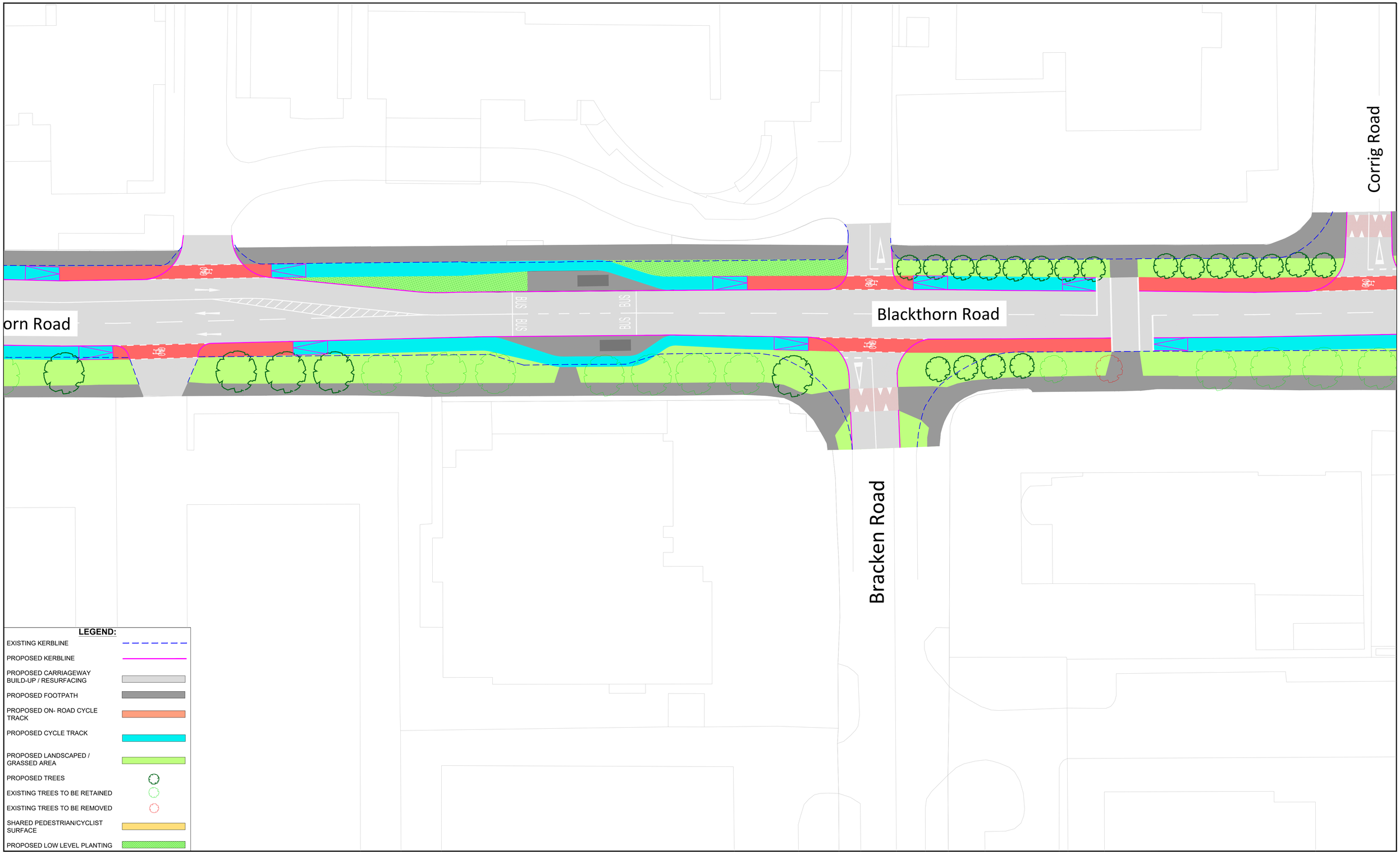
Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme		Status: S1
Drawing Title:	General Layout - Sheet 05		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		



dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme		Status: S1
Drawing Title:	General Layout - Sheet 06		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		

dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme	Status:	S1
Drawing Title:	General Layout - Sheet 07		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		

dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

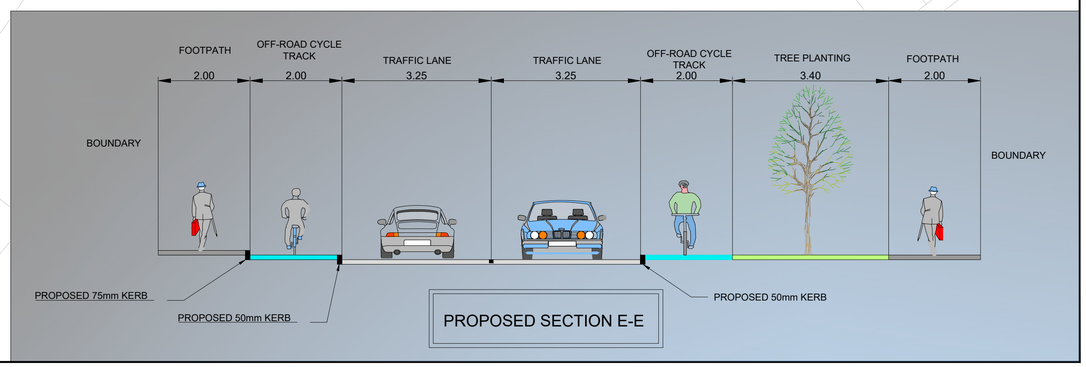
Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme	Status:	S1
Drawing Title:	General Layout - Sheet 08		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		

Steps
Steps
Pond
Ramp
Ramp to underground carpark
Steps
Tk
Tk
BUS
BUS
BUS
BUS
E
E
Blackthorn Road

LEGEND:

- EXISTING KERBLINE
- PROPOSED KERBLINE
- PROPOSED CARRIAGEWAY BUILD-UP / RESURFACING
- PROPOSED FOOTPATH
- PROPOSED ON- ROAD CYCLE TRACK
- PROPOSED CYCLE TRACK
- PROPOSED LANDSCAPED / GRASSED AREA
- PROPOSED TREES
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- SHARED PEDESTRIAN/CYCLIST SURFACE
- PROPOSED LOW LEVEL PLANTING



PROPOSED SECTION E-E

dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

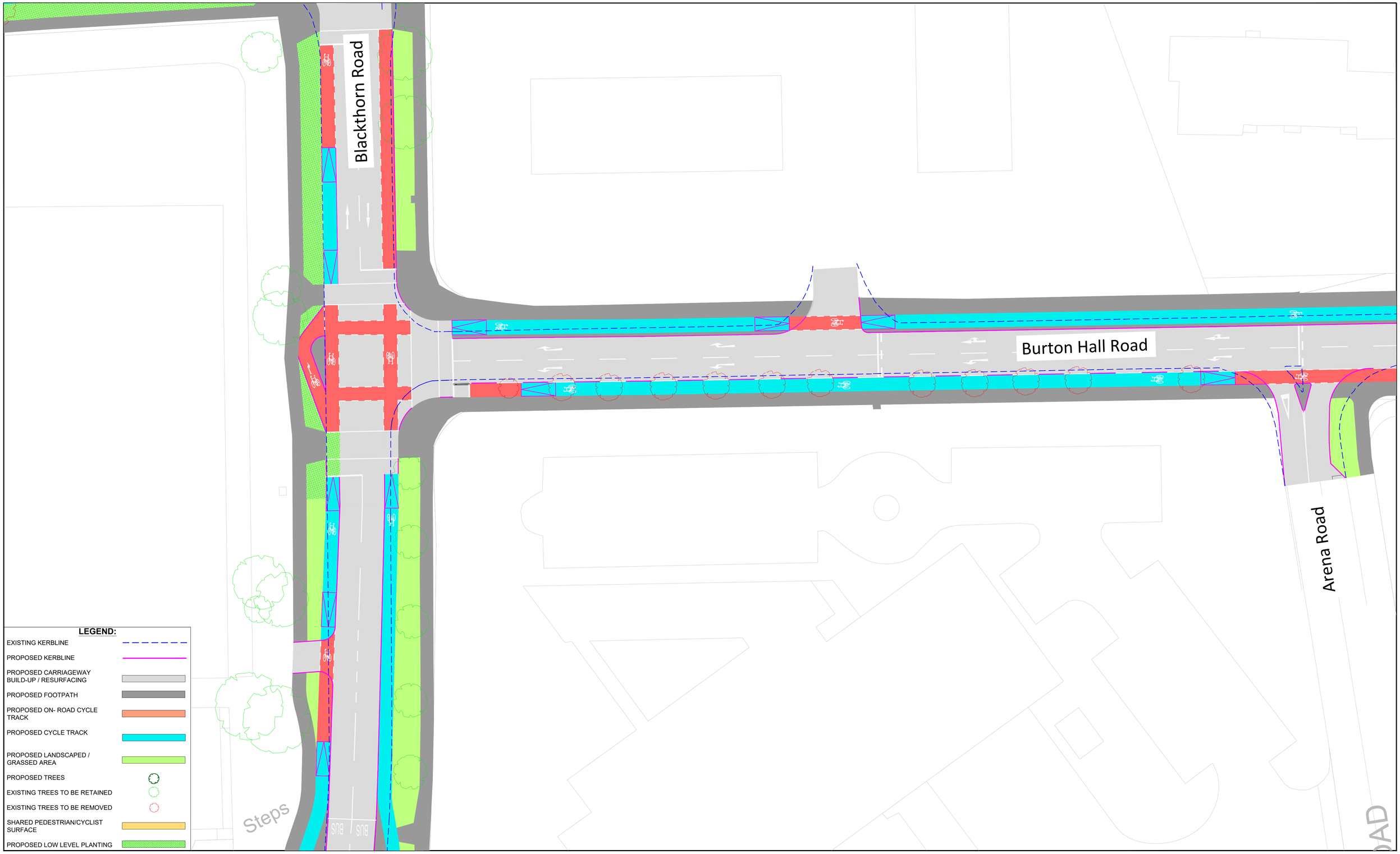
Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme	Status:	S1
Drawing Title:	General Layout - Sheet 09		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		



dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme		Status: S1
Drawing Title:	General Layout - Sheet 10		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		

Burton Hall Road

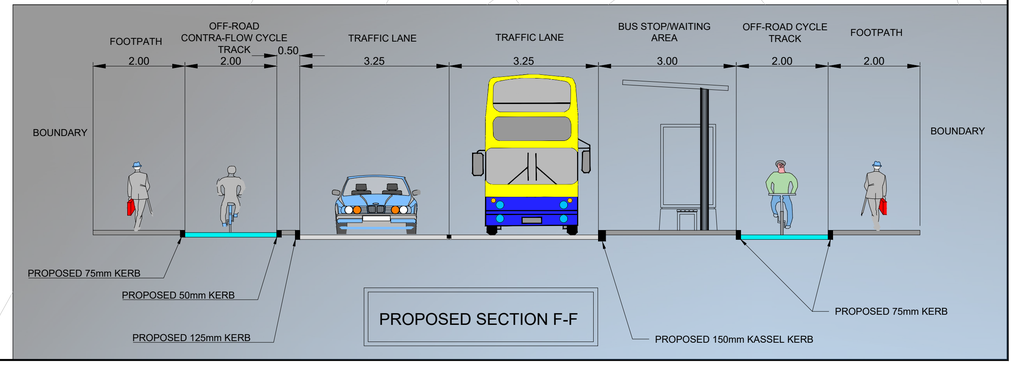
Woodies

F

F

LEGEND:

- EXISTING KERBLINE
- PROPOSED KERBLINE
- PROPOSED CARRIAGEWAY BUILD-UP / RESURFACING
- PROPOSED FOOTPATH
- PROPOSED ON- ROAD CYCLE TRACK
- PROPOSED CYCLE TRACK
- PROPOSED LANDSCAPED / GRASSED AREA
- PROPOSED TREES
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- SHARED PEDESTRIAN/CYCLIST SURFACE
- PROPOSED LOW LEVEL PLANTING



PROPOSED SECTION F-F

dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

BARRY TRANSPORTATION

Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland

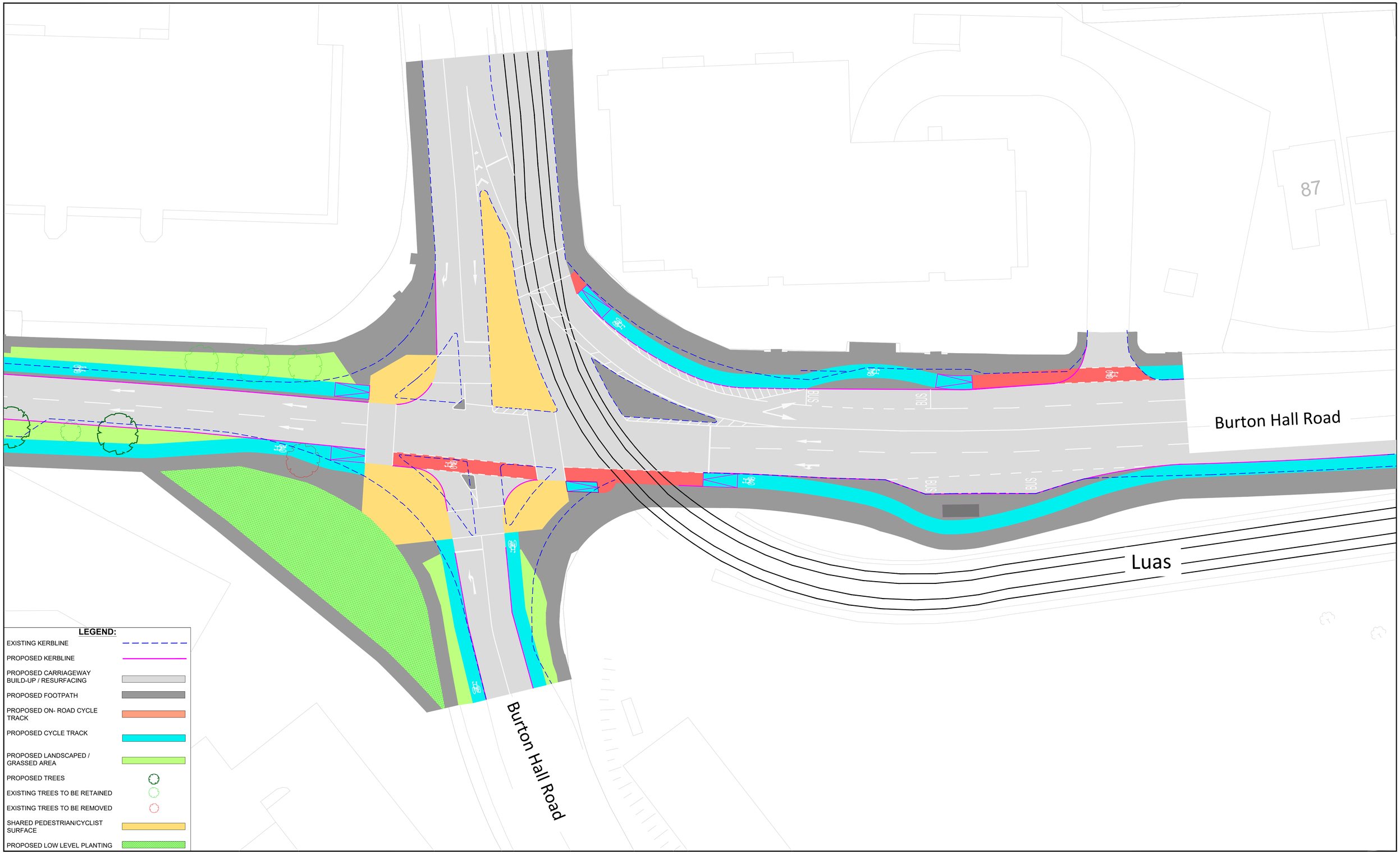
Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme		Status: S1
Drawing Title:	General Layout - Sheet 11		
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No. 19407-BT-00-ZZ-DR-00018	Rev: 07
Drawn: BE			
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		



dlr Comhairle Contae County Council

Údarás Náisiúnta Iompair National Transport Authority

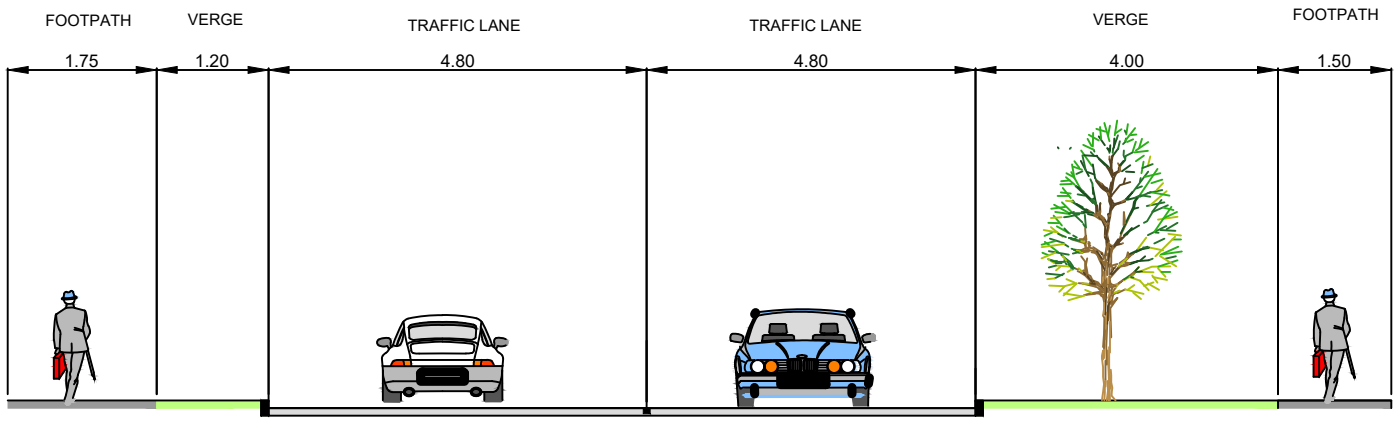
BARRY TRANSPORTATION
Classon House
Dundrum Business Park,
Dundrum Road,
Dublin 14,
Ireland
Phone: +353 1 485 1400
Email: info@jbbarry.ie

Notes

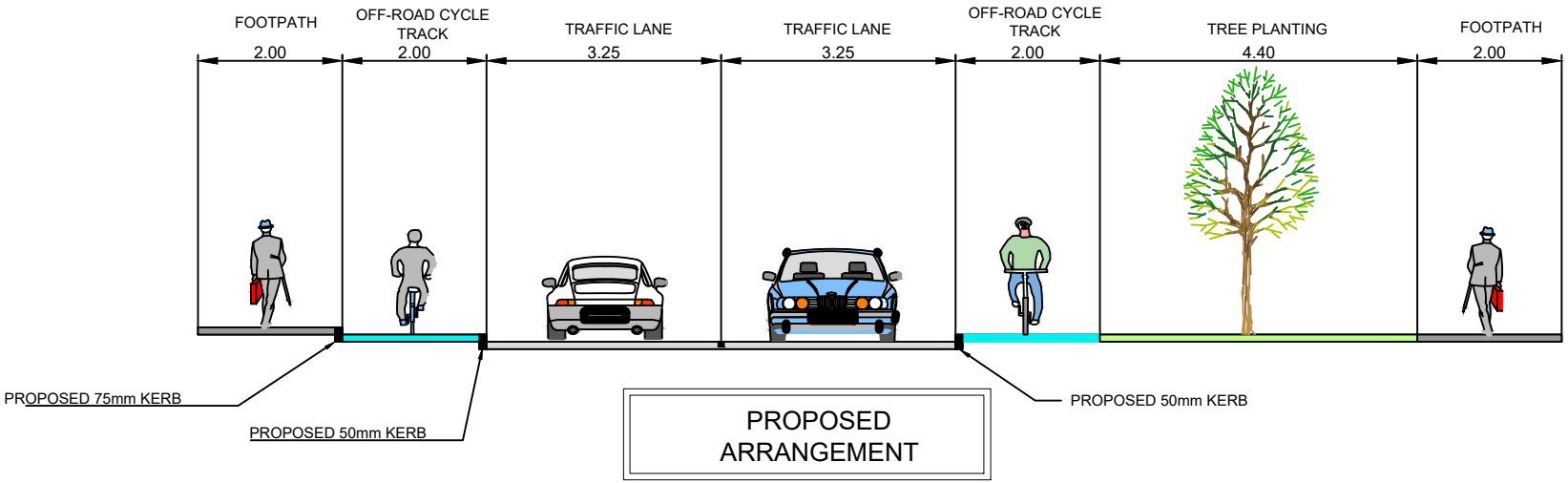
All levels are referred to Ordnance Survey Datum, Malin Head.
This document should not be relied on or used in circumstances other than those for which it was originally prepared. Barry Transportation accepts no responsibility for this document to any other party other than the party by whom it was commissioned.

Rev.	Date	Drawn	Description	Chk'd	Appr.

Project Title:	Sandyford Cycle Improvment Scheme	Status:	
Drawing Title:	General Layout - Sheet 12		S1
Designed: BE	File Name: 19407-BT-00-ZZ-DR-00018	Drawing No.	Rev:
Drawn: BE		19407-BT-00-ZZ-DR-00018	07
Approved: RC	Scale at A1: 1:250		
Checked: RC	Date: May 2021		



EXISTING ROAD LAYOUT



PROPOSED ARRANGEMENT

ESB Link Road
&
Link to Arena Road

Part 8 Planning
Environmental Report

October 2013

Client:
Dún Laoghaire Rathdown County Council
County Hall
Marine Road
Dún Laoghaire, Co Dublin

Consulting Engineer:
ROD – Aecom Alliance
Arena House
Arena Road
Sandyford
Dublin 18

ESB Link Road and Link to Arena Road

Part 8 Planning
Environmental Report

Table of Contents

Non-Technical Summary

1.0 Introduction

This Environmental Report (ER) has been prepared by Roughan & O'Donovan - AECOM Alliance (ROD-AECOM) for Dún Laoghaire Rathdown County Council (DLRCC) as part of the documentation to accompany a Part 8 planning process for the proposed ESB Link Road and Link to Arena Road between M50 Junction 14 and Blackthorn Road. The scheme includes the replacement of the roundabout at ESB Junction 14 with a signalised junction and the construction of a new signalised junction on Blackthorn Road. The ER documents the assessment of the impact of the proposed development on the environment in the vicinity of that development.

This non-technical summary summarises the outcome of the environmental assessment and highlights, in non-technical language, the main impacts of the proposed scheme.

2.0 Background to the Scheme

The Sandyford Urban Framework Plan has planned for the increase in the working and living population within the area from an estimated 15,000 in 2006 to 40,000 in 2016 and to 55,500 by 2030. The traffic study carried out during the development of the SUFP determined that this growth requires, in the short term, to be supported by a number of additional elements of road and public transport infrastructure, including the proposed ESB Link Road and Link to Arena Road.

The Sandyford Urban Framework Plan was incorporated into the Dún Laoghaire - Rathdown County Development Plan in September 2011 as Variation No. 2.

3.0 Description of Proposed Scheme

The development site is located in the Sandyford and Leopardstown Road area of South Dublin. The proposed development comprises: -

- The provision of a new road link between the existing signalised roundabout at M50 Junction 14 and Blackthorn Road.
- A link from the new road above to the existing cul-de-sac at Arena Road
- The replacement of the signalised roundabout at Junction 14 with a signalised junction.
- Construction of a new signalised junction on Blackthorn Road.
- Improvements to pathways, cycleways and crossings and improvements to the quality of the public realm locally.
- Upgraded public lighting

4.0 Alternatives Considered

At the time of the development of the Sandyford Urban Framework Plan, a number of alternatives were considered:

(i) A slip road from the M50 southbound off-slip onto Heather Road;

(ii) Construction of the Burton Hall Road Extension instead.

(iii) Do Nothing

Both of the above were examined individually and in conjunction with the ESB Link Road and Link to Arena Road. In the case of the former, the National Roads Authority had significant concerns and expressed a strong preference that the scheme be combined with the ESB Link Road so as to have one exit point only towards Sandyford Business District from the M50 southbound off-slip. In the case of the latter two options, the development aspirations for Sandyford Business District could not be accommodated without the development of both the Burton Hall Link Road and the ESB Link Road and Link to Arena Road. Therefore, both schemes were included as Objectives of the Development Plan.

5.0 Traffic

The Transportation Study that informed on the preparation of the Sandyford Urban Framework Plan determined a road configuration that represents the level of new road infrastructure required to facilitate the future office development envisaged. This roads configuration was included in the Sandyford Urban Framework Plan as TAM18: Six-Year Roads Objectives and incorporates the following schemes: -

- Burton Hall Road Extension
- Leopardstown Roundabout Reconfiguration
- Leopardstown Link Road (with access to car parks in Central Park)
- Direct access from M50 Junction 14 diverge ramp (the preferred option for which is to the ESB Link Road and Link to Arena Road
- Bracken Road Extension
- Blackthorn & Arena Road Links (or ESB Link Road and Link to Arena Road)
- Sandyford Orbital Quality Bus Corridors

Consideration was also given to the NRA's recent M50 Demand Management Study. However, no adjustment of future traffic demand forecasts has been made in this study and as such the traffic analysis represents a robust assessment of the road network within the Sandyford Business Estate and that of the National Road network.

Traffic analysis shows that the road will operate at near full capacity at the time of opening. Daily traffic flows of 10,000 vehicles are predicted for the route. The road will mitigate congestion on the local road network, especially at the Leopardstown Roundabout/ proposed signalised junction.

The preferred scheme will not have any significant impact on the traffic demand or operation of the M50. Specifically the provision of a fully signalised junction to replace the current signalised roundabout will ensure that any queuing back along the M50 southbound off-slip will be controlled by the timings of the signals to ensure that queues do not extend back towards the M50 mainline.

6.0 Impact on Human Beings

The area adjacent to the proposed road is a mix of brown field, commercial, open space and institutional land uses. Most existing development consists of commercial office and warehouse type development. Future population growth in the area is an objective of the County Council Development Plan, and this will depend on the provision of new commercial residential development as envisaged by the Sandyford Urban Framework Plan. Improvements to the local transportation infrastructure as

set out in the SUFP are a prerequisite to support the anticipated population growth in the area.

The proposed road will facilitate further residential and commercial development in the Sandyford area by mitigating congestion that would otherwise arise on the existing road network.

The proposed road scheme, in conjunction with other transportation initiatives will ensure that the area of Sandyford Business District will remain an attractive location for businesses. This will support demand for commercial and professional services, thereby increasing local employment opportunities.

7.0 Environmental Issues

7.1 Noise and Vibration

During the construction phase of the project there will be some small impact on nearby properties due to noise emissions from site traffic and other activities. The transient nature of construction works, the application of binding noise limits and hours of operation, along with implementation of appropriate noise control measures, will ensure that noise impact is kept to a minimum.

The predicted noise level generated by the proposed road development during the operational phase is not expected to represent a significant increase on current noise levels in the area.

Ground vibrations produced by road traffic are unlikely to cause perceptible structural vibration in properties located near to well-maintained and smooth road surfaces.

7.2 Air Quality and Climate

The air quality in the vicinity of the proposed ESB link Road will not be significantly affected by vehicle exhaust emissions.

7.3 Hydrology and Hydrogeology

The proposed scheme will have no impact on and water quality. Mitigation measures to ensure water quality is maintained during construction are provided.

7.4 Soil

The proposed ESB link Road will have no impact on the soil along the scheme.

8.0 Ecology (Flora & Fauna)

A flora and fauna survey was carried out along the proposed ESB Link road and Link to Arena Road project in November 2012. The flora and fauna survey was carried out to investigate the potential impacts of a proposed development flora and fauna.

The site for the proposed project consists mainly of buildings and artificial surfaces, non-native shrub and immature tree lines and built ground. There is one culverted stream under the proposed link road. No flora, fauna or habitats of conservation importance were discovered during the present survey. Mitigation measures are recommended, mainly with respect to timing of clearance works and water quality, to help prevent unnecessary negative impacts to local wildlife populations and aquatic environment.

There are a number of nature conservation designated areas within 10km of the site. These include South Dublin Bay Special Area of Conservation (SAC) and South Dublin Bay and Tolka Estuary Special Protection Area (SPA) downstream of the proposed works. An Appropriate Assessment Screening for potential impacts on the Natura 2000 network of SAC's and SPA's has been carried out and is reported in Appendix 1 of this document. Following an appraisal of the potential impacts of the proposed ESB Link Road & Link to Arena Road on the Natura 2000 network, the likelihood of significant negative impacts arising on either the qualifying interests (South Dublin Bay SAC and South Dublin Bay and Tolka Estuary SPA) or on the integrity of any Natura 2000 site, has been ruled out. Therefore it is possible to screen out the need for an Appropriate Assessment and it is not deemed necessary to undertake any further stages of the Appropriate Assessment process.

9.0 Landscape and Visual Impacts

The proposed scheme will not have an adverse impact in its setting. A reinforced concrete retaining wall is required along one section on the east boundary of the road otherwise the proposed road generally follows the existing ground levels. The route travels though an industrial / business district that has no landscape and visual sensitivities.

10.0 Material Assets

The proposed ESB Link Road will run between two warehouses on lands owned by Aviva Insurance. This area is currently used as a yard to service the warehouse to the west, which is owned by Aviva. As such, there will be a significant negative impact on this land.

It is understood that both other directly affected landowners; ESB and EIRCOM; intend to redevelop their sites in the medium term and the delivery of the proposed ESB Link Road will facilitate this. Therefore, while the proposed road scheme may have a moderate negative impact on the landholdings in the short term, its medium term impact will be significantly positive.

The warehouses to the east of Aviva are in the control of Brooks Ltd. The impact on these will be neutral, as the proposed road will cause additional severance but will provide more direct access.

11.0 Architectural, Archaeological and Cultural Heritage

All works will take place, with only minor surface effects, either within the corridor of the existing road or directly adjacent to the existing road in land that has been subject to recent development. All works will take place outside the boundary and curtilage of the protected structure of Burton Hall. Consequently there are no predicted impacts on architectural, archaeology and cultural heritage.

12.0 Construction Phase

The construction of the road scheme will cause an increase in noise during working hours, but contract conditions will limit this noise to acceptable levels. Working hours will be limited, thereby avoiding the potential for disturbance of residents at night. The Contract will include requirements for appropriate measures to prevent an accidental spillage of pollutant materials into watercourses. The Contractor will be obliged to ensure that the surrounding roads are kept free from dirt. Construction

traffic for the scheme will be directed to use main roads to access the site and residential areas will not be affected.

13.0 Mitigation Measures

The following is a summary of the mitigation measures that will be undertaken to reduce the potential environmental impacts of the proposed ESB Link Road & Link to Arena Road scheme:

- Noise control measures during construction will minimise disturbance to local residents.
- Machinery and compounds will be positioned, where possible, to avoid undue disruption.
- Pollution control measures will be taken to protect the surface water drainage system during construction.
- The contractor will be required to prevent dirt from being released onto public roads.

14.0 Further Information

Copies of the full Part 8 Environmental report may be inspected at the following locations: -

Dún Laoghaire - Rathdown County Council,
County Hall,
Marine Road,
Dún Laoghaire,
Co. Dublin.

Dún Laoghaire - Rathdown County Council,
Dundrum Office Park,
Main Street,
Dundrum,
Dublin 14.

15.0 Planning Process

Section 179 of the Planning and Development Act 2000 as amended, and Part 8 of the Planning and Development Regulations, 2001 to 2011 set out the process to be used for planning approval of local authority projects that are not subject to a requirement for a formal Environmental Impact Statement under other relevant legislation. The planning approval process will involve a period of public consultation after which Dún Laoghaire - Rathdown County Council will review any submissions made by the public. The final decision to approve or reject the scheme will be made at a meeting of the elected members of the County Council.

Chapter 1 Introduction

1.1 Introduction

This Environmental Report (ER) has been prepared by Roughan & O'Donovan - AECOM Alliance (ROD-AECOM) for Dún Laoghaire Rathdown County Council (DLRCC) as part of the documentation to accompany a Part 8 planning process for the proposed ESB Link Road and Link to Arena Road between M50 Junction 14 and Blackthorn Road.

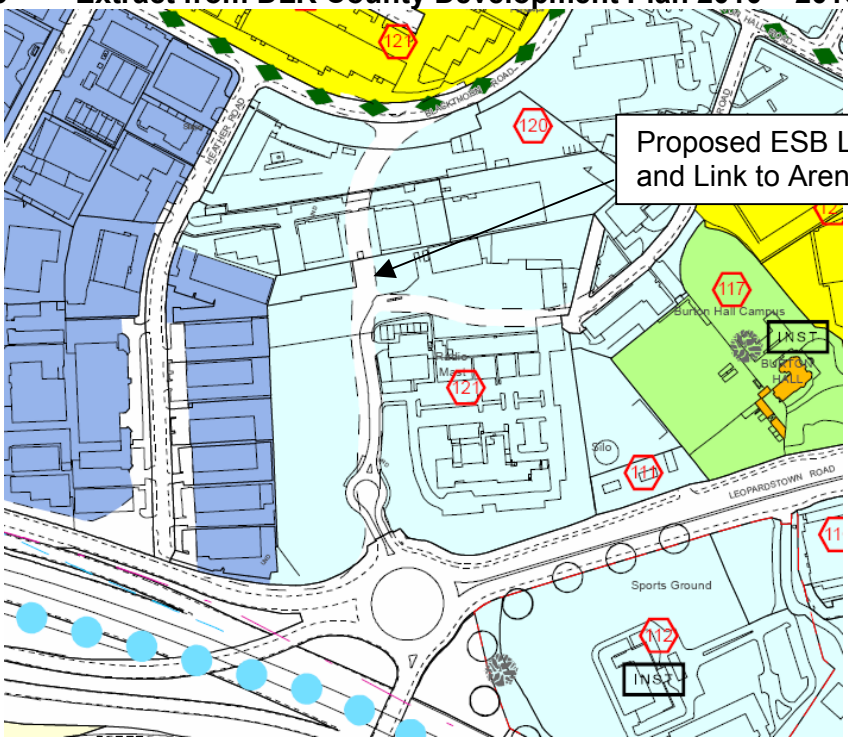
The construction of the ESB Link Road and Link to Arena Road is a six-year objective of DLRCC included in the Sandyford Urban Framework Plan, an approved Variation to the current County Development Plan (2010 – 2016). As the impacts of the scheme are local to the Dún Laoghaire - Rathdown County Council administrative jurisdiction, the scheme does not feature in national or regional policy, but sits within such broader policy in the context of the approved Dún Laoghaire - Rathdown County Development Plan.

Figure 1.1 M50 Junction 13 / 14

The principal requirements of the proposed project are to deliver increased levels of accessibility to Sandyford Business Estate for all modes to avoid a situation where further development leads to an increase in congestion on existing approaches, particularly along the M50 and N11 approaches. The scheme will facilitate and support the expected growth in traffic arising from the future development envisaged by the Sandyford Urban Framework Plan and will fulfil the improved public transport objectives for the area (the ESB Link Road forms part of the Sandyford Orbital Bus Route). The delivery of the scheme will proceed in parallel with various initiatives to encourage the use of sustainable transport modes, as documented in the County Development Plan and supporting documentation.

Figure 1.2 Aerial View

Figure 1.3 Extract from DLR County Development Plan 2010 – 2016



1.2 Planning Process

The planning for the proposed project is undertaken in accordance with the legislative requirement in Part XI, Section 179 of the Planning & Development Act, 2000 as amended. Part 8 of the Planning and Development Regulations, 2001 to 2011 details the class of development that is prescribed for the purposes of Section 179 of the Act and the relevant class for the proposed scheme is as follows:

b) "Construction of a new road or widening or realignment of an existing road, where the length of the new road or of the widened or realigned portion of the existing road, as the case may be, would be – in the case of a road in an urban area, 100 metres or more,"

Under Part 8 of the Regulations, the Local Authority is required to make details of the proposed road development available for public inspection and comment and to prepare a report in relation to the proposal for consideration by the elected members of the local authority. This Environmental Report (ER) contains information on the potential environmental impacts of the proposed scheme. It has been prepared in accordance with the information requirements of the Planning and Development Act (2000) and Planning and Development Regulations (2001).

The purpose of the ER is to identify the potential impacts the proposed scheme will have on the environment and to propose measures to avoid, reduce or remedy undesirable potential impacts as appropriate.

1.3 Legislative Requirement for an Environmental Impact Report

Article 8 of the Roads Regulations 1994 prescribes the types of proposed road development that require the preparation of an Environmental Impact Assessments as: -

- Construction of a motorway.
- Construction of a new road of four or more lanes, or the realignment or widening of an existing road so as to provide four or more lanes, where such new, realigned or widened road would be 8km or more in length in a rural area or 500m or more in length in an urban area.
- Construction of a new bridge or tunnel, which would be 100m or more in length.

The proposed ESB Link Road will involve the provision of approximately 350 metres length of new single carriageway road linking Blackthorn Road and the roundabout at M50 junction 14. The proposed scheme also includes the provision of a new northbound quality bus corridor a new signalised junction at Blackthorn Road and the replacement of the signalised roundabout at M50 junction 14 with a signalised junction. A link from the proposed road to Arena Road will involve the provision of approximately 145 metres length of new single carriageway road. Improvements will also be made to the existing Blackthorn Road at the approaches to the new junction. As such the ESB Link Road & Link to Arena Road development does not require the preparation of an Environmental Impact Statement under the relevant legislation. However it was decided by Dún Laoghaire Rathdown County Council to prepare an Environmental Report (ER) for this scheme, broadly following the same process as would be undertaken for a full Environmental Impact Statement.

Approval for the South Eastern Motorway scheme was granted by the Minister for the Environment and Local Government on the 19th October 1998 under section 51 of the Roads Act 1993 without any modifications. The South Eastern Motorway (SEM) scheme approved consisted of the construction of approximately 10.9 kilometres of

two by two lane motorway, six motorway interchanges, 21 structures, 2.7 kilometres of dual carriageway and 4 kilometres of ancillary roads.

Having regard to the nature, complexity and scale of the overall SEM project it is considered that the modifications now proposed, i.e. the modifications to the ESB roundabout, are not of such significance as to change the essential nature of the development or to result in the proposed road development being of a significantly different development from that for which approval has been previously granted.

Therefore, whilst due regard was had to the Environment Impact Statement (EIS) prepared for the South Eastern Motorway (September 1997) it is considered that the Environmental Report prepared for the ESB Link Road & Link to Arena Road adequately addresses any potential impacts on the environment of the proposed scheme.

1.4 Format of the Environmental Impact Report

The ER is prepared having regard to the requirements of Section 50 of the Roads Act 1993 as amended.

Section 50 of the Roads Act and the Environmental Impact Assessment Regulations require that the following information be included in an EIS:

> "*A description of the proposed road development comprising information on the site, design and size of the proposed road development;*
> - *A description of the measures envisaged in order to avoid, reduce and, if possible remedy significant adverse effects;*
> - *The data required to identify and assess the main effects which the proposed road development is likely to have on the environment;*
> - *An outline of the main alternatives studied by the road authority concerned and an indication of the main reasons for its choice, taking into account the environmental effects;*
> - *A summary in non-technical language of the above information.*

An Environmental Impact Statement also requires, in addition to and by way of explanation or amplification of the specified information referred to above further information on the following matters:

A description of the physical characteristics of the whole proposed road development and the land-use requirements during the construction and operational phases,
An estimate, by type and quantity, of the expected residues and emissions (including water, air and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed road development.
A description of the aspects of the environment likely to be significantly affected by the proposed road development, including in particular-
- *Human beings, fauna and flora,*
- *Soil, water, air, climatic factors and the landscape,*
- *Material assets, including the architectural and archaeological heritage, and the cultural heritage,*
- *The inter-relationship between the above factors;"*

The Environmental Report has been prepared with regard to the above requirements. The format used in this Environmental Report document seeks to allow the reader to access the issues of interest to them as easily as possible.

Chapter 2 Background to Scheme

2.1 Objectives of the Proposed Road

The Sandyford Urban Framework Plan has planned for the increase in the working and living population within the area from an estimated 15,000 in 2006 to 40,000 in 2016 and to 55,500 by 2030. The traffic study carried out during the development of the SUFP determined that this growth requires, in the short term, to be supported by a number of additional elements of road and public transport infrastructure, including:

- M50 junction 14 diverge ramp access to Sandyford
- Revised access to South County Business Park (the Leopardstown Link Road) including an access to the car parks within Central Park
- The Bracken Road Extension to the Drummartin Link Road
- Burton Hall Road Extension to Leopardstown Road
- ESB Link Road and Link to Arena Road
- Reconfiguration of the Leopardstown Roundabout
- Bus/Luas Interchange at the Stillorgan Luas stop
- Lower Kilmacud Road Quality Bus Corridor
- Internal circular Quality Bus Corridor
- Tallaght to Sandyford Quality Bus Corridor
- Cycling and Walking Routes

Several studies and traffic models were undertaken in selecting the schemes to feature in the final plan. These included the Sandyford Land Use and Transportation Study by FaberMaunsell and modelling for the SUFP itself by Mott McDonald. This process is summarised in the Transportation Background Paper for the SUFP, available on the DLRCC website.

At the time of the development of the Sandyford Urban Framework Plan, a number of alternatives was considered:

(i) A slip road from the M50 southbound off-slip onto Heather Road;

(ii) Construction of the Burton Hall Road Extension instead.

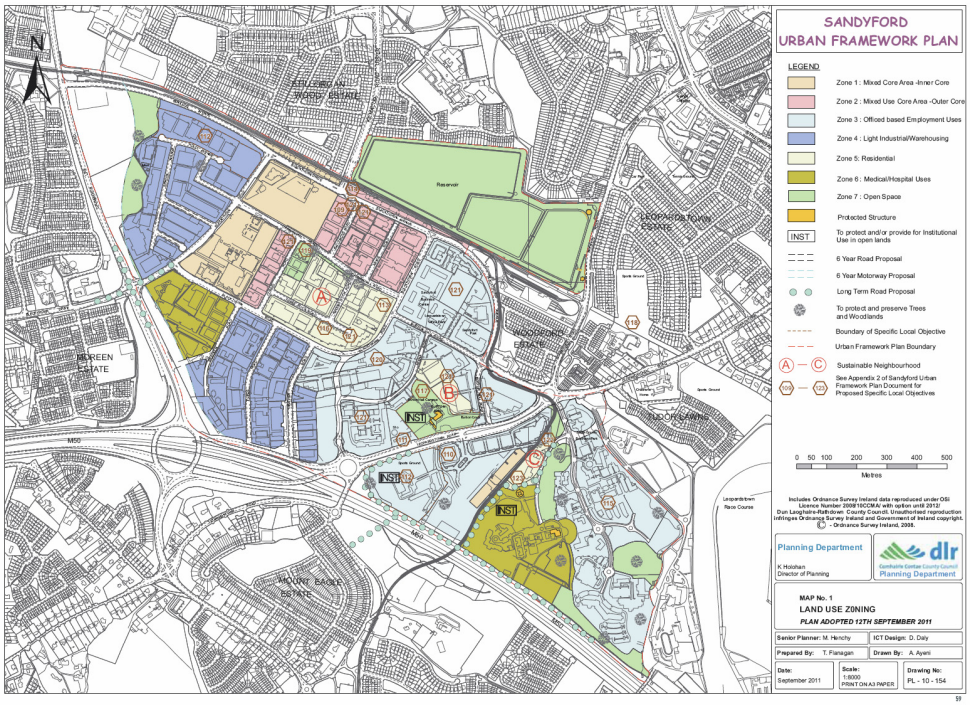
(iii) Do Nothing

Both of the above were examined individually and in conjunction with the ESB Link Road and Link to Arena Road. In the case of the former, the National Roads Authority had significant concerns and expressed a strong preference that the scheme be combined with the ESB Link Road so as to have one exit point only towards Sandyford Business District from the M50 southbound off-slip. In the case of the latter two options, the development aspirations for Sandyford Business District could not be accommodated without the development of both the Burton Hall Road Extension and the ESB Link Road and Link to Arena Road. Therefore, both schemes were included as Objectives of the Development Plan.

2.2 Recent Developments

The Council adopted the Sandyford Urban Framework Plan as Variation No.2 to the County Development Plan 2010-2016 at the Council meeting held on 12th September 2011. The variation includes the ESB Link Road and Link to Arena Road as a six-year roads objective and details the road reservation on the "Land Use Zoning" map.

Figure 2.1 Sandyford Urban Framework Plan – Land Use Zoning Map



2.3 Objectives of the ESB Link Road and Link to Arena Road

All of the access routes constructed into Sandyford Business District from the M50 were designed to prioritise the movement of vehicular traffic and remain, despite some improvements, hostile to pedestrians and cyclists. This has resulted in many commuters being put off these modes - even for short trips from the far side of the M50 motorway. One of the key principles being adopted for the design of the ESB Link Road and Link to Arena Road scheme is that the facilities provided for pedestrians and cyclists are as good as or better than the facilities being provided for private cars.

The development of the scheme design coincided with the launch of the Design Manual for Urban Roads and Streets. Additionally, the design team liaised extensively with the design teams working on developing lands along the route, thereby ensuring that the completed scheme would integrate well into the future urbanised context.

The ESB Link Road and Link to Arena Road forms part of the proposed orbital bus route in Sandyford Business District, and therefore it is a requirement that the scheme provide good quality facilities for buses in the northbound direction.

The scheme has been designed having regard to the geometric criteria of the Design Manual for Urban Roads and Streets, permitting tighter radii to regulate traffic speeds. The proposed vertical alignment has been designed with a maximum gradient of 4% so as to ensure its attractiveness to pedestrians and cyclists.

Chapter 3 Description of Proposed Scheme

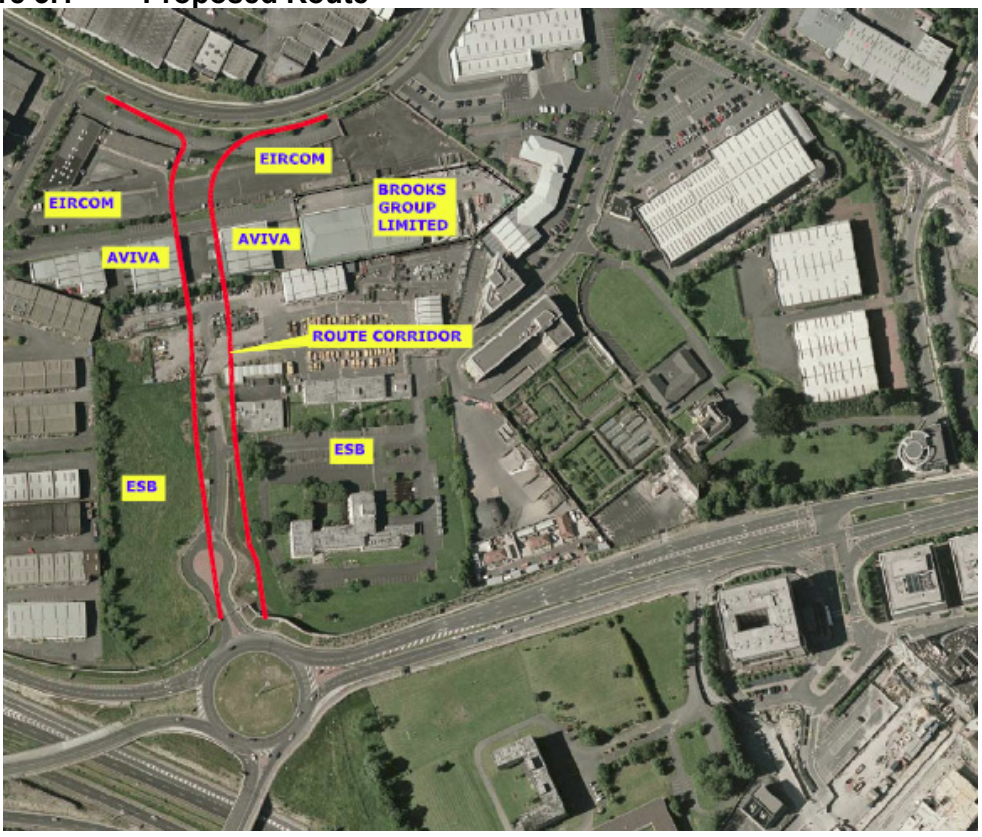
3.1 Road Layout

Based on the principle of providing pedestrian and cycle facilities as good as or better than the facilities for cars, the following general layout has been proposed for the scheme:

- Footways: A 2m footpath to be provided on either side of the road.
- Cycleways: A 2.5m two-way cycle track to be provided on either side of the road.
- Public Transport: A 3m bus lane to be provided in the northbound direction.
- Car traffic: One 3.25m through traffic lane in each direction and a 3m central reservation for turning lanes to serve the development lanes on either side. Additional turning lanes provided at major junctions.
- Landscaping: A 2.0m verge to be provided on either side of the road between the kerb-line and the cycle tracks to accommodate landscaping. The verges shall be kept clear of longitudinal services to facilitate tree planting.

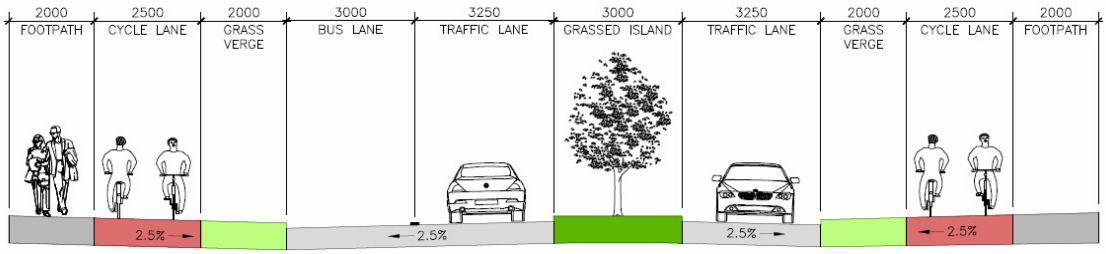
The route of the proposed scheme runs north from the M50 Junction 14 northern roundabout through the ESB Lands. The route then cuts between two warehouses owned by AVIVA to the north through the yard between the two warehouses. The route then curves eastward through lands owned by EIRCOM to join Blackthorn Road East.

Figure 3.1 Proposed Route



The scheme has been the subject of a Road Safety Audit and a Road User Audit, the recommendations of which have been incorporated by the Design Team, as appropriate.

Figure 3.2 Typical Cross Section



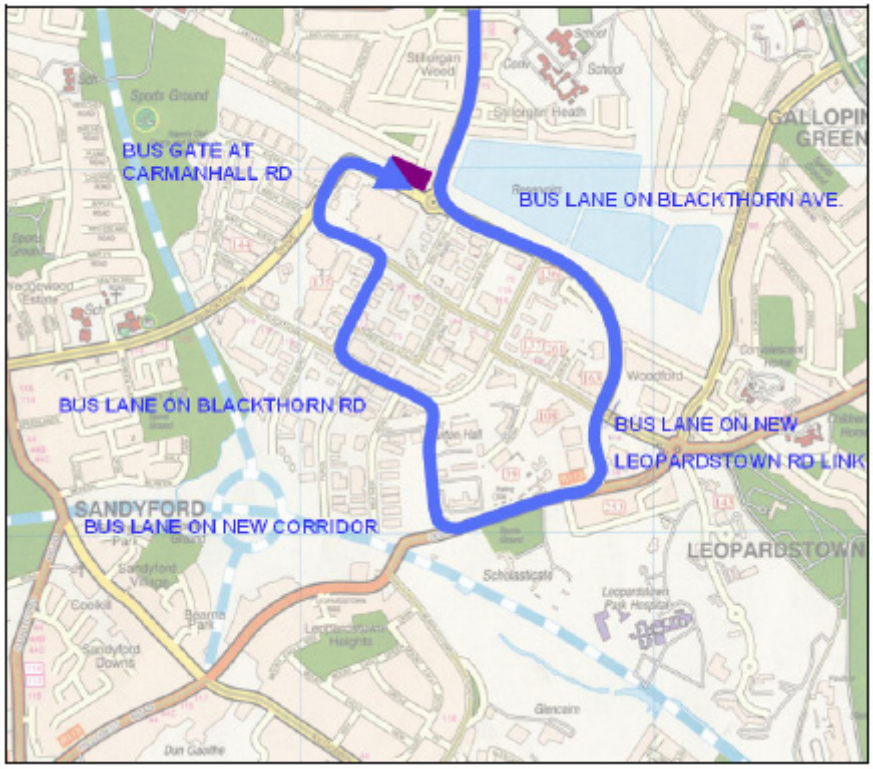
3.2 Cycling and Walking Facilities

The Dún Laoghaire - Rathdown County Development Plan Policy T12 is to promote cycling and walking through the provision of cycle and pedestrian facilities in the design of public transport routes and road schemes. The Sandyford Urban Framework Plan adopted as Variation No.2 to the County Development Plan 2010 – 2016 includes objective TAM6 to implement this cycling and walking route as part of the provision of this new road proposal. In accordance with the Development Plan and the Sandyford Urban Framework Plan, pedestrian and cycle facilities will be provided on both sides of the ESB Link Road and Link to Arena Road scheme.

3.3 Sandyford Bus Route

The Sandyford Land Use and Transportation study 2006 proposed a bus route as shown below, with a view to providing a fast and effective route through Sandyford. It provides good connectivity with the Luas and development throughout the Sandyford Business District.

Figure 3.3 Sandyford Orbital Bus Route



The ESB Link Road and Link to Arena Road forms part of the proposed orbital bus route in Sandyford Business District, and therefore it is a requirement that the scheme provide good quality facilities for buses in the northbound direction.

3.4 Public Lighting

A public lighting scheme has been devised, taking account of the different character of various affected roads, including the proposed urban environment of the ESB Link Road and Link to Arena Road and the motorway environment at M50 Junction 14. Columns of 10m and 12m are proposed at various locations, with wattages varying from 150W to 400W, as detailed on the accompanying drawings. Class CE1 lighting is to be provided at junctions, with Class ME2 on all roads except Arena Road Link, which will have Class ME3a.

3.5 Drainage

The drainage arrangements may ultimately be influenced by the attenuation proposals for adjoining lands, however, a notional design has been proposed that can function and be constructed independently of the development of the adjoining lands. The areas beneath the verge and cycle track construction should be constructed of permeable materials to permit infiltration into the surrounding soils. A partially perforated pipe should be incorporated to allow the conduct of water when the infiltration zone reaches saturation. At the lower reaches, larger fully enclosed pipes should be used to allow online attenuation. The drainage will discharge to the Sandyford Stream at its culvert in the Eircom lands. A hydrobrake should be installed to limit the rate of discharge to the stream and the upstream attenuating pipes sized accordingly. The drainage of the proposed M50 Junction 14 signalised junction should discharge to the existing piped drainage network at the roundabout.

3.6 Structures

No significant structures are required to accommodate the proposed scheme. Retaining walls (approximately 150m in length) may be required through the ESB lands to limit the footprint of the scheme. The retaining walls will be reinforced concrete with a patterned finish or as may be agreed with the relevant landowner. The maximum height of any such wall is approximately 2.75m above ground level.

The scheme runs over a culvert carrying the Sandyford Stream in the Eircom lands. The culvert is approximately 2m below the proposed road and already carries traffic above. The structure will be assessed at the detailed design stage to ensure its adequacy in the long term.

3.7 Earthworks

The proposed vertical alignment falls at a constant gradient through the ESB lands before following existing ground levels from the northern boundary of the ESB site to Blackthorn Road. Approximately 2,500m^3 of imported fill will be required to achieve the proposed vertical alignment through the ESB site.

3.8 Road Construction

It is anticipated that the road construction will consist of:

- 300mm of capping material (large crushed stone)
- 150mm of sub-base (small crushed stone)
- 150mm of road base
- 65mm of binder course
- 35mm of surface course.

The proposed surface course is polymer modified stone mastic asphalt, which generates less noise when trafficked than other materials and is therefore more suited to an urban area.

The depth of capping material required will have to be confirmed at detailed design stage, subject to confirmation of the strength of the underlying sub grade. It is anticipated that 300mm should be adequate, as there is very strong granite at shallow depth and the materials above are likely to consist of weathered granite.

3.9 Junctions

A detailed traffic analysis of the scheme was undertaken to inform the design of the junctions at either end. The following synopsises the initial findings:

- The heaviest traffic movements at the northern end of the scheme are between Blackthorn Road East and the ESB Link Road. On that basis, the priority on Blackthorn Road has been changed such that the through traffic movement will be between Blackthorn Road East and the new link road. Blackthorn Road West will be accessed via a signalised junction. A right turning lane will be provided for traffic from the north. The bus lane will stop 30m south of the junction to accommodate left turners from the ESB Link Road. The traffic analysis has indicated that the bus lane will be sufficiently close to the junction to allow a bus to pass the stop line in a single signal cycle.
- The northern roundabout at M50 Junction 14 was recently signalised to improve throughput of traffic and to prevent queuing onto the M50 mainline. The recent improvements have significantly enhanced capacity. The traffic analysis has indicated that the introduction of a significant new road access onto the roundabout will be incompatible with the current signalised roundabout layout. Furthermore, the existing layout is unconducive to the safe passage of pedestrians and cyclists. Therefore, it is proposed to convert the existing signalised roundabout to a four arm signalised junction.

3.10 Landscaping

A landscaping scheme has been developed for the proposed Link Road in consultation with the Developers of the adjoining lands so as to ensure the proposed scheme integrates into the future urbanised environment. The selection of trees and shrubs has been made having regard to the sometimes windy conditions and the need to design the planting accordingly. The design of the landscaping also takes account of the desire to minimise the ongoing maintenance requirement. Further details of the landscaping proposals are shown on the detailed drawings forming part of this Part 8 planning application.

3.11 Other Utilities and Services

It is likely that the final scheme will include ancillary underground elements to serve the Sandyford Business District, including, inter alia:

- Watermains
- Diverted ESB cables
- Foul sewerage.

Other utilities such as gas mains may also be required. These features will not impact appreciably on the design of the road, as they will be constructed below ground under the footpaths and cycle tracks. The verge shall be kept clear of services in order to facilitate tree planting. However it may be necessary for services to cross the verge at particular locations. The exact nature and number of services to be accommodated will be established during the detailed design stage.

Chapter 4 Alternatives Considered

4.1 Alternatives Considered

In developing the road strategy for the Sandyford Urban Framework Plan a number of alternative road configurations were considered and examined using the SATURN traffic model. The conclusion of the SUFP roads study determined the optimum configuration required to facilitate the further development envisaged by the plan for the area. This optimum configuration includes the ESB Link Road and Link to Arena Road and the M50 junction 14 diverge ramp access to Sandyford (provided via a free flow slip to the ESB Link Road).

At the time of the development of the Sandyford Urban Framework Plan, a number of alternatives were considered:

- A slip road from the M50 southbound off-slip onto Heather Road;
- Construction of the Burton Hall Road Extension instead.
- Do Nothing

Both of the above were examined individually and in conjunction with the ESB Link Road and Link to Arena Road. In the case of the former, the National Roads Authority had significant concerns and expressed a strong preference that the scheme be combined with the ESB Link Road so as to have one exit point only towards Sandyford Business District from the M50 southbound off-slip. In the case of the latter two options, the development aspirations for Sandyford Business District could not be accommodated without the development of both the Burton Hall Road Extension and the ESB Link Road and Link to Arena Road. Therefore, both schemes were included as objectives of the Development Plan.

The proposed route has been developed in conjunction with landowners along the scheme extent and is considered optimal taking into account both existing land uses and proposed future developments.

The do nothing scenario presents an alternative to the proposed scheme, however this alternative would not facilitate any further development within the Sandyford Business District, without exacerbating traffic congestion.

The design of a do minimum scenario was considered involving the construction of the ESB Link Road without the quality bus corridor. However, this was dismissed in order to fulfil the improved public transport objectives for the area.

Chapter 5 Traffic Impacts

5.1 Traffic Model

The primary analysis tool that has been used for the traffic assessment and project appraisal is the Sandyford VISSIM Model, developed by AECOM and Roughan & O'Donovan in 2011 on behalf of the NRA as a decision making tool in the signalisation of the ESB Roundabout. The Sandyford models were developed as microsimulation models using the transportation modelling software VISSIM (V5.4-02). This type of model is particularly suited to small scale congested urban networks, simulating the behaviour of individual vehicles within the network.

The VISSIM model has been developed specifically to account for route choice effects of network interventions through the Sandyford area, and to allow replication of the complex interaction through a number of complex junctions. The study area of the Sandyford VISSIM model is outlined below in Figure 3.1.

Figure 5.1: Boundary of Sandyford VISSIM Model

The models were developed to replicate a Base year of 2012, covering the AM Peak period (07:00 –10:00) and PM Peak period (16:00 – 19:00).

The model calibration process was undertaken in accordance with the requirements of PAG Unit 5.2: Construction of Traffic Models and with reference to the calibration criteria outlined in Table 5.2.2 of that Unit. The models were developed based on traffic information for 31 junctions (including significant SCATS data) and utilising a number of journey time surveys. The models have been calibrated to a standard compliant with the PAG criteria for all user classes and all time periods.

The outputs of the Sandyford VISSIM models (for instance travel time, delay time and vehicle kilometres) have been utilised to inform an appraisal of the scheme.

Full details of the various models are included in the Traffic Modelling Report (Appendix 3).

5.2 M50 Demand Management Study

The NRA in conjunction with a number of local authorities in the Greater Dublin Area, including: Dún Laoghaire Rathdown; Fingal; and South Dublin County Councils recently undertook an extensive study into traffic demand measurements along the M50. These objective traffic management measures were to reduce demand on the M50, such that it operates without congestion for longer; and improve the safety and reliability of the M50 by reducing congestion. Measures were identified in order to achieve these objectives. These measures are as follows:

- Fiscal Measures – multi point tolling along the M50;
- Intelligent Transport Systems/Traffic Control – variable speed limits and incident management services;
- Information – information from the traffic control systems to be provided to the public via the internet;
- Smarter Travel – area based travel planning, most notably in the Sandyford Area; and
- Provision of a traffic control centre.

Modelling undertaken to supplement the M50 Demand Management Study indicated that the measures outlined above would have a significant impact on travel behaviour including: reassignment to avoid the tolls; some mode shift from the private car; and demand changes. Consequently, the study forecasts a reduction in demand along the M50 and also a reduction in traffic volumes using the on and off ramps at M50 Junction 14 to the order of 45% during the AM peak. Therefore, no adjustment of the demand matrices was considered necessary. As such, the traffic modelling undertaken represents a robust assessment of the road network within the Sandyford Business Estate and that of the National Road network.

5.3 M50/M11 Corridor Study

The subject study has been undertaken with reference to the M50/M11 Corridor study. The M50/M11 Corridor study was undertaken to understand transport pressures between Sandyford and Fassaroe in Wicklow. The study included a range of road upgrades and traffic management measures within the study area. The final future scenario included some 40 separate schemes and included the subject scheme, the ESB Link Road and Link to Arena Road. Additional schemes within the study area, that were also included within the M50/M11 Corridor study include: Burton Hall Extension; signalisation of Leopardstown Roundabout; Leopardstown Link / Central Park to South County Business Park Link Road; Murphystown Link Road. Each of these schemes have been considered to some extent within the subject study.

5.4 The Sandyford Urban Framework Plan

The Sandyford Urban Framework Plan (SUFP) identified a number of road improvement schemes in the Sandyford area, which are in the final stages of planning/pre construction and are due to be constructed within the next two years. For the purposes of this study it is assumed these will be in place in advance of the ESB Link Road and Link to Arena Road being implemented. These improvements constitute the “Do-Minimum” Scenario. The “Do-Something” Scenario is then taken as the addition of the proposed ESB Link Road and Link to Arena Road scheme.

Schemes included in the Do-Minimum Scenario

- Scheme 1: Burton Hall Road Extension
- Scheme 2: Replacement of Leopardstown Roundabout with signals

Schemes included in the Do-Something VISSIM models

- Scheme A: ESB Link Road to Blackthorn Road (incl different junction options)
- Scheme B: Additional link to Arena Road

Finally the forecast future traffic demand was calculated based on the proposed future development included in the SUFP. As described in the Traffic Modelling Report a design year of 2019 was taken for the completion of the SUFP.

AM and PM peak hour Do-Minimum and Do-Something models were created for both 2012 (current flows) and 2019 (SUFP flows). In addition a number of sub-models were developed to assess the performance of various different junction options in the design year of 2019. For the northern junction with Blackthorn Road different arrangements of a three arm traffic signalled junction were assessed before arriving at the preferred layout. For the southern junction, the existing ESB roundabout, options were explored for upgrading the current signalised roundabout and for replacing this with a conventional 4-arm traffic signal controlled junction. The Traffic Modelling Report describes the relative performance of these options in 2019 and explains why the preferred arrangement, a 4-arm signalised junction, was selected as the preferred scheme.

The 2012 and 2019 Do-Minimum and Do-Something traffic models were compared to identify the impact on traffic that the proposed scheme is forecast to have and to determine the traffic flows along the new link road. This comparison showed that the principal effect of the ESB Link Road will be to provide an alternative route into the Business Estate and ease traffic congestion that would otherwise occur if the scheme were not constructed. In particular there is forecast to be a significant reduction of the eastbound flow along Leopardstown Road in the AM peak period. In addition the left turning manoeuvre from Leopardstown Road into the Business Estate via the Leopardstown Roundabout or Burton Hall Road Extension is forecast to be reduced significantly.

Full details of these impacts are included in the Traffic Modelling Report. A summary of the overall impact of the scheme on the Sandyford road network is provided in Tables 3.1 and 3.2 below. These show that based on 2012 flows the scheme will have a relatively small positive impact on average traffic speed, travel time and distance travelled. Based on the forecast 2019 traffic flows associated with the SUFP the scheme has very significant positive impact on average speeds and travel times compared to the Do-Minimum scenario.

Table 5.1: 2012 Network Performance Statistics

Indicator	Units	Vehicles	AM Period		PM Period	
			Do Min	Do Some	Do Min	Do Some
Average Speed	(km/hr)	Lights	44.0	45.4	43.1	44.4
		Heavies	36.9	36.8	36.7	37.4
Ave. Travel Time / vehicle	(hrs)	All Vehicles	0.080	0.076	0.080	0.077
Average Distance Travelled	(km)	All Vehicles	3.483	3.432	3.439	3.421

Table 5.2: 2019 Network Performance Statistics

Indicator	Units	Vehicles	AM Period		PM Period	
			Do Min	Do Some	Do Min	Do Some
Average Speed	(km/hr)	Lights	10.4	32.0	6.3	22.6
		Heavies	11.8	30.7	6.6	22.6
Ave. Travel Time / vehicle	(hrs)	All Vehicles	0.345	0.108	0.584	0.152
Average Distance Travelled	(km)	All Vehicles	3.542	3.433	3.690	3.424

Forecast junction traffic flows for 2019 along the ESB Link Road are shown in the figure below.

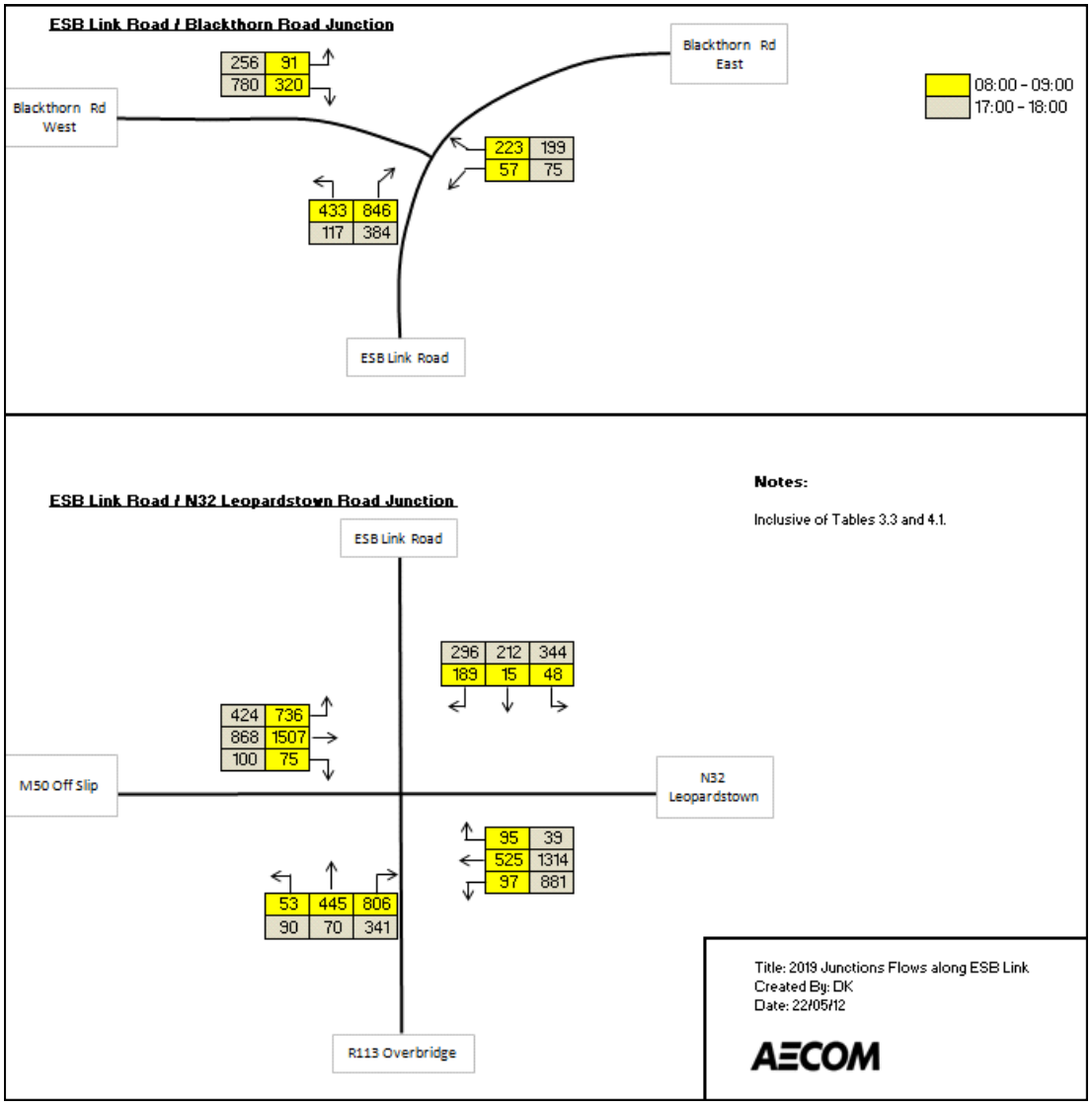


Figure 5.2 2019 Forecast Junction Traffic Flows

Chapter 6 Impact on Human Beings

6.1 Introduction

This chapter of the Environmental Report describes the impact of the proposed project on the "human environment" in terms of population, employment and community impacts.

Sandyford Business District is one of the largest and most important employment districts in the country. The Business District includes numerous offices, services and apartment blocks and is home to over 600 major national and multinational companies. Future zoning for the immediate environs of the proposed ESB Link Road and Link to Arena Road is made up largely of office and enterprise development with open space and ancillary active recreational amenities and for the creation of sustainable residential neighbourhoods.

The proposed project will result in a loss of lands currently used as warehousing and storage for ESB, Eircom and tenants of Aviva (Ireland). The development will have a positive impact on all residential and commercial development and those working in the Sandyford District in terms of facilitating area-wide traffic management especially during peak hours. The additional traffic capacity provided by the ESB Link Road and Link to Arena Road, in conjunction with the other roads proposals identified in the Sandyford Urban Framework Plan will allow for future planned development in Sandyford Business District.

6.2 Population

Receiving Environment for Population

The area adjacent to the proposed road is a mix of brown field, commercial, open space and institutional land uses. Most existing development consists of commercial office and warehouse type development. Future population growth in the area is an objective of the County Council Development Plan, and this will depend on the provision of new commercial residential development as envisaged by the Sandyford Urban Framework Plan. Improvements to the local transportation infrastructure as set out in the SUFP are a prerequisite to support the anticipated population growth in the area.

Predicted Impact of Scheme for Population

The proposed road will facilitate further residential and commercial development in the Sandyford area by mitigating congestion that would otherwise arise on the existing road network.

6.3 Employment

The predicted impacts on employment due to the various stages of the scheme are outlined below:

Construction Phase

The construction phase of the roads scheme will generate construction employment on site in addition to jobs in support industries e.g. builders suppliers, local retailers etc.

Operational Phase

The development of the scheme, in conjunction with other transportation initiatives for the area will insure that the area of Sandyford Business District will remain an attractive location for business at an important nodal point within a regional multi-modal transportation network. This will result in the increased demand for commercial and professional services, thereby increasing employment opportunities within the Sandyford Business District area.

Do Nothing Impact:

If the road is not constructed, there will be an increase in traffic congestion on the local road network and the potential for future commercial and residential development in the area of Sandyford Business District will be curtailed.

6.4 Community Impact

Receiving Environment

The receiving environment is in brown-field industrial use and is zoned for redevelopment (contingent on the provision of the proposed road scheme).

Predicted Impact of Proposed Community Impacts

The proposed scheme will increase permeability into and out of Sandyford Business District, benefiting both the population of the Business District and the population of hinterland areas south of the M50.

No additional severance will arise between communities because of the proposed road. There will be a beneficial community impact arising from the provision of additional communication routes for traffic, cyclists and pedestrians.

Chapter 7 Environmental Issues

7.1 Introduction

This chapter outlines the effects of the scheme and proposes mitigation measures required to ameliorate these effects, under the following headings: -

(a) Noise & Vibration

(b) Air Quality and Climate;

(c) Hydrology & Hydrogeology;

(d) Soil

7.2 Noise & Vibration

7.2.1 Noise

There is unlikely to be significant noise impact as part of the construction phase of the scheme. Due to the nature of the scheme any noise nuisance will be temporary and localised. Standard limitations for noise will apply as laid out in the National Roads Authority (NRA) publication Guidelines for the treatment of Noise and Vibration, which sets out limits for construction activities.

A new road will be provided through a predominantly brownfield site. There are no residential properties located in the immediate vicinity of the site and therefore it is considered that there will be no impact as a result of noise during operation of the proposed project. Future developments adjacent to the ESB Link Road and Link to Arena Road will be designed taking account of the proposed road links and therefore noise won't adversely affect their residents.

Burton Hall, which contains a walled garden open to the public, and a training and rehabilitation centre for Cluain Mhuire is the closest noise sensitive receptor. The centre is contained within the walled grounds of Burton House and is over 100m from Arena Road. The facility is open during day time hours only. It is considered that any predicted increase in traffic will not have a significant impact as a result of noise on sensitive noise receptors.

Construction Impacts and Mitigation Measures for Noise

A variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators. There will be vehicular movements to and from the site that will make use of existing roads.

The contract documents will clearly specify that the Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of BS 5228: Part 1 and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001. These measures will ensure that:

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise.
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.

- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.
- Any plant, such as generators or pumps, that is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen.

During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Table 8.9 using methods outlined in BS 5228 “Noise and Vibration Control on Construction and open sites”, Annex E. It should be noted that BS 5228 does not detail any specific noise limits in relation to construction noise.

Working Hours

Normal working times will, in general, be during daylight hours 07:00 to 19:00hrs Monday to Saturday. Works other than the pumping out of excavations, security and emergency works will not be undertaken outside these working hours without the prior consent of the Employer or Employer's Representative. However some limited nighttime working will be required for the proposed new junction works. This permission, if granted, can be withdrawn at any time should the working regulations be breached.

Operational Phase

The predicted noise level generated by the proposed road development during the operational phase is not expected to represent a significant increase on current noise levels in the area.

7.2.2 Vibration

Potential Vibration Impacts – Operational Phase

As a vehicle travels along a road, vibration can be generated in the road and subsequently propagate towards nearby buildings. Such vibration is generated by the interaction of a vehicle’s wheels and the road surface and by direct transmission through the air of energy waves. Some of these waves arise as a function of the size, shape and speed of the vehicle, and others from pressure fluctuations due to engine, exhaust and other noises generated by the vehicle.

Ground vibrations produced by road traffic are unlikely to cause perceptible structural vibration in properties located near to well-maintained and smooth road surfaces. Problems attributable to road traffic vibration can therefore be largely avoided by maintenance of the road surface.

Potential Impacts – Construction Phase

The potential for vibration at sensitive locations during construction is typically limited to demolition, excavation works, rock-breaking operations and lorry movements on uneven road surfaces. The more significant of these is the vibration from excavation and rock-breaking operations; the method of which will be selected and controlled to ensure there is no likelihood of structural or even cosmetic damage to existing neighbouring buildings.

7.3 Air Quality & Climate

7.3.1 Air Quality

Construction Phase

There is the potential for a number of emissions to the atmosphere during the construction of the scheme. In particular, the construction activities may generate quantities of dust. If a satisfactory dust minimisation plan is implemented, the effect of construction on air quality will not be significant.

The Contractor will be obliged by the local authority and the relevant legislation to ensure that the surrounding roads are kept free from dirt. In dry weather conditions, the Contractor will be required to minimise airborne dust from the site through spraying of exposed earthworks with water.

Operational Phase

Although some increase in pollutant concentrations may occur as a result of the proposed road development, it is considered that no significant increase in pollutant levels will occur. Therefore the road scheme will result in an imperceptible impact on air quality in the operational phase.

7.3.2 Climate Impact

In terms of climate, Ireland ratified the Kyoto Protocol in May 2002 agreeing to limit the net growth of the six greenhouse gases to 13% above the 1990 level over the period 2008 to 2012. Traffic flows on the proposed road will be a source of greenhouse gas emissions. However, these will be insignificant in terms of Ireland's obligations under the Kyoto Protocol.

7.4 Hydrology and Hydrogeology

The road drainage system will discharge to existing urban drainage systems and as such the risk of pollution to watercourses from the road is limited. However the road drainage system is designed in accordance with in accordance with sustainable urban drainage systems (SUDS) best practice.

7.5 Soil

This proposed ESB Link Road and Link to Arena Road will have no significant impact on soils along the proposed route.

Chapter 8 Flora and Fauna

8.1 Assessment Objectives

The objective of the survey was to assess the significance of the flora and fauna on the site proposed for the ESB Link Road and Link to Arena Road. Various legal instruments such as The Wildlife Acts (1976 and 2000) and the Flora Protection Order (1999) provide protection for species of conservation importance. The EU Habitats Directive (1992) obliges member states to protect species and habitats that are of importance on a Europe-wide scale. The EU Birds Directive (1979) protects birds of conservation concern.

8.2 Methodology

8.2.1 Assessment of Flora and Habitats

A desktop survey and field assessment was carried out for the project in early November of 2012. The site was walked systematically while noting plant species and habitat types. Habitat types were assigned to categories (and given codes) according to the Heritage Council classification system (Fossitt 2000).

Information on sites of conservation importance (National Parks and Wildlife Service, web-based map viewer) for County Dublin, and various texts such as the Irish Red Data Book for vascular plants (Curtis and McGough, 1988) and Preston et al. (2002) were examined. Records for rare or locally important vascular plant species were checked (Dublin Naturalists' Field Club, 1998). Web site such as Biodiversity Ireland was also consulted to provide lists of all known recorded species within the study area.

8.2.2 Assessment of Fauna

During the daytime survey the site was walked systematically while searching for signs of mammal activity. Signs of mammal activity include tracks and footprints, discarded prey items, scats and burrows or other resting places. Bird species were noted whenever encountered either visually or according to their song. Habitat suitability was also noted for all fauna species.

The National Parks and Wildlife (of Department of Environment, Heritage and Local Government) website showing conservation designations and rare species records was also examined for details of known areas or species of conservation interest in the vicinity (www.npws.ie). Bat records for the vicinity of the survey site were also checked (www.batconservationireland.org). A review of Biodiversity Ireland website identified species which have been recorded within a 1km radius of the proposed development.

8.3 Results

8.3.1 The Baseline Environment

The land surrounding the proposed development is largely urban, with office and light industrial units, busy roads and made ground.

The site proper is mostly flat and concreted with occasional street landscaping provided. There are no records of rare or protected species or conservation designations listed on the National Parks and Wildlife website for the immediate locality. There are, however a number of species listed within the Biodiversity Ireland

Website. In addition a number of Special Areas of Conservation, Special Protection Areas and proposed Natural Heritage Areas are situated within 10km of the site proposed for development.

One culverted stream runs through the study area. This watercourse flows into the Carysfort Stream at Leopardstown which in turn flows into Dublin Bay approximately 7 km downstream of the proposed works. This area is designated for Natura 2000 Sites: South Dublin Bay SAC and South Dublin Bay and Tolka Estuary SPA.

Table 8.1 Species identified from Biodiversity Ireland Website

Species:	Common Name	Protected Status
Rana temporaria	Common frog	Protected species EU Habitats Directive Annex V, and Wildlife Acts
Cupressus macroacarpa	Monterey Cypress	None
Betula pendula	Silver Birch	None
Aeshana juncea	Common Hawker	None
Libellula quadrimaculata	Four-spotted Chaser	None
Didea fasciata	Diptera (true fly)	None
Eupeodes corolla	Diptera (true fly)	None
Eupeodes luniger	Diptera (true fly)	None
Heringia vitripennis	Diptera (true fly)	None
Merodon equestris	Diptera (true fly)	None
Platycheirus aurolateralis	Diptera (true fly)	None
Platycheirus splendidus	Diptera (true fly)	None
Scaeva pyrastri	Diptera (true fly)	None
Sphaerophoria scripta	Diptera (true fly)	None
Xylota florum	Diptera (true fly)	None
Nyctalus leisleri	Leisler bat	Protected species: EU habitats directive Annex IV, and Wildlife Acts
Pipistrellus pipistrelles sensu lato	Pipistrelle	Protected species: EU habitats directive Annex IV, and Wildlife Acts
Pipistrellus pygmaeus	Soprano Pipistrelle	Protected species: EU habitats directive Annex IV, and Wildlife Acts

While a number of protected species are found in the above table within 1km kilometre radius of the proposal (bat species and common frog), there is no suitable habitat located within the study area for these species. Therefore it is unlikely that these species are present within or in proximity to the development site.

No signs of badger (e.g. setts, latrines, diggings or tracks) or otters were found nor is suitable habitat available in the vicinity of the works.

Rats (Rattus norvegicus) and field mice (Apodemus sylvaticus) are likely to occur but these species are not protected under conservation legislation. Signs of fox activity

were observed in the area although no evidence was found for the presence of a fox's earth. Foxes (Vulpes vulpes) are not protected under the Wildlife Acts.
There is no flora on the site that may be considered of conservation significance. No native rare or protected plants or habitat types were found during the present survey. The habitats present on the site are relatively common in the context of the surrounding landscape.

8.4 Impact of the proposed Development

Overall the habitats that make up the site and surrounding area is made ground with occasional landscaping. There is no protected species or habitats found within the study area. The proposed development will result in loss of some non-native shrub/immature treelines, amenity grassland. Some semi-mature trees may be removed for the construction of the route at the entrance to the ESB site.

Potential nesting and foraging habitats for various song and other birds will be slightly reduced.

Trees that require removal as part of the proposed scheme will be removed outside of the bird breading season and will be replaced with appropriate planting where feasible. There are no trees of significance within the Study area and therefore a tree survey has not been considered necessary.

A screening for appropriate assessment has been carried out (See Appendix 1). Following an appraisal of the potential impacts of the proposed ESB Link Road & Link to Arena Road on the Natura 2000 network, the likelihood of significant negative impacts arising on either the qualifying interests (South Dublin Bay SAC and South Dublin Bay and Tolka Estuary SPA) or on the integrity of any Natura 2000 site, has been ruled out. Therefore it is possible to screen out the need for an Appropriate Assessment and it is not deemed necessary to undertake any further stages of the Appropriate Assessment process.

8.5 Mitigation Measures

8.5.1 Construction Phase

Any shrub or tree lines which are proposed for removal should be scrubbed out during winter, between the end of September and late March to protect nesting birds.

Care should be taken to prevent damage to roots of existing trees that are to be retained during construction work in consultation with the DLRCC parks department.

Measures should be taken to ensure that surface water runoff is free from suspended solids and other pollutants.

Chapter 9 Landscape & Visual Impacts

The proposed scheme is located in the urban environment of the Sandyford Business District. Given the nature and design of the business park, which is made up of multi-storey buildings and warehousing units, there are limited extended views within the area and no protected landscape or visual amenity sites are identified within the Sandyford Business District area.

The proposed scheme will link the M50 Junction 14 via a new road through ESB, Eircom and Aviva (Ireland) land to Arena Road and Blackthorn Road. The overall length of new road construction is approximately 495 metres. The land required for the proposed road development is currently made up of hard surface (vehicle parking / storage and industrial units). There is some limited boundary treatment that will be impacted by the proposal where occasional trees will be removed along with the severance of small areas of hedgerow.

A reinforced concrete retaining wall is required along one section on the east boundary of the road otherwise the proposed road generally follows the existing ground levels.

The route travels though an industrial / business district that has no landscape and visual sensitivities. Therefore the proposed scheme will not have an adverse impact in its setting.

Proper landscape planning of the proposed route will mitigate any impact as a result of construction of the project and replacement planting will be provided.

Chapter 10 Impact on Material Assets

10.1 Impact on Material Assets

The proposed scheme will require occupy a permanent land area of approximately 0.9046 hectares. The impacts of the proposed road for each of the affected landholdings are considered as follows: -

Electricity Supply Board (ESB)

The proposed road scheme will require approximately 0.5847 hectares of the landholding in the ownership of the ESB. The scheme when constructed in its entirety will divide the ESB landholding into three distinct segments. However, it is understood that the ESB intend to redevelop their site in the medium term and the delivery of the proposed ESB Link Road & Link to Arena Road will facilitate this. Therefore, while the proposed road scheme may have a moderate negative impact on the landholdings in the short term, its medium term impact will be significantly positive.
It is recognised that the proposed link to Arena Road may interfere with the current strategic operations of the ESB. Therefore the construction of the Arena Road Link should be undertaken only when ESB operations have reduced to a level that permits construction.

Aviva Ireland Limited

The proposed ESB Link Road will run between two warehouses on lands owned by Aviva. The proposed road will divide the Aviva property into two distinct segments and would result in the loss of the existing service yard (approximately 0.1256 hectares) that serves the centrally located building. The proposed ESB Link Road will therefore have a significant adverse impact in terms of the continued use of the centrally located building as it will no longer have a service yard. It is understood that Aviva have no proposals to redevelop these lands at present but redevelopment of these lands is envisaged by the Sandyford Urban Framework plan and the delivery of the proposed ESB Link Road & Link to Arena Road will facilitate this. Therefore, while the proposed road scheme may have a significant negative impact on the landholding in the short to medium term, its medium to long-term impact will be significantly positive.

Eircom

The proposed road scheme will require approximately 0.1943 hectares of the landholding in the ownership of Eircom. The scheme when constructed in its entirety will divide the Eircom landholding into two distinct segments. However, it is understood that Eircom intend to redevelop their site in the medium term and the delivery of the proposed ESB Link Road & Link to Arena Road will facilitate this. Therefore, while the proposed road scheme may have a moderate negative impact on the landholdings in the short term, its medium term impact will be significantly positive.

Brooks Group Limited

The warehouse to the east of Aviva is owned by the Brooks Group Ltd. The impact on this landholding will be neutral in the short to medium term, as the proposed road will cause additional severance but will provide more direct access. The Sandyford Urban Framework Plan has envisaged the redevelopment of this land and the delivery of the proposed ESB Link Road & Link to Arena Road will facilitate this. Therefore, while the proposed road scheme may have a neutral impact on the landholding in the short to medium term, its medium to long-term impact will be significantly positive.

10.2 Provisions for Access to Existing and Future Development

Access will be maintained to all properties throughout the construction phase. Provision has been made in the proposals to access existing and future development as follows: -

Electricity Supply Board (ESB)

Two access points have been included to the existing and future development on the ESB lands to the west of the proposed road. Two temporary access points have also been provided for the existing ESB offices to the east of the proposed road. These eastern accesses are to facilitate the existing operations of the ESB and will be removed with the redevelopment of the ESB lands and the construction of the Arena Road Link. Access to the redeveloped ESB lands to the east of the proposed ESB Link Road will be provided from the Arena Road Link.

Aviva and Brooks Group

Access to the Aviva properties on Fern Road to the west of the ESB Link Road will be maintained from the existing junction on Heather Road. Access to the Aviva and Brooks Group properties to the east of the ESB Link Road will be provided from the proposed new road where a right turning lane is proposed.

Eircom

Access to the Eircom property to the west of the ESB Link Road will be maintained from the existing access on Heather Road. Access to the Eircom property to the east of the ESB Link Road will be provided from a proposed new access on Blackthorn Road where a right turning lane is proposed.

10.3 Boundary Treatment

The proposed road boundary treatment will be subject to agreement between the Council and the respective landowners.

Chapter 11 Architectural, Archaeological and Cultural Heritage

11.1 General

All works will take place, with only minor surface effects, either within the corridor of the existing road or directly adjacent to the existing road in land that has been subject to recent development. Consequently there are no predicted impacts on architectural, archaeology and cultural heritage.

11.2 Impacts on Monuments and Places

A review of all recorded monuments show that there are no RMP (Record of Monuments and Places) sites located within or in proximity of the proposed road alignment. A review of protected structures listed within the Dún Laoghaire Rathdown Development Plan 2010 – 2016 identified one protected structure in proximity to the proposal project:

- Burton Hall.

Burton Hall adjoins Arena Road to the north and Leopardstown Road to the south. Neither the property nor its curtilage will be directly impacted as part of the proposed project.

Figure 11.1 Burton Hall, Arena Road, Sandyford

Any development that includes topsoil and subsoil stripping, reduction of ground levels and excavation can potentially have a negative impact on archaeological and cultural remains both recorded and unrecorded. The proposals will not directly

impact on any recorded archaeological monuments. There is no predicted impact on known archaeological remains.

11.3 Mitigation Measures for Cultural Heritage

Archaeological assessment is not required because this area has been subject to previous ground disturbance that would have removed any archaeological features and deposits should they have been present.

Chapter 12 Construction Phase

12.1 Introduction

This chapter of the Environmental Report outlines, the significant environmental effects that may arise during the construction phase. Furthermore the proposed ameliorative measures, which are generally considered in the previous chapters, are also outlined. This chapter deals with the issue of the timescale for construction, locations and operation of the site compounds and details temporary impacts, not previously described, on residents, road users, pedestrians and cyclists.

12.2 Time Scale for Construction

The period of time to complete the proposed road scheme is estimated at 12 months.

12.3 Site Compounds

A site compound will be required in a location to suit the construction activities. This compound will provide office and canteen facilities as well as providing a space for storage of materials and construction plant.

12.4 Impact of Construction Activities

Construction Noise: The construction of the road scheme will cause an increase in local noise levels during working hours. No particularly high noise generating activities such as blasting are anticipated. Contract conditions will limit working hours to daytime, thereby avoiding the potential for disturbance of residents at night. However some night-time operations may be required to complete the road connection and new signal controlled junction at the Leopardstown Road.

Pollution of Watercourses: Accidental spillages into the watercourses and drainage systems could lead to pollution. The Contract will include requirements for appropriate measures to prevent an accidental spillage of pollutant materials. Measures will be adopted to prevent discharge of suspended solids into the watercourses during construction phase. The road drainage run-off will be treated before discharging to the receiving waters.

Dirt and Dust: The Contractor will be obliged by the local authority and the relevant legislation to ensure that the surrounding roads are kept free from dirt. In dry weather conditions, the Contractor will be required to minimise airborne dust from the site through spraying of exposed earthworks with water.

Construction Traffic: There will be traffic associated with the construction phase of the proposed project. However as the earthworks are limited, construction movements will not be significant. The Contractor will be obliged to use main roads to access the site and also to avoid using residential areas for site access.

Private Access: Access will be maintained to all properties throughout the construction phase.

Chapter 13 Interrelationships

13.1 Introduction

Each of the various environmental and related topics has been separately discussed in the previous chapters of the Environmental Report. In this chapter the impacts that the ESB Link Road and Link to Arena Road will have on the existing environment have been identified as follows: -

In the table below the shaded boxes indicate inter-relationships between different aspects of the environmental impacts of the scheme.

Table 13.1 Environmental Impact Matrix

Activity \ Receptor	Traffic	Community	Noise & Vibration	Air Quality	Landscape / Visual	Ecology	Soils	Climate	Water	Archaeology	Architecture
Traffic		*	*	*				*			
Community											
Noise & Vibration		*									
Air Quality		*						*			
Landscape / Visual		*									
Ecology					*				*		
Soils			*								
Climate											
Water						*					
Archaeology											
Architecture											

Chapter 14 Summary of Mitigation Measures

14.1 Noise & Vibration

- Low noise road surfacing will be provided on the proposed road.
- The application of BS 5228:1997 "Noise Control on Construction and Demolition Sites" should minimise disturbance to locals,
- Machinery and compounds will be positioned, where possible, to avoid undue disruption.

14.2 Archaeology and Cultural Heritage

Construction Phase for Archaeology

- The cessation of machine work must occur as soon as archaeological material has been uncovered.

14.3 Construction Phase

- All measures shall be taken to ensure that surface water runoff is free from suspended solids and other pollutants,
- All storage areas should be in bunded compounds away from watercourses,
- Regular maintenance and servicing of machinery and plant will be required,
- The contractor must set up systems to prevent dirt from being released onto public roads. In the event that site traffic does dirty the roads, then the contractor will be required to clean all the roads affected,
- Control of the release of suspended solids into the public drainage systems will be done through the use of interceptors or traps,
- Contract conditions will require that the contractor prevents silt laden water from discharging into the watercourse,
- On site temporary toilet facilities shall be serviced and maintained by a specialist contractor.
- Access will be maintained to all properties throughout the construction phase.
- Any shrub or tree lines that are proposed for removal should be scrubbed out during winter months, between the end of September and late March to protect nesting birds.

APPENDIX 1

Appropriate Assessment Screening Report

Screening for Appropriate Assessment

The requirement for Appropriate Assessment is set out in the EU Habitats Directive (92/43/EEC) in Article 6 (3) which states:

> "*Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives."*

The Habitats Directive is transposed in Ireland by the European Communities (Birds and Natural Habitats) Regulations, 2011 (consolidating the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in recent CJEU Judgements) (hereafter referred to as the Habitats Regulations) and the Planning and Development (Amendment) Act, 2010.

This Screening for Appropriate Assessment (Stage 1) has been prepared in accordance with current guidance and provides an ecological impact assessment for the proposed scheme.

The Screening provides the information required in order to establish whether or not the proposed development is likely to have a significant impact on the Natura sites in the context of their conservation objectives and specifically on the habitats and species for which the Natura 2000 sites have been designated.

By undertaking the ecological impact assessment in a step-by-step manner in relation to the habitats and species of the Natura 2000 sites, this chapter seeks to inform the screening process required as the first stage of the process pursuant to Article 6.3 of the EU Habitats Directive.

Report Format

This Screening Report includes the assessment and testing required under Stage 1 – the Screening Process. In complying with the obligations under Article 6(3) and to be consistent with the Guidance for Planning Authorities, this report has been structured as follows:

- Description of the Plan/Project;
- Identification of Natura 2000 sites, and the associated Conservation Objectives, which may be potentially affected;
- Identification and description of individual and cumulative impacts likely to result from the Plan/Project;
- Assessment of the significance of the impacts identified above on site integrity. Exclusion of site where it can be objectively concluded that there will be no significant effects

Description of the Plan/Project

The proposed project is described in Section 1 of this Report and identifies the construction of a scheme that runs north from the M50 Junction 14 roundabout though lands owned by ESB, AVIVA and EIRCOM to join Blackthorn Road. The proposed ESB Link Road will involve the provision of approximately 350 metres length of new single carriageway road linking Blackthorn Road and the roundabout at M50 junction 14. The proposed scheme also includes the provision of a new northbound quality bus corridor a new signalised junction at Blackthorn Road and the replacement of the signalised roundabout at M50 junction 14 with a signalised junction. A link from the proposed road to Arena Road will involve the provision of approximately 145 metres length of new single carriageway road. Improvements will also be made to the existing Blackthorn Road at the approaches to the new junction. The scheme includes footpaths, cycleway, pedestrian crossings, general landscaping, drainage and street lamps.

Identification of Natura 2000 sites, and associated Conservation Objectives

There is one stream which will be impacted as a result of the proposed project and provides the only link to Natura 2000 Sites of conservation interest. This stream is culverted in the location of the works and flows into the Carysfort Stream at Leopardstown which in turn flows into Dublin Bay approximately 7 km downstream of the proposed works. This area is designated for Natura 2000 Sites: South Dublin Bay SAC and South Dublin Bay and Tolka Estuary SPA. See Table 1 for the conservation Objectives (Qualifying interests) of Natura 2000 sites in proximity to the proposed works.

Table 1 Natura 2000 Sites, conservation interests and assessment of impacts

Name	SAC /SPA Qualifying Interests	Proximity	Potential Effects	Justification
South Dublin Bay SAC	Mudflats and Sandflats	>7km	None	SAC is located over 7km downstream of the works at the mouth of the Carysfort Stream. There is no risk of pollution to the bay with standard best practice measures in place. A distance of 7km downstream of the work will provide sufficient dilution to any accident event. Mudflats and Sandflats are not sensitive to low level pollution.
South Dublin Bay and Tolka Estuary SPA	Coastal Birds	>7km	None	No birds using the SPA are found in proximity to the works. As above the risk of pollution is not significant and given the distance any accident events that could occur would not result in impact on birds within the SAC.

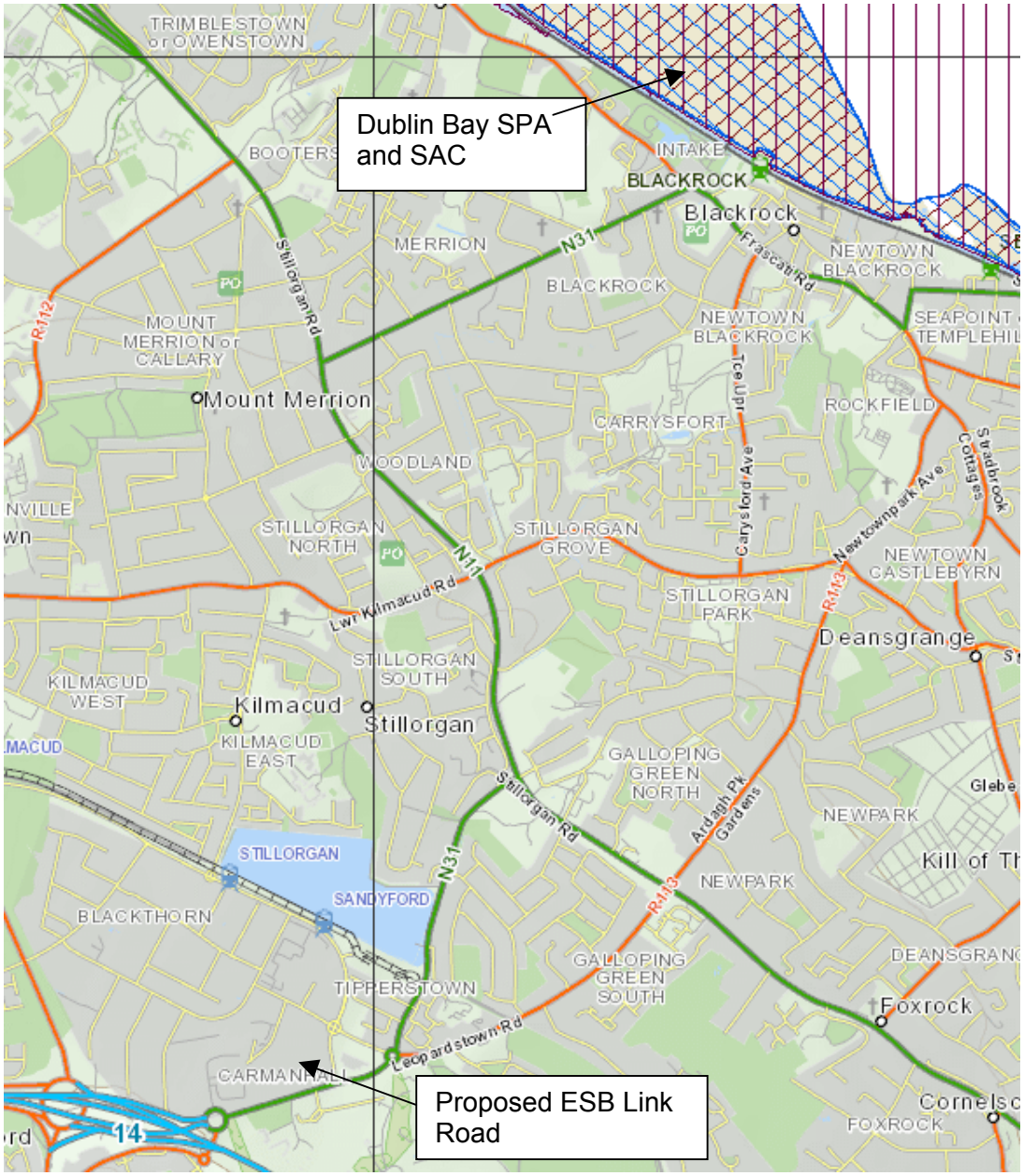


Figure 1 Natura 2000 Sites (source NPWS web viewer)

Identification and description of individual and cumulative impacts

Works are to be carried out on the existing culverted stream which is located in ESB lands. The stream in this location has no habitats or species of conservation interest or related to the conservation objective of any Natura 2000 sites. South Dublin Bay SAC and SPA is designated for its habitats of Mudflats and sandflats and a range of coastal birds. Therefore given distance between the works and the bay and that standard best practice measures will be employed during the construction phase, there will be no impact on protected habitats and species located within South Dublin Bay SAC and SPA.

Given the scale of works and the conclusion of no potential for impact on Natura 2000 sites it is determined that in combination with any other developments that there will be no cumulative impact.

Assessment of the significance of the impacts and conclusion

Following an appraisal of the potential impacts of the proposed ESB Link Road & Link to Arena Road on the Natura 2000 network, the likelihood of significant negative impacts arising on either the qualifying interests (South Dublin Bay SAC and South Dublin Bay and Tolka Estuary SPA) or on the integrity of any Natura 2000 site, has been ruled out. Therefore it is possible to screen out the need for an Appropriate Assessment and it is not deemed necessary to undertake any further stages of the Appropriate Assessment process.

APPENDIX 2

Scheme Drawings

(included as a separate volume)

APPENDIX 3

Traffic Modelling Report

(included as a separate volume)

Waterman Moylan
Engineering Consultants




Avid Sandyford SHD

Statement of Consistency on DMURS

February 2022

Waterman Moylan Consulting Engineers Limited
Block S, East Point Business Park, Alfie Byrne Road, Dublin D03 H3F4
www.waterman-moylan.ie

Waterman Moylan
Engineering Consultants

Client Name: Sandyford Environmental Construction Ltd
Document Reference: 21-118r.064
Project Number: 21-118

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015 and BS EN ISO 14001: 2015)

Issue	Date	Prepared by	Checked by	Approved by
Draft 2	18 Feb 2022	Brian McCann		

Comments

Waterman Moylan
Engineering Consultants

Disclaimer

This report has been prepared by Waterman Moylan, with all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the Client.

We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report is confidential to the Client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

Content

Figures

1. Introduction

1.1 Introduction

This Preliminary Statement of Consistency with the Design Manual for Urban Roads and Streets (DMURS) has been prepared by Waterman Moylan on behalf of Sandyford Environmental Construction Ltd to accompany an SHD application to An Bord Pleanala (ABP) for a residential development on a brownfield site at the junction of Carmanhall Road and Ravens Rock Road, Sandyford, Dublin 18. See Figure 1.

It is a requirement of the regulations that the proposed residential development is compliant with the requirements of the Design Manual for Urban Roads and Streets (DMURS).

The stated objective of DMURS is to achieve better street design in urban areas. This will encourage more people to choose to walk, cycle or use public transport by making the experience safer and more pleasant. It will lower traffic speeds, reduce unnecessary car use and create a built environment that promotes healthy lifestyles and responds more sympathetically to the distinctive nature of individual communities and places. The implementation of DMURS is intended to enhance how we go about our business; enhance how we interact with each other and have a positive impact on our enjoyment of the places to and through which we travel.

1.2 Location

The subject site is located at Sandyford in south County Dublin. The site which has an area of 0.56ha (1.4 acre) is located at the junction of Carmanhall Road and Ravens Rock Road, Sandyford, Dublin 18. It was formerly occupied by Tack Packaging.

The adjoining site to the east at the junction of Carmanhall Road and Blackthorn Road was formerly occupied by Avid Technology. It extends to 0.81 ha ((2.0 acre).

Figure 1 Location Map

1.3 Proposed Development

The proposed development will comprise some 208 Build-to-Rent residential units. See Figure 2.

Car parking with a total of 74 car spaces will be provided at Lower Ground Level and Basement. Cycle parking with 250 spaces will be provided at Lower Ground Level. Access is proposed from Ravens Rock Road with egress onto Carmanhall Road.

The public realm around the site will incorporate an upgrade of the pedestrian and cycle environment.

The development includes all associated infrastructure to service the development including access junctions, footpaths and cycle paths together with a network of watermains, foul water drains and surface water drains.

A concurrent development on the former Avid Technology site to the east is expected to comprise 336 Build-to-Rent residential units and 118 car parking spaces at Lower Ground Level and Basement. Access will be from Carmanhall Road and egress onto Blackthorn Road.

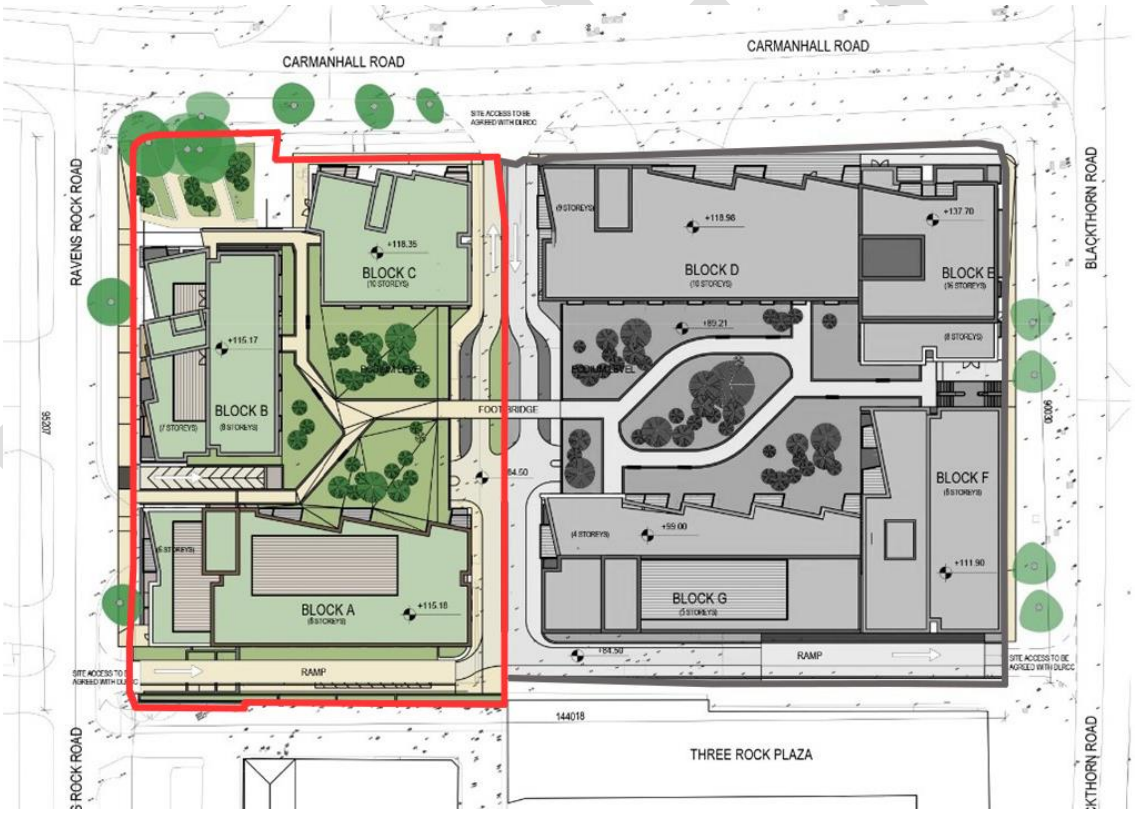


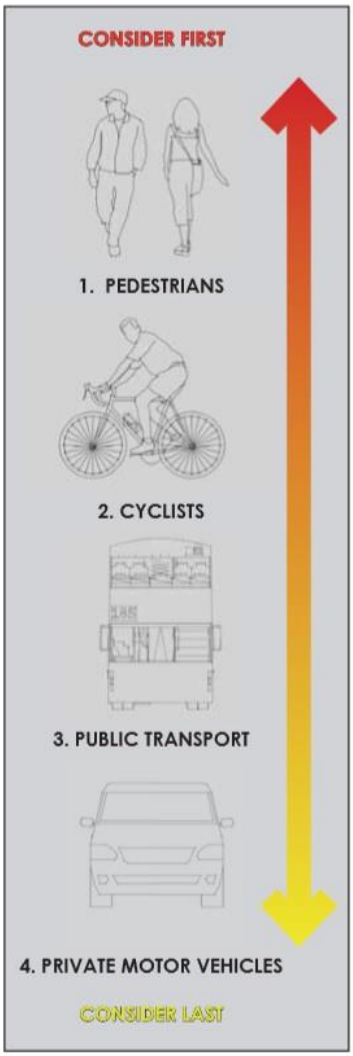
Figure 2 Proposed Site Layout

2. Creating A Sense of Place

Four characteristics represent the basic measures that need to be established in order to create people friendly streets that facilitate more sustainable neighbourhoods. Each of these characteristics are set out in the sections below together with a commentary setting out how the proposed residential development complies with each of these characteristics

2.1 Connectivity

"The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected."



In order of importance, DMURS prioritises pedestrians, cyclists, public transport then private cars.

This is illustrated in the image on the left extracted from DMURS.

The proposed development has been designed with careful consideration for pedestrians and cyclists. It has been integrated with the Sandyford Business District Pedestrian and Cycle Improvement Scheme being developed by Dun Laoghaire Rathdown County Council. See Figure 2.

The Council's Traffic & Road Safety Section undertook a Non-Statutory Public Consultation for the Sandyford Pedestrian and Cycle Scheme during August and September 2021. At the time of writing in December 2021, a post consultation report is being prepared for the Dundrum Area Committee.

This Scheme will provide good connectivity between the proposed development and the surrounding pedestrian and cycle regime.

There are two existing accesses from the site onto the surrounding public road network. Four accesses are proposed to the new development, one to Blackthorn Road, one to Carmanhall Road and two to Ravens Rock Road.

Pedestrian and cycle connectivity is provided throughout the development with good links to the surrounding public regime and the two Luas Stops on Blackthorn Avenue.

Dedicated access to cycle parking will, be provided off Blackthorn Road at the northeast corner of the site and from Ravens Rock Road at the northwest corner of the site. Within the site, the various locations will be connected by a series of pedestrian paths. This connected network will provide a safe and secure environment for pedestrians and will facilitate progression to the local area and surrounding public transport network.

The closest bus stops are located along Blackthorn Road and Blackthorn Avenue some 250 metres from the proposed development. In addition, the site is a 5 - 6-minute walk from the Sandyford and Stillorgan Stops on the Luas Green Line.

The proposed development has been carefully designed to promote strong levels of connectivity in favour of pedestrians, cyclists and public transport users with vehicular movement taking a secondary role in line with the objectives of DMURS. Connectivity throughout the scheme is heavily weighted towards the pedestrian with four local accesses to the off-street car parks. There are no other roads or streets proposed on site with all other areas fully pedestrianised.

The proposed development can therefore be considered to be fully compliant with the connectivity objectives of DMURS.

2.2 Enclosure

"A sense of enclosure spatially defines streets and creates a more intimate and supervised environment. A sense of enclosure is achieved by orientating buildings towards the street and placing them along its edge. The use of street trees can also enhance the feeling of enclosure."

The proposed development has been designed so that the residential units are overlooking the main access routes to the development, circulation areas within the development and the primary public open space. High quality landscaping and tree planting are proposed within the scheme.

The apartment buildings, surrounding the open space create a sense of enclosure. The high-quality landscaping creates a very definitive sense of place. The proposed development will also include the provision of central open space which provides a sense of communities and place to future residents.

2.3 Active Edge

"An active frontage enlivens the edge of the street creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings that ensure the street is overlooked and generate pedestrian activity as people come and go from buildings."

The proposed apartment blocks are all located so that they front directly onto the roads, streets and open spaces. Entrances to the units are provided directly from communal spaces and pedestrian pavement which will ensure that there is plenty of activity as residents come and go. Furthermore, pedestrian/cyclist routes will generate pedestrian and cycle activity through the site.

The central open space within the heart of the development will enhance activity and enliven this area between the proposed buildings.

2.4 Pedestrian Activities/Facilities

"The sense of intimacy, interest and overlooking that is created by a street that is enclosed and lined with active frontages enhances a pedestrian's feeling of security and well-being. Good pedestrian facilities (such as wide footpaths and well-designed crossings) also makes walking a more convenient and pleasurable experience that will further encourage pedestrian activity."

As outlined above, the proposed development has been designed to provide excellent pedestrian connectivity. The apartments are all located so that they front directly onto the active edges/open space, which will provide surveillance to enhance pedestrians feeling of safety and wellbeing.

The pedestrian routes across the site are 2.0 metres wide which provide adequate space for two people to pass comfortably. DMURS identifies a 1.8 metres wide footpath as being suitable for areas of low pedestrian activity and a 2.5m footpath as being suitable for low to moderate pedestrian activity. It is considered that a 2.0 metre wide footpath is appropriate for the proposed development.

Around the proposed development, the proposed Sandyford Business District Pedestrian and Cycle Improvement Scheme will provide new and extended pedestrian and cycle facilities linking the proposed development to the public transport network and the surrounding amenities. Pedestrians and cyclists will.be able to benefit from the improved public facilities creating a fully integrated pedestrian and cycle networks which will increase the overall accessibility by both modes.

3. Key Design Principles

3.1 Introduction

DMURS sets out four core design principles which designers must have regard in the design of roads and streets. These four core principals are set out below together with a commentary setting out how these design principals have been incorporated into the design of this proposed residential development.

3.2 Design Principle 1 (Connected Networks)

"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."

The layout of the proposed development has been integrated with the proposed Sandyford Business District Pedestrian and Cycle Improvement Scheme which will deliver walking and cycling improvements around the site on Burton Hall Road, Blackthorn Road and Carmanhall Road.

The main works to be carried out as part of the Sandyford Business District Pedestrian and Cycle Improvement Scheme include the following:

- The provision of raised and adjacent cycle tracks on both sides of Burton Hall Road, Blackthorn Road and Carmanhall Road.
- The provision of a traffic signalised junction at Carmanhall Road and Blackthorn Road junction.
- Relocation of the existing pedestrian crossing on Carmanhall Road by 15 – 20 metres to the west.
- The upgrading of crossings at some junctions to allow bicycles to use the signalised crossings where appropriate.
- Reducing in traffic lane width from the existing 3.5 – 4.6 metres to 3.25 metres.
- Tightening of corner radii at junctions and side roads.
- Removal of left turn slips and pedestrian refuge islands
- The provision of increased pedestrian space and widened footpaths with a minimum width of 2.0 metres.
- The provision of increased area for landscaping with the retention of as many existing trees as possible and new tree planting to compensate for any losses.
- Retention of the existing on-street car parking spaces where possible with some car parking to be removed on Carmanhall Road.

The layout of the proposed development will incorporate a number of pedestrian routes providing access to each of the apartment blocks on site. As described above, the proposed development has been carefully designed, providing filtered permeability, to ensure that the focus on connectivity is centred on pedestrians and cyclists. The provision of the high levels of connectivity for pedestrians and cyclists are intended to promote walking and cycling by making them a more attractive option to the private car.

The proposed development will be well connected to the surrounding road network with access to Blackthorn Road, Blackthorn Avenue and the Green Luas line connecting directly to Dublin City Centre.

Figure 3 Sandyford Business District Pedestrian and Cycle Improvement Scheme

3.3 Design Principal 2 (Multi-Functional Streets)

"The promotion of multi-functional, place based streets that balance the needs of all users within a self-regulating environment."

Open space proposals have been designed to complement and enhance the development with street trees provided to act as a buffer to traffic noise, provide traffic-calming and enhance legibility of the main access road.

The central area will also create a central place to meet. It will be a vibrant location with lots of people movement which will provide a real sense of place.

The overall masterplan layout strategy for the site sets out a network of streets and open spaces that reinforce the sense of place. It will provide for pedestrians and cyclists allowing their movement independent of motorised traffic. It will also provide a clear mental marker orientating people.

The access junctions have been laid out with corners of restricted radius that will inherently slow traffic and facilitate pedestrian movements along the footways.

3.4 Design Principal 3 (Pedestrian Focus)

"The quality of the street is measured by the quality of the pedestrian environment."

The design of the scheme has placed a particular focus on the pedestrian. Connectivity throughout the scheme is heavily weighted towards the pedestrian. There are excellent pedestrian links to the surrounding road networks, public transport services and amenities.

The central open space has been designed to provide a sense of enclosure and to be active with good passive surveillance in order to enhance pedestrian sense of safety and well-being within this area.

3.5 Design Principal 4 (Multi-disciplinary Approach)

"Greater communication and co-operation between design professionals through promotion plan led multidisciplinary approach to design."

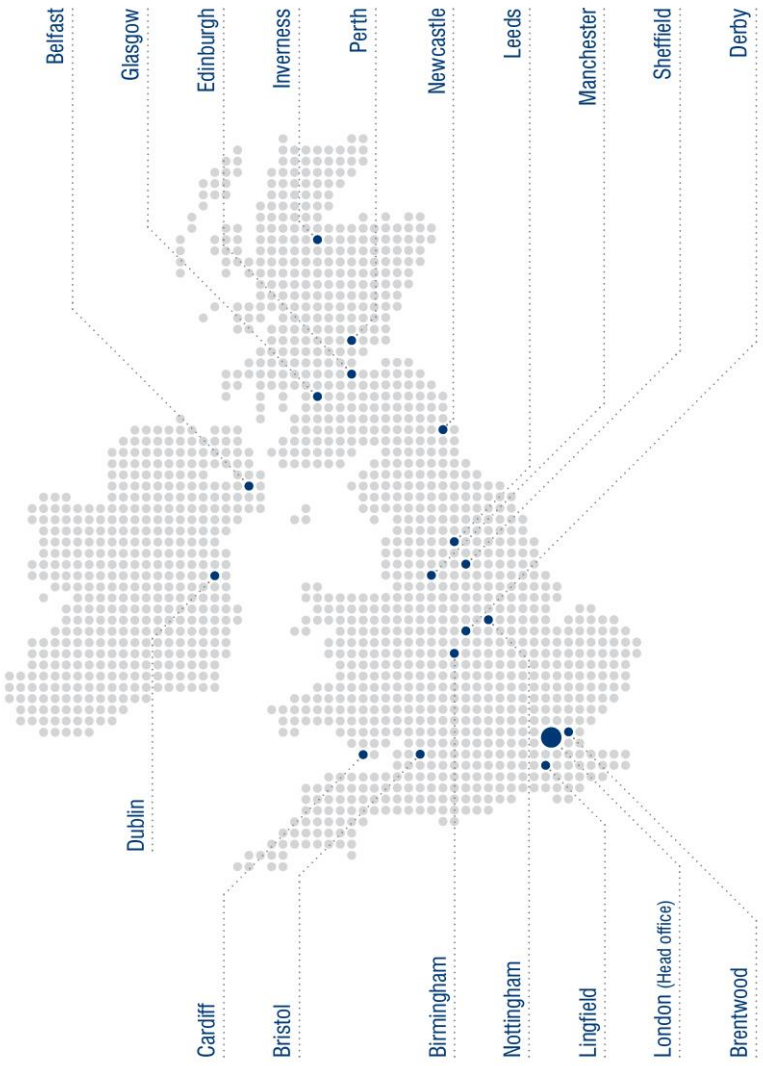
The design of the proposed scheme has been developed through the design team working closely together. The proposed development design is led by McCauley Daye O'Connell Architects working together with Waterman Moylan Consulting Engineers, MacCabe Durney Barnes, Planning Consultants and Niall Montgomery and Partners, Landscape Architects. The developer and promoter of the scheme is committed to delivering a high-quality development which complies with the recommendations of DMURS.

4. Conclusion

This Statement of Consistency sets out how the proposed development has been designed to achieve the objectives set out in DMURS.

It demonstrates that proposed development is consistent with the requirements for the design of urban roads and streets as set out in DMURS.

UK and Ireland Office Locations



Waterman Moylan
Engineering Consultants

Tack Sandyford SHD

Traffic & Transport Assessment (T&TA)

February 2022

Waterman Moylan Consulting Engineers Limited
Block S, East Point Business Park, Alfie Byrne Road, Dublin D03 H3F4
www.waterman-moylan.ie

Waterman Moylan
Engineering Consultants

Client Name: Sandyford Environmental Construction Ltd
Document Reference: 21-118r.066
Project Number: 21-118

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

Issue	Date	Prepared by	Checked by	Approved by
Draft 2	21 Feb 2022	B McCann		

Comments

Waterman Moylan
Engineering Consultants

Disclaimer

This report has been prepared by Waterman Moylan, with all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the Client.

We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report is confidential to the Client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

Content

Figures

Tables

Appendices

1. Introduction

1.1 Introduction

This Traffic and Transport Assessment (T&TA) has been prepared by Waterman Moylan on behalf of Sandyford Environmental Construction Ltd to accompany an SHD application to An Bord Pleanala (ABP) for a residential development on a brownfield site at the junction of Carmanhall Road and Ravens Rock Road, Sandyford, Dublin 18.

The subject site is located at Sandyford in south County Dublin. The site which has an area of 0.56ha (1.4 acre) is located at the junction of Carmanhall Road and Ravens Rock Road, Sandyford, Dublin 18. The existing access to the site is from Ravens Rock Road.

The site was formerly occupied by Tack Packaging but at the time of writing in February 2022, it was unoccupied save for a number of empty buildings.

The adjoining site to the east at the junction of Carmanhall Road and Blackthorn Road was formerly occupied by Avid Technology. It extends to 0.81 ha ((2.0 acre). See Figure 2.

During the preparation of the T & TA for this development, two alternative scenarios were considered as part of the assessment of the traffic impact of this development. Firstly, to assess the traffic impact of a residential development on the subject site. Secondly, to assess the subject site in conjunction with the adjoining site as a single development for traffic purposes. For reasons of this latter option was selected and the developments on the two sites assessed as a single development on a single site.

1.2 Threshold for Traffic and Transport Assessment

Sections 8.2.4.2 and Appendix 10 of the Dun Laoghaire Rathdown County Development Plan 2016 – 2022 specify that that a Traffic & Transport Assessment is required where an existing or proposed development has significant car trip potential and meets one or more of the following thresholds: -

- Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road or 100 trips in the peak hours
- Residential development of 200 residential units or more

1.3 Standards

This T & TA has been prepared in accordance with Traffic and Transport Assessment Guidelines (2014) issued by Transport Infrastructure Ireland (TII).

It includes a projection forward 5 years and 15 years after the opening date in accordance with the TII Traffic and Transport Assessment Guidelines and the UK's Institution of Highways and Transportation Guidelines and in its analysis considers all major new road and traffic schemes and existing and proposed developments in the area.

The Traffic and Transport Assessment (T&TA) for this development is expected to be accompanied by a Travel Plan (formerly Mobility Management plan) prepared in accordance with Section 8.2.4.3 of Dun Laoghaire Rathdown County Development Plan 2016 – 2022.

1.4 Program

At the time of writing in February 2022, it is likely that construction of the proposed development could commence in 2023 for completion in 2026.

Projections are included for Design Year 2031 (Opening Year + 5) and Future Year 041 (Opening Year + 15).

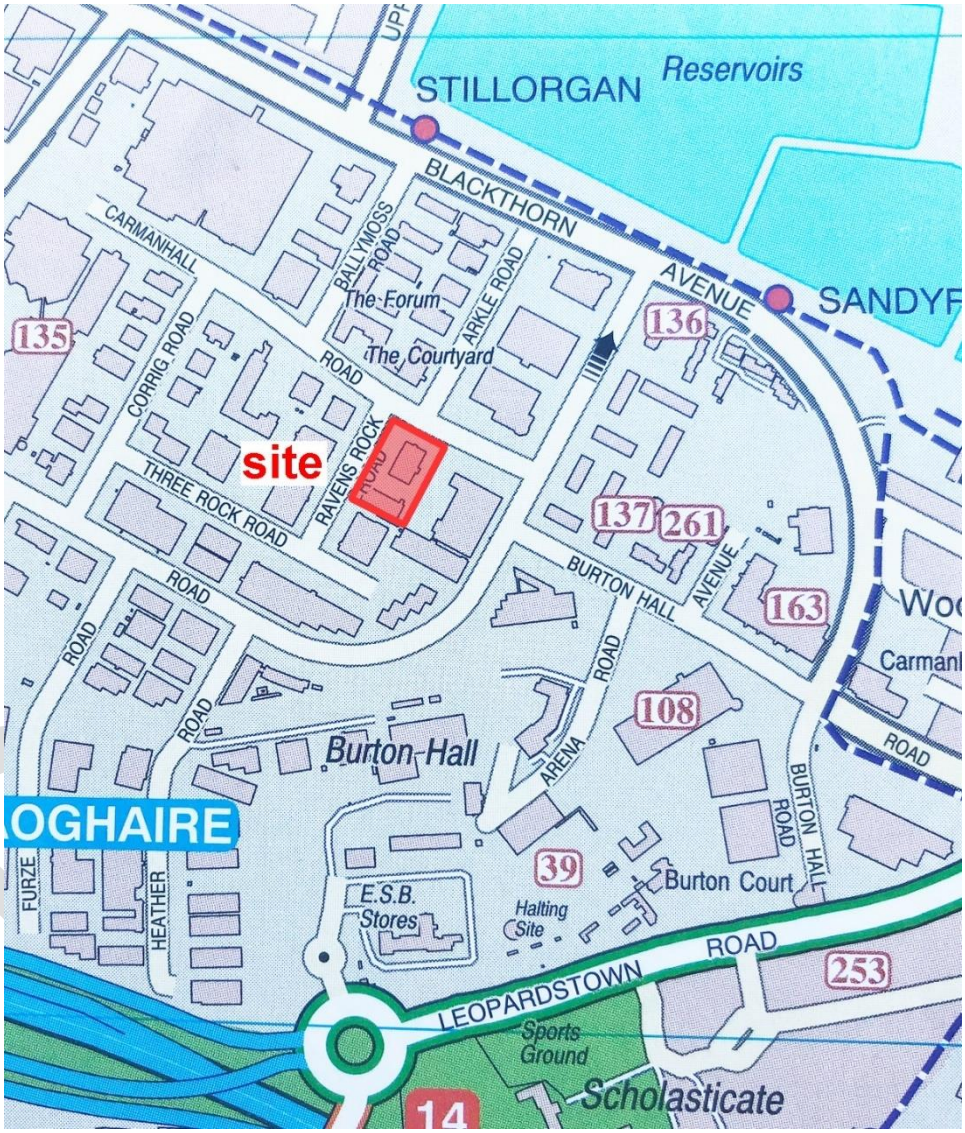


Figure 1 Location Map

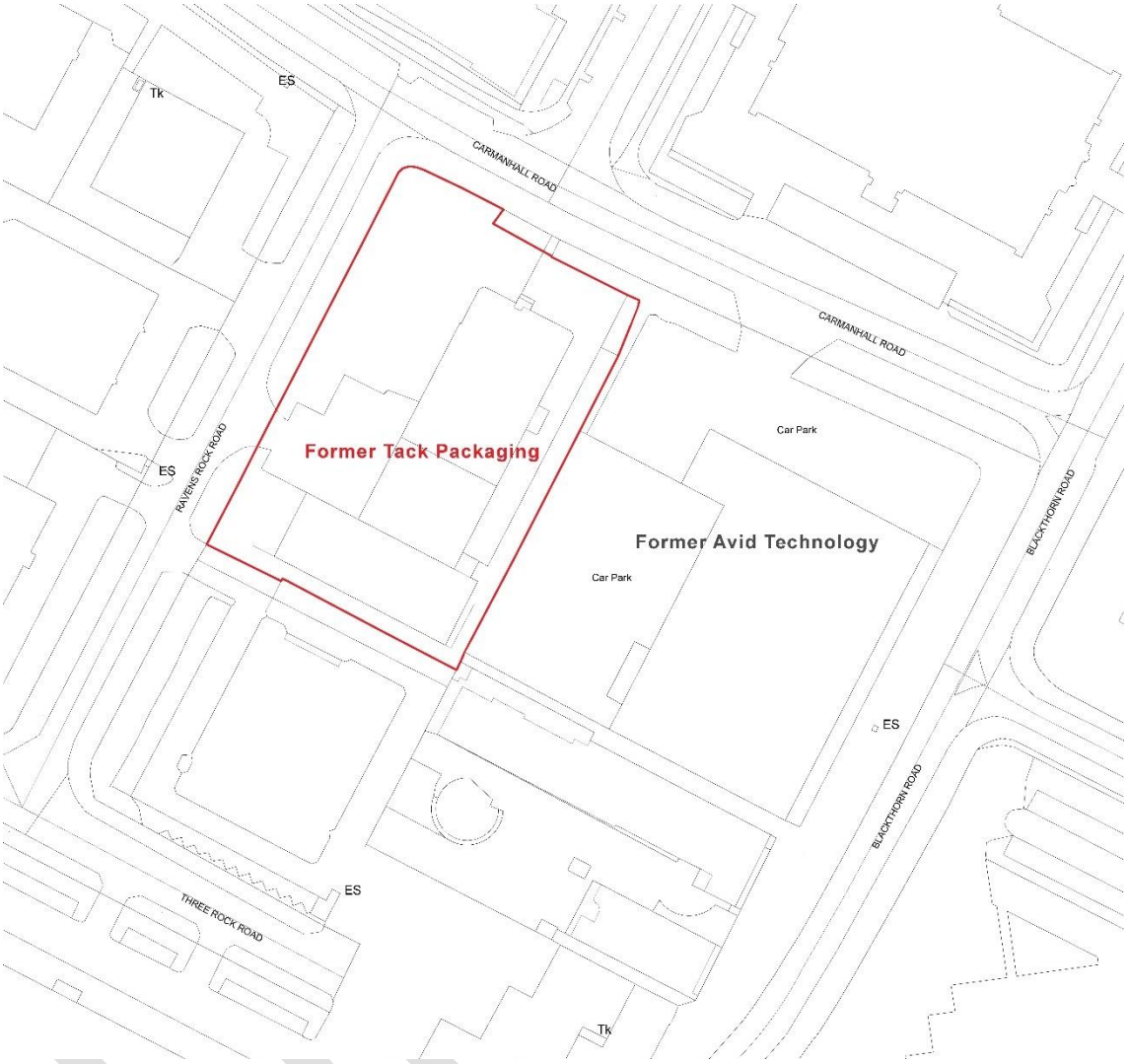


Figure 2 Former Avid Technology and Tack Packaging Sites

2. Proposed Development

2.1 Description

The proposed development will comprise some 208 Build-to-Rent residential units. See Figure 3.

Car parking with a total of 74 car spaces will be provided at Lower Ground Level and Basement. Cycle parking with 250 spaces will be provided at Lower Ground Level. Access for vehicular traffic is proposed from Ravens Rock Road with egress onto Carmanhall Road.

The public realm around the site will incorporate an upgrade of the pedestrian and cycle environment.

The development includes all associated infrastructure to service the development including access junctions, footpaths and cycle paths together with a network of watermains, foul water drains and surface water drains.

Figure 3 Proposed Site Layout

(to be replaced)

2.2 Contiguous Development

A concurrent development with a separate Traffic & Transport Assessment on the former Avid Technology site to the east will comprise 336 Build-to-Rent residential units and 118 car parking spaces at Lower Ground Level and Basement. Access is proposed from Carmanhall Road and egress onto Blackthorn Road.

The traffic impact from this contiguous development has been incorporated into this T&TA.

2.3 Future Road and Cycle Schemes

During the preparation of this T & TA, consultations were held with the project engineers for two schemes. The two schemes which are being developed by Dun Laoghaire Rathdown County Council are: -

(a) ESB Link Road – Junction 14 Roundabout to Blackthorn Road.

(b) Sandyford Business District Pedestrian and Cycle Improvement Scheme.

Both schemes and their impact on the road network in the area of the subject site are described in this T & TA.

It is understood at the time of writing in February 2022, that both schemes are progressing to the tender stage for completion in 2023.

2.4 Access

Vehicular access to the proposed development is proposed Ravens Rock Road and egress onto Carmanhall Road.

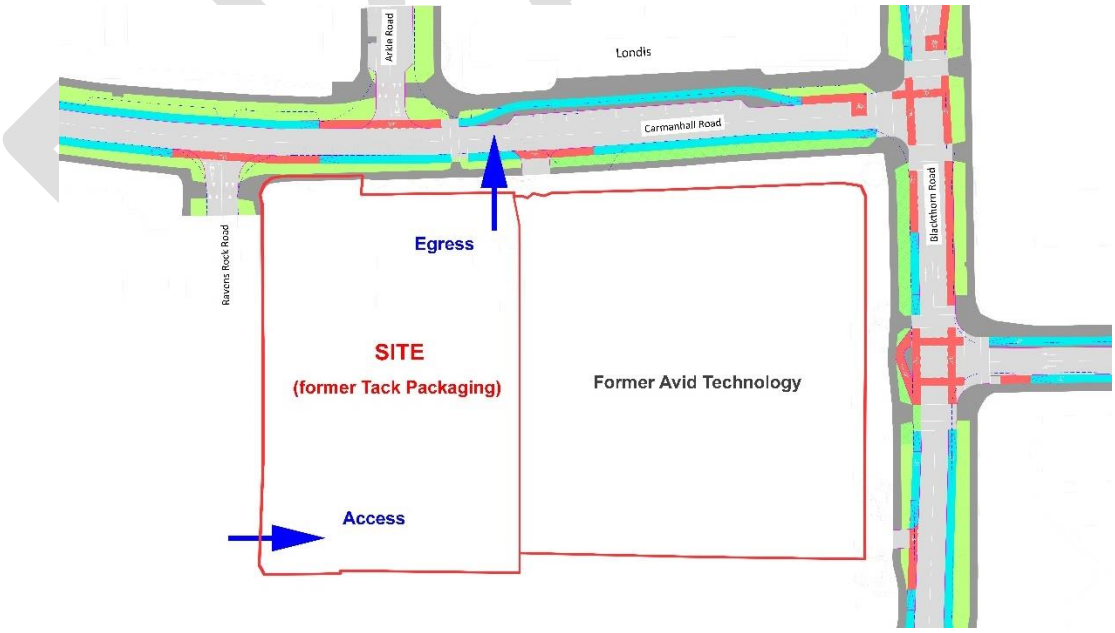


Figure 4 Proposed Access

2.4.1 Proposed Access on Ravens Rock Road

An entrance only access is proposed on Ravens Rock Road for cars, service deliveries, refuse freighter and emergency vehicles. See Figure 3.

2.4.2 Proposed Access on Carmanhall Road

An exit only for all vehicles is proposed onto Carmanhall Road immediately to the west of the boundary between the subject site and the adjoining Avid Technology site to the east. See Figure 3.

No constraint is expected from the existing signalised pedestrian crossing which is located immediately to the west of the existing access. It is proposed that this crossing be relocated as part of the Sandyford Business District Pedestrian and Cycle Scheme. See Figure 5.

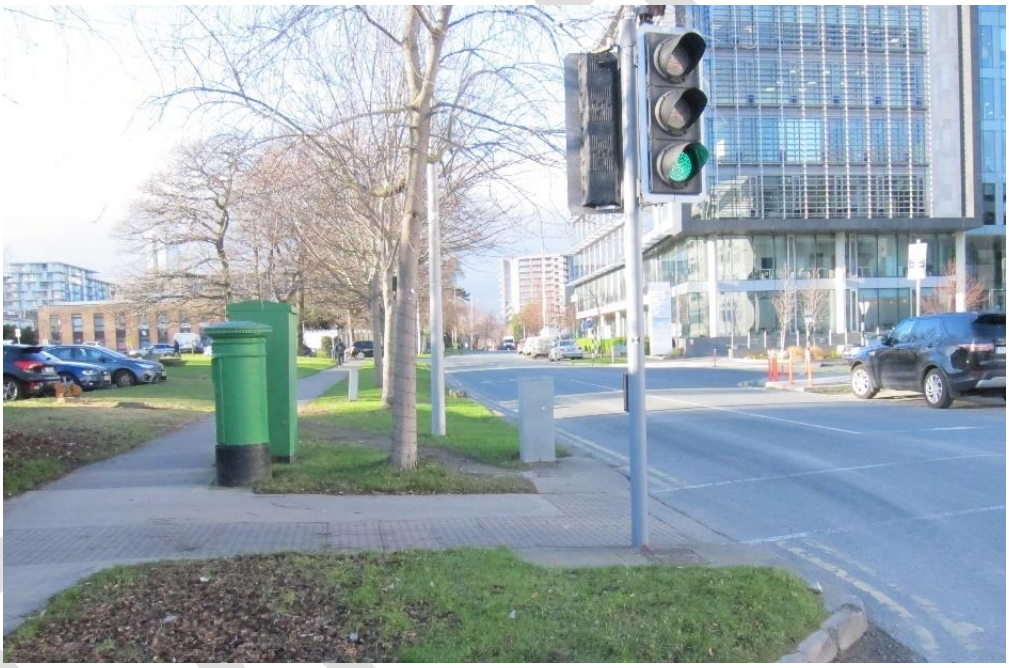


Figure 5 Pedestrian Crossing and Trees in Sightline at Carmanhall Road

2.4.3 Sightlines at Carmanhall Road

The sightlines for the proposed exit from this development onto Carmanhall Road have been based on Section 4.4.5 of the Design Manual for Urban Roads and Streets (DMURS) which requires

- A setback of 2.4m from the edge of the carriageway at the junction.
- Sightlines of 45m for roads with a 50kph design speed such as Carmanhall Road.
- Sight distance to the left to the centreline of the road and sight distance to the right to the nearside kerb line.

Two trees at the Carmanhall Road access are likely to be affected by the sightlines, one on either side of the new entrance. The affected trees can be seen in Figure 5.

2.5 Internal Road Layout

The internal road layout and possible future connection to the future internal road layout within the former Avid Technology site to the east is shown on Waterman Moylan Drg No 21-118/P101 reproduced in Figure 6. This drawing also shows the sightlines on Carmanhall Road

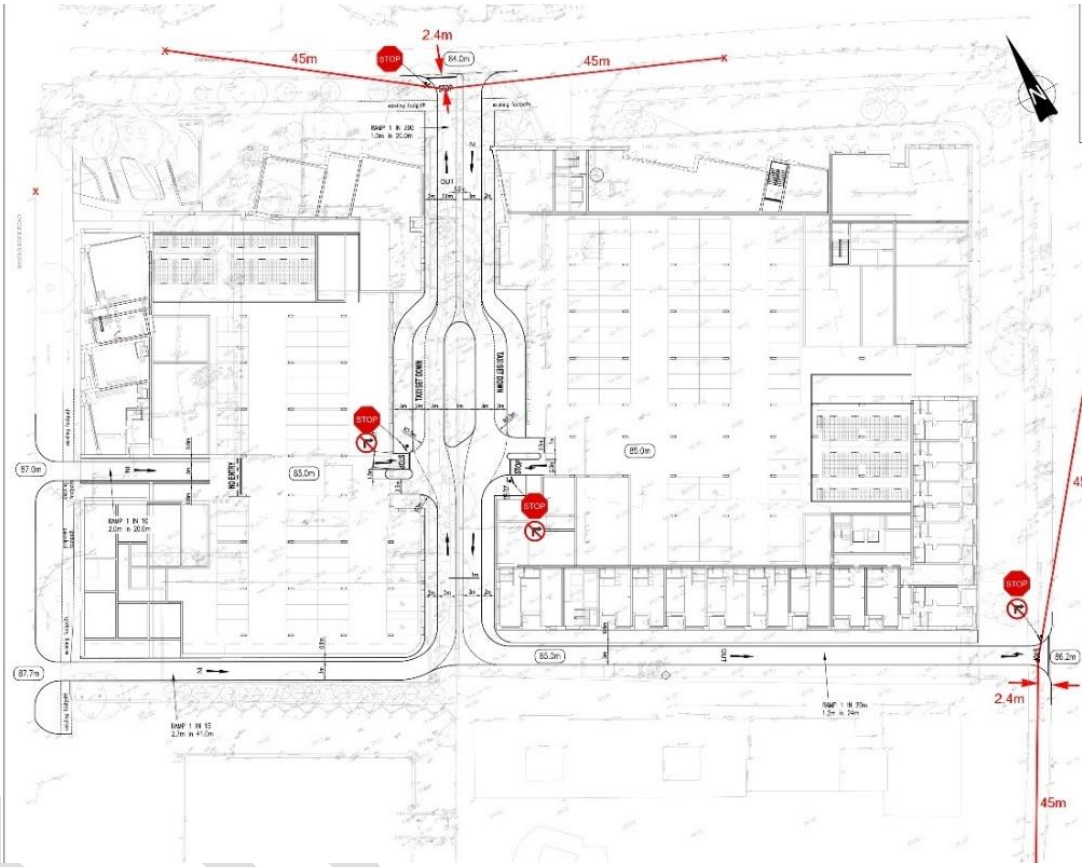


Figure 6 Internal Roads and Sightlines

2.6 Design Population

It is estimated that the number of residents in the proposed development on the subject site and the contiguous development on the Avid site will be some 1,224 persons as calculated in Table 1.

Table 1 Development Population

Unit Size	Avid		Tack		Total	
	Units	Persons	Units	Persons	Units	Persons
Studios (1-person)	76	76	49	49	125	125
1-Bed (2 persons)	189	378	102	204	291	582
2-Bed (4 persons)	71	284	56	224	127	508
3-Bed (5 persons)	0	0	1	5	1	1
Total	336	738	208	482	544	1,224

2.7 Car Parking

The proposed provision of car parking will be 74 spaces calculated at the rate of 0.35 space per unit per unit for 208 units.

The provision of 74 spaces will include 3 spaces for disabled drivers (4%), 8 spaces with charging facilities for electric vehicles (10%) and 2 spaces for car sharing (GoCar).

A total of 55 spaces will be located at lower ground level as shown in Figure 7 with 65 spaces on the adjoining site. Provision has been included in the design for interconnection between the two car parking areas.

A total of 19 spaces will be provided at basement level as shown in Figure 8 with 53 spaces on the adjoining site. No interconnection is proposed between the car parks at this level.

Figure 7 Parking Layout at Lower Ground Level (55 spaces)

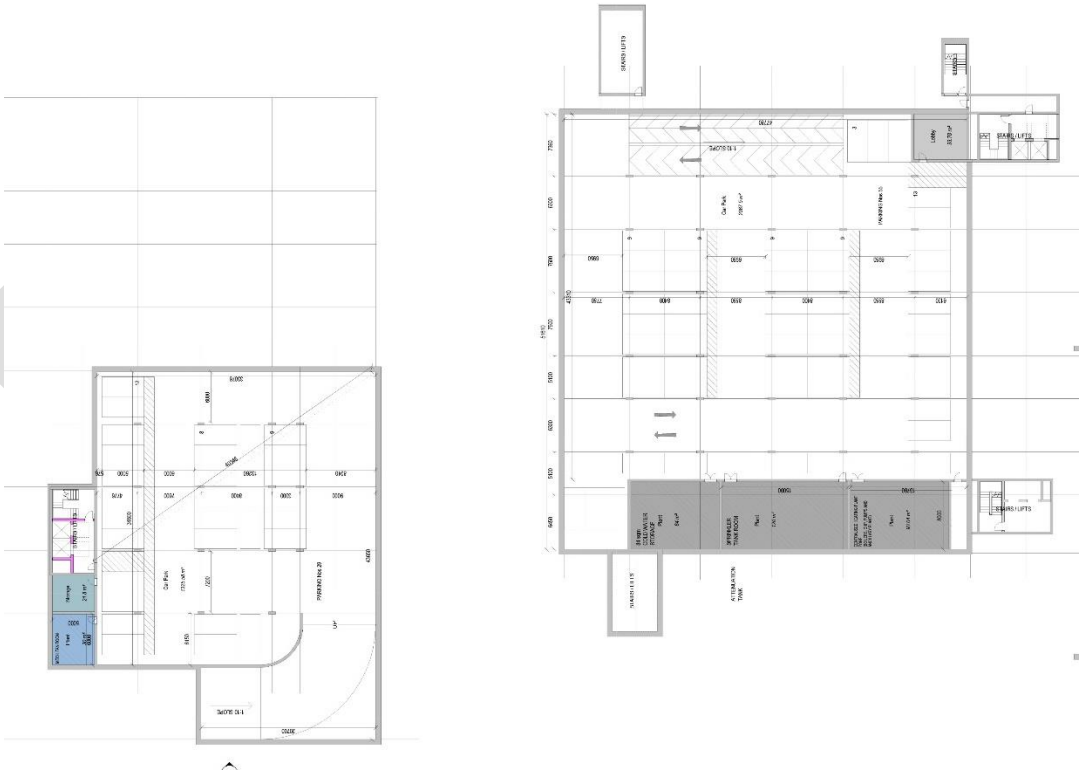


Figure 8 Parking Layout at Basement Level (19 spaces)

2.8 Motorcycle Parking

The parking provision for motorcycles within the proposed development will be 3 spaces (4% of the car parking provision).

2.9 Pedestrians and Cyclists

The pedestrian and cycle access to the proposed development have been integrated with the proposals for the Sandyford Business District Pedestrian and Cycle Improvement Scheme. 2021.

This scheme provides for upgraded footpaths and cycle tracks on the Blackthorn and Carmanhall Road frontages of the subject site together with the signalisation of the Blackthorn Road / Carmanhall Road junction.

2.10 Cycle Parking

It is proposed that a total of 240 cycle parking spaces be provided within the proposed development.

A total of 208 long term spaces will be provided for residents and a total of 42 short term spaces will be provided for visitors.

Provision for future additional demand for cycle parking of +20% equivalent to 50 spaces has been included in the cycle parking provision for this development (tbc)

2.11 Waste Collection

An Autotrack analysis has been undertaken on the proposed layout to demonstrate that a 10.2m long refuse freighter can access the proposed development from Ravens Rock Road, drive through the development and exit onto Carmanhall Road.

The Autotracking which is illustrated in Figure 9 confirms that the selected vehicle can access the proposed development.

2.12 Emergency Access

An Autotrack analysis has been undertaken on the proposed layout to demonstrate that an 8.4m long Class B fire tender can access the proposed development from Ravens Rock Road, drive through the development and exit onto Carmanhall Road.

The Autotracking which is illustrated in Figure 10 confirms that the selected vehicles can access the proposed development.

Insert figure

Figure 9 Autotrack Tracking for Refuse Freighter

Insert figure

Figure 10 Autotrack Tracking for Fire Tender

2.13 Travel Plan (formerly Mobility Management Plan)

The Traffic and Transport Assessment (T&TA) for the proposed development is expected to be accompanied by a Travel Plan prepared in accordance with Section 8.2.4.3 of Dun Laoghaire Rathdown County Development Plan 2016 – 2022.

A separate Travel Plan is also expected to be prepared for the proposed development on the adjoining former Avid Technology site to the east.

3. Receiving Environment

3.1 Site Layout – Existing

The existing site layout is illustrated in Figure 11.

The subject the site extending to 0.56 ha (1.40 acres) was formerly occupied by Tack Packaging. The existing access is from Ravens Rock Road.

At the time of writing in February 2022, the site was unoccupied save for a number of empty buildings on the site.

The adjoining site to the east on which a concurrent development is expected extends to 0.73 ha (1.83 acres) and was formerly occupied by Avid Technology. The existing access is from Carmanhall Road

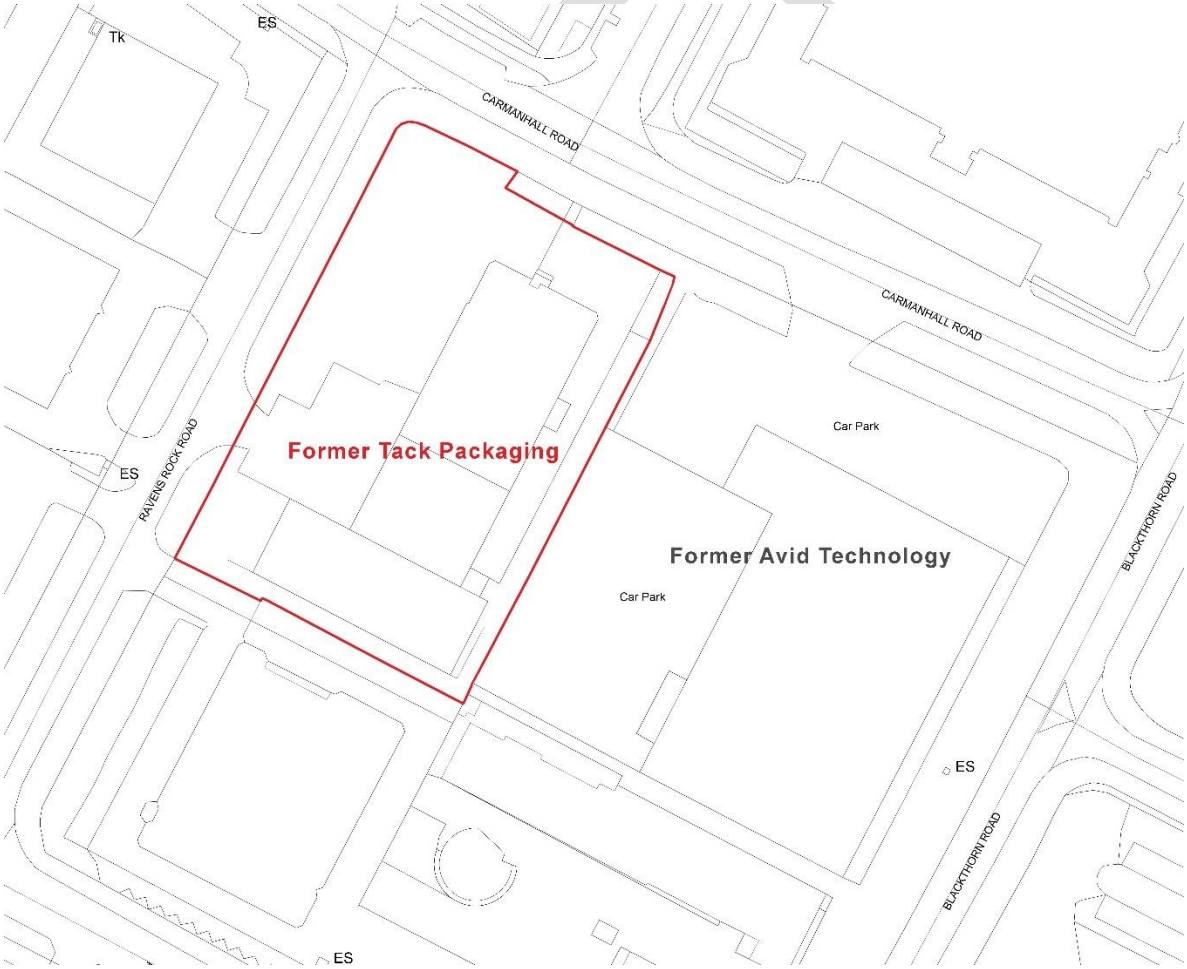


Figure 11 Site Layout – Existing

3.2 Existing Roads

The primary roads in the area of the subject site are shown on Figure 12. The roads which form its eastern, northern and western boundaries of the site are:

- Blackthorn Road
- Carmanhall Road
- Ravens Rock Road.

Figure 12 Sandyford Business Estate Road Hierarchy (SUFP Drawing No 7)

(Level 1 Roads in yellow and Level 2 Roads in pink)

Blackthorn Road is a Level 1 Local Road with a posted speed limit of 50 kph. It has a single carriageway 9.0 metres wide with grass verges and footpaths on both sides. There is a signalised junction with pedestrian facilities at Burton Hall Road and a priority junction at Carmanhall Road. See Figure 13.

The Average Annual Daily Traffic (AADT) on Blackthorn Road is some 17,500 vehicles per day. The two-way traffic flow on Blackthorn Road is some 1,230 vehicles per hour (vph) during the AM peak hour reducing to 450 vph during the PM peak hour.

Only very limited access and no parking is provided off Blackthorn Road.

Figure 13 Blackthorn Road

Carmanhall Road is a Level 2 Local Road with a posted speed limit of 50 kph. It has a single carriageway 7.5 metres wide with grass verges and footpaths on both sides. There are priority junctions with Blackthorn Road and Ravens Rock Road. There is also a signalised pedestrian crossing to the east junction with Ravens Rock Road. See Figure 14.

The Average Annual Daily Traffic (AADT) on Carmanhall Road is some 9,600 vehicles per day The two-way traffic flow on Carmanhall Road is some 650 vehicles per hour (vph) during the AM peak hour reducing marginally to 600 vph during the PM peak hour.

Parking on Carmanhall Road is limited to 1 hour controlled by Pay & Display 08h00-17h00 Monday – Saturday. Parking demand is high on weekdays.

Figure 14 Carmanhall Road

Ravens Rock Road is a Level 2 Local Road with a posted speed limit of 50 kph. It has a single carriageway 7.5 metres wide with grass verges and footpaths on both sides. There are priority junctions at both ends with Carmanhall Road and Three Rock Road. See Figure 15.

Parking on Ravens Rock Road is controlled by Pay & Display 08h00-17h00 Monday – Saturday. Parking demand is high on weekdays.

The Average Annual Daily Traffic (AADT) on Ravens Rock Road is some 1,900 vehicles per day. The two-way traffic flow on Ravens Rock Road is some 150 vehicles per hour (vph) during the AM peak hour. reducing marginally to 100 vph during the PM peak hour.

Figure 15 Ravens Rock Road

3.3 Site Access - Existing

There is a single vehicular access to the subject site from Ravens Rock Road.

There is also a single access to the adjoining former Avid Technology site from Carmanhall Road.

3.4 Pedestrian Linkage

3.4.1 Existing Environment – Pedestrians

Pedestrian facilities in the area surrounding the subject site are generally of high standard.

Street lighting and tactile paving are provided at most crossing points and footways are free of street clutter caused by inappropriately located street furniture.

3.4.2 Proposed Pedestrian Routes

In addition to the existing pedestrian facilities, the pedestrian environment in the area of the subject will be enhanced by the implementation of the Sandyford Business District Pedestrian and Cycle Improvement Scheme. See Figure 16.

3.5 Cycle Linkage

3.5.1 Existing Environment – Cycles

There are very limited cycle facilities on the road network in the area around the subject site.

This deficiency will be remedied by the implementation of the Sandyford Business District Pedestrian and Cycle Improvement Scheme.

3.5.2 Proposed Cycle Routes

The Council Cycling Policy, adopted in June 2010, provides local guidelines on the delivery of the aims and objectives of the National Cycle Policy Framework 2009-2020.

The Cycling Policy includes guidance and standards for the provision of cycle parking and associated cycling facilities for all new developments. Developments in the Sandyford Business District will be required to adhere to the Council Cycling Policy as part of their Travel Plan.

In addition to the existing pedestrian facilities, the cycle environment in the area of the subject will be enhanced by the implementation of the Sandyford Business District Pedestrian and Cycle Improvement Scheme. See Figure 16.

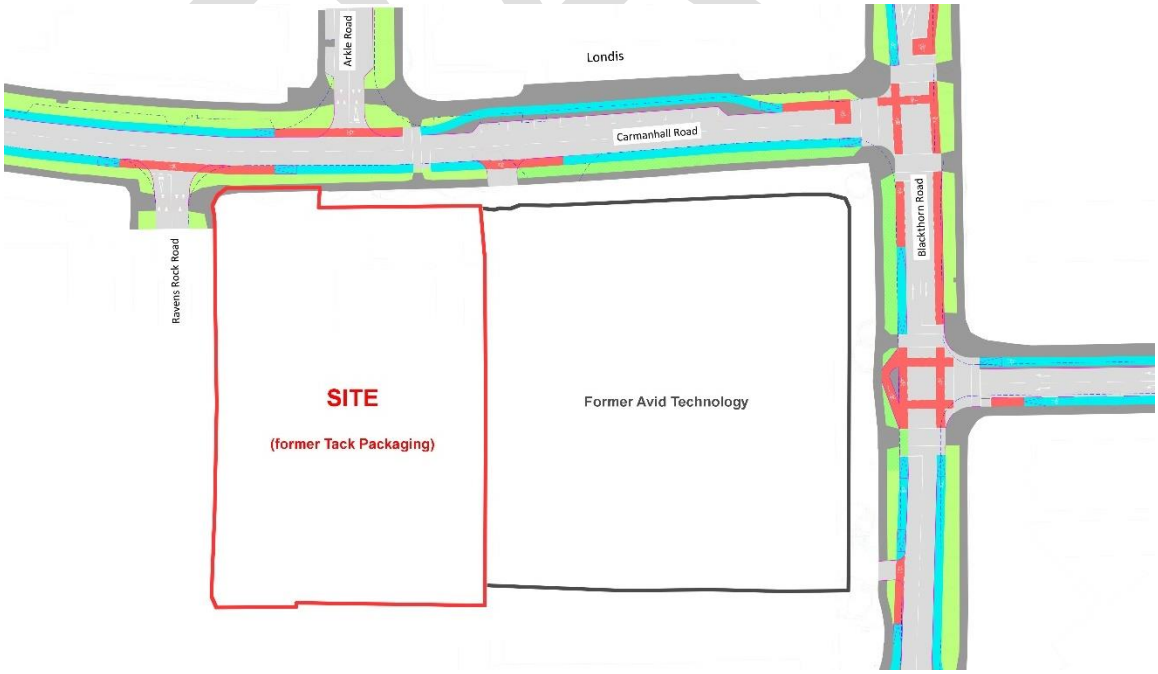


Figure 16 Sandyford Business District Pedestrian and Cycle Improvement Scheme

3.6 Car Sharing

The DLR County Development Plan is silent on the quantum of car club spaces to be provided within a new development.

A total of 2 paces are proposed within this development to be operated by a company such as GoCar. GoCar bases in the area around the subject site are located within a short walking distance at the following locations illustrated in Figure 18.

- Carmanhall Road
- Blackthorn Avenue
- Blackthorn Road
- Heather Road

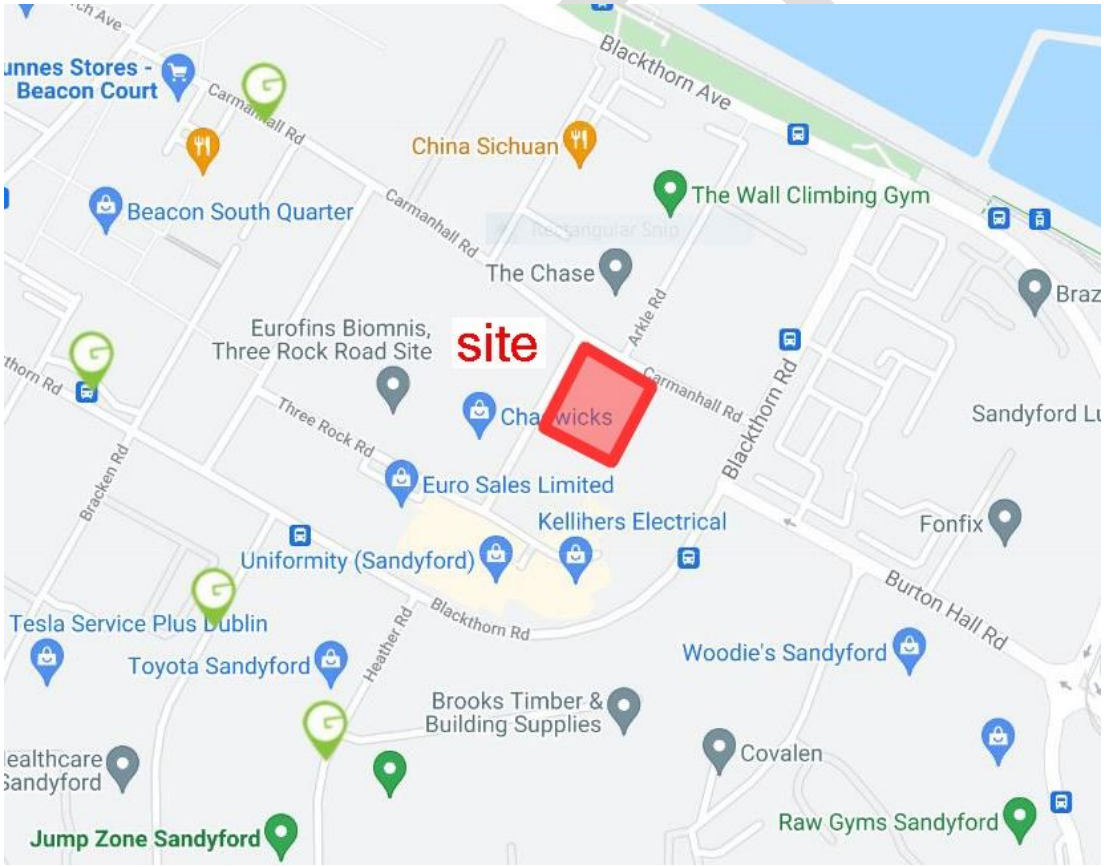


Figure 17 GoCar Bases in Sandyford Area.

3.7 Road Collision Statistics

Road traffic statistics for the area around the subject site were reviewed in the Road Safety Authority (RSA) website www.rsa.ie.

This website details traffic collision data for the years 2005 – 2016. The records detail only those occasions where the incident was officially recorded such as the Garda being present to formally record details of the incident.

The incidents are classified as fatal, serious or minor. An extract from the RSA collision map is presented in Figure 19.

None of the collisions were fatal or reoccurring or raise any concerns in relation to the existing road network.

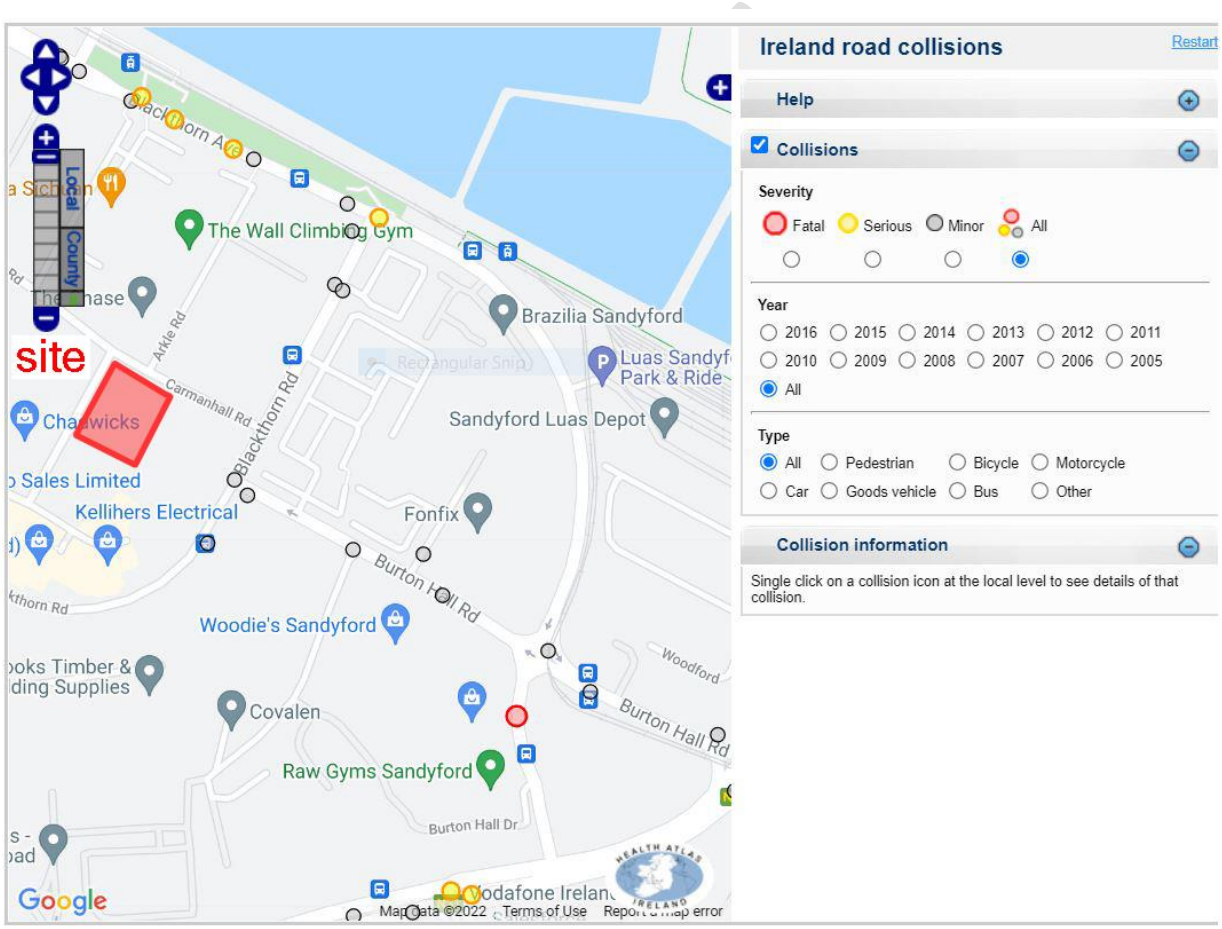


Figure 18 Road Traffic Collisions 2005 - 2016.

4. Public Transport – Light Rail

4.1 Background

Services on the Luas Green Line between St Stephens Green and Sandyford commenced in 2004. Subsequently, the line was extended south to Cherrywood in 2010 (Line B1) and north to Broombridge in 2017 (Line BX).

Luas services operate at 2 – 15 minute intervals in both directions.

Both the Sandyford Stop and the Stillorgan Stop on Blackthorn Avenue will serve the proposed development with both stops being 6 minutes' walk time from the subject site.

4.2 Operation

The overall service on the Green Line comprises 100 trams per day in each direction between Brides Glen and Sandyford increasing to 200 trams per day in each direction between Sandyford and the City Centre.

Between 8am and 9am, the Green Line has 20 services from Sandyford to City Centre, with a carrying capacity of around 6,300 passengers depending on a variable Luas call comfort factor.

From Brides Glen to Sandyford, there are 10 services between 8am and 9am, and a carrying capacity of 3,150.

The frequency, demand and capacity on the Luas Green Line are set out in Table 2. The subject site is located between Sandyford and the City Centre.

Table 2 Green Line Frequency, Demand and Capacity

	Brides Glen - Sandyford	Sandyford - City Centre
Frequency	6 – 15 minutes each way	3- 15 minutes each way
AM Peak Loading	931 passengers per tram inbound (Leopardstown – The Gallops)	4,648 passengers per tram inbound (Milltown – Cowper)
PM Peak Loading	497 passengers per tram outbound (Leopardstown – The Gallops)	2,685 passengers per tram outbound (Beechwood – Ranelagh)
Capacity	3,150 passengers per tram	6,300 passengers per tram

4.3 Green Line Capacity

The Green Line Capacity Enhancement Scheme was launched in 2017 and completed by TII in 2021 at a cost of €100m.

Earlier surveys by the NTA of passenger demand and conditions on the Luas Green Line indicated that the line was operating at capacity during peak periods, with crowding experienced between the Balally and Ranelagh stops. This crowding resulted in passengers being unable or unwilling to board at these stops.

The Capacity Enhancement Scheme provided for the replacement of the original 44 metre long trams each with a nominal capacity of 319 passengers with 55 metre long trams each with a capacity of nominal capacity of 408 passengers.

Following completion of the Green Line Capacity Enhancement Scheme in 2019, the passenger capacity on the Green Line comfortably exceeds passenger demand in the AM and PM Peak as set out in the Table 1 above.

4.4 Future Increase in Line Capacity

In March 2019, the National Transport Authority confirmed that notwithstanding the ongoing increase in passenger demand, the next increase in capacity on the Luas Green Line would not be required before 2040.

4.5 Passenger Demand

Based on a modal split of 28%, the peak demand from the proposed development is 342 passengers per hour equivalent to 2.7 % of the Green Line Capacity of 12,600 passengers per hour.

4.6 Access to Luas Stops

Walking distances to Luas stops in the area of the proposed development are set out in Table 3.

The nearest Luas stops are Stillorgan and Sandyford both located on Blackthorn Avenue less than 0.5km to the north of the proposed development. Both stops are within 6 minutes walking distance.

Other stops within 20 minutes walking distance are Kilmacud and Central Park.

Table 3 Walking Time to Luas Stops

Luas Stop	Services	Walk Time from Development
Kilmacud	Blackthorn Avenue	17 minutes
Stillorgan	Blackthorn Avenue	4 minutes
Sandyford	Blackthorn Avenue	6 minutes
Central Park	Leopardstown Road	16 minutes

5. Public Transport – Bus

5.1 Dublin Bus

Details of the bus services operated by Dublin Bus in the area of the proposed development are presented in Table 4 below.

Table 4 Dublin Bus Services

Bus Route	From	To	AM Peak Hour Frequency (08h00 – 09h00)	PM Peak Hour Frequency (17h00 – 18h00)
11	Ballymun	Sandyford Industrial Estate	3 in each direction	3 in each direction
47	City Centre	Belarmine	2 in each direction	2 in each direction
75	Dun Laoghaire	Tallaght	2 in each direction	3 in each direction

5.2 GoAhead Bus Services

Details of the bus services operated by GoAhead in the area of the proposed development are presented in Table 5 below.

Table 5 GoAhead Bus Services

Bus Route	From	To	AM Peak Hour Frequency (08h00 – 09h00)	PM Peak Hour Frequency (17h00 – 18h00)
114	Blackrock DART	Ticknock	1 in each direction	1 in each direction

5.3 Aircoach Services

Aircoach operate a 24-hour coach service between Clayton Hotel (formerly Bewleys Hotel) at Central Park and Dublin Airport.

Services on Route 700 to and from Central Park operate at the following frequencies:

From 00h00 - 04h00 : Every Hour

From 04h00 - 06h00 : Every 20 minutes

From 06h00 – 20h00 : Every 10 minutes

From 20h00 – 00h00 : Every 20 minutes

5.4 Future Bus Services

Objective TAM 4 of the Sandyford Urban Framework Plan sets out the expansion of bus services in the Sandyford area including: -

- *Fast and frequent shuttle bus service from the Blackrock DART station to the Stillorgan Luas and Sandyford Business Estate. This service shall open up public transport as an option to the vast hinterland of the DART line from Greystones to Malahide and Howth.*
- *An internal shuttle bus service. This service will provide a more sustainable travel opportunity and provide a campus feel to the area. It will also aid in the transporting of people from the Luas/Bus Interchange to their destination within the Sandyford Business District*

5.5 Bus Connects

Future bus services in the area of the proposed development are set out in Table 6 and illustrated in Figure 10.

The proposed timetable provides for a total of 10 buses in each direction during the AM Peak.

Table 6 Bus Connects Services

Route No	Route	Type	Frequency AM Peak
S8	Dun Laoghaire – City West	Orbital	15 minutes
86	Ticknock – City Centre	Other City Bound Route	30 minutes
L13	Kilternan – City Centre	Local Route	60 minutes
P13	Kilternan - UCD	Peak Time Route	30 minutes
P16	Ballyboden – UCD	Peak Time Route	60 minutes

Figure 19 Bus Connects - Extract from Dundrum Area Map

5.6 Access to Bus Stops

The nearest bus stops to the proposed development are located on Burton Hall Road, Blackthorn Road, and Blackthorn Avenue.

All of the stops are less than 6 minutes' walk from the proposed development. See Table 7.

Table 7 Walking Time to Bus Stops.

Location	Stop No	Services	Walk Time from Development
Blackthorn Drive (Carmanhall Road)	3181	11, 47, 75A, 114, 116	3 minutes
Blackthorn Drive (pick up)		Aircoach	4 minutes
Blackthorn Avenue (Blackthorn Drive)	451	11. 47, 116	3 minutes
Blackthorn Avenue (Luas Stop)		47, 114	6 minutes
Burton Hall Road (Arena Road)	448	47, 114, 700	3 minutes

6. County Development Plan 2016 - 2022

6.1 Road Objectives

Map 6 from the Dun Laoghaire Rathdown County Development Plan 2016 – 2022 shows the following 6-year Road Proposals in the area of the subject site: -

- E.S.B. Roundabout on Leopardstown Road to Arena Road and Blackthorn Road.

No Long-Term Road Proposals are shown on Map 6, an extract from which is presented in Figure 21.

Specific Local Objective 113 on the former Avid Technology site relates *to 'the provision of community infrastructure at ground floor along the eastern outer edge of the Carmanhall residential neighbourhood along Blackthorn Road.'*

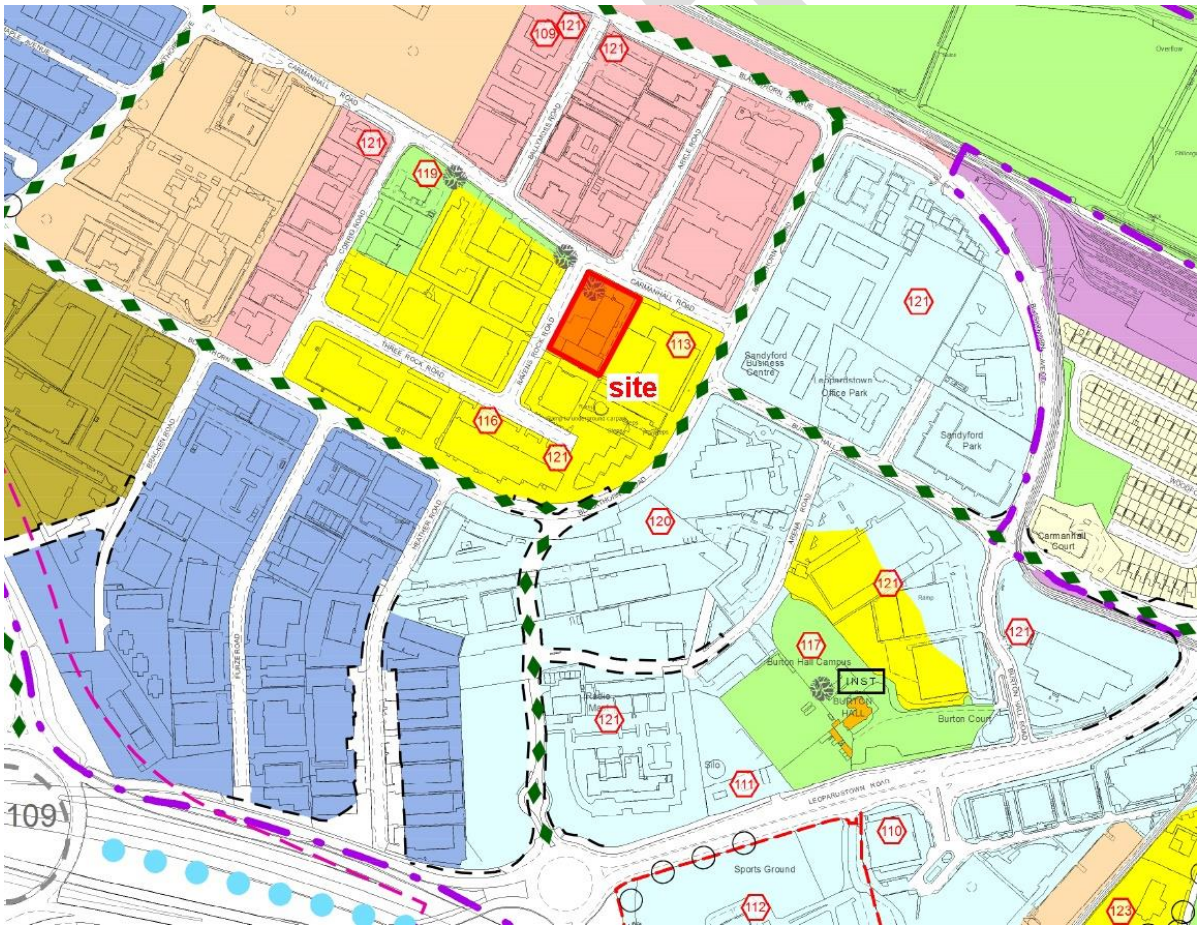


Figure 20 Map 6 DLR County Development Plan 2016-2022

6.2 Bus Priority

Map 6 illustrates the following Bus Priority Schemes serving the subject site: -

- The second phase of a Luas/Bus Interchange at the Stillorgan Luas stop on Blackthorn Avenue.
- Internal circular Quality Bus Corridor from a Luas / Bus Interchange at the Stillorgan Luas stop, proceeding in a clockwise direction via Blackthorn Avenue, Blackthorn Road and Blackthorn Drive.

  The above route will be modified to proceed via the Burton Hall Road Extension, Leopardstown Road, ESB Link Road, Corrig Road, left on Carmanhall Road and onto Blackthorn Drive.
- Tallaght to Sandyford (orbital route).

6.3 Bus Services

Objective TAM 4 of the Sandyford Urban Framework Plan sets out the expansion of bus services in the Sandyford area including

- *Fast and frequent shuttle bus service from the Blackrock DART station to the Stillorgan Luas and Sandyford Business Estate. This service shall open up public transport as an option to the vast hinterland of the DART line from Greystones to Malahide and Howth.*
- *An internal shuttle bus service. This service will provide a more sustainable travel opportunity and provide a campus feel to the area. It will also aid in the transporting of people from the Luas/Bus Interchange to their destination within the Sandyford Business District*

6.4 Cycling Objectives

Cycling policies and objectives are set out in Section 2.2.7 of the County Development Plan.

The objectives include an Orbital Cycle Route on Leopardstown Road.

No specific mention of the Sandyford Business District Pedestrian and Cycle Improvement Scheme was noted in the DLR County Development Plan 2016 – 2022.

6.5 Cycle Parking Standards

Standards for cycle parking are set out in Section 8.2.4.7 of the Dun Laoghaire Rathdown County Development Plan 2016 – 2022 and in the '*Standards for Cycle Parking and Associated Cycling Facilities for New Developments*', published by DLRCC in July 2017.

Long stay (resident) cycle parking for the proposed development is required to be provided at the rate of 1 space per unit.

Short stay (visitor) cycle parking for the proposed development is required to be provided at the rate of 1 space per 5 units.

6.6 Motorcycle Parking Standards

Section 8.2.4.8 of the Development requires the provision of motorcycle parking at the rate of 4 spaces per 100 car parking spaces.

6.7 Electric Cars

Section 8.2.4.12 of the Development requires the provision of charging for electric cars at the rate of 10 spaces per 100 car parking spaces.

6.8 Walking Objectives

Policies and objectives for walking are set out in Section 2.2.7 of the County Development Plan.

No specific objectives relevant to the proposed development were noted.

6.9 Sustainable Travel and Transportation

Policies and objectives for Sustainable Travel and Transportation are set out in Section 2.2 of the County Development Plan.

Policy ST20 requires *'the submission of Travel Plans for developments that generate significant trip demand. Plans should seek to reduce reliance on car-based travel and encourage more sustainable modes of transportation over the lifetime of the development.*

7. Sandyford Urban Framework Plan 2016 - 2022

7.1 Background

The Sandyford Urban Framework Plan 2016 – 2022 is included in Appendix 15 of the County Development Plan 2016 – 2022.

Section 4.2 sets out the policies and objectives for *Sustainable Transport Infrastructure.*

7.2 Smarter Travel Objectives

Objective TAM1 in Section 4.2.1 of the Sandyford Urban Framework Plan advises as follows:

'It is an objective of the Council to require all future development in the Sandyford Business District to achieve a peak hour transport mode split of 45% trips by car drivers (maximum) and 55% by walking, cycling, public transport and other sustainable modes (minimum targets) as per Government policy stated in the document published by the Department of Transport entitled 'Smarter Travel, A Sustainable Transport Future 2009 – 2020'.

7.3 Cycling and Walking Objectives

The 6 Year Objectives for Cycling and Walking in TAM 6 of Section 4.2 of the SUFP are illustrated in Figure 22. They do not include any objectives, either Six-Year Objectives or Long-term Objectives for Cycling and Walking in the area of the proposed development.

Figure 21 SUFP Walking and Cycling Routes (SUFP Drawing No 6)

7.4 Road Objectives

Six-Year

The Six-Year Road Objectives for Sandyford are set out in Objective TAM 17and Drawing No 8 of the SUFP. These objectives which are illustrated in Figure 23 include:

- ESB Link Road and Link to Arena Road (No.6)

Long-Term

The long-term road objectives for Sandyford are set out in Objective TAM 18 and Drawing No 9 of the SUFP. See Figure 24.

They do not include any objectives for long term road objectives in the area of the proposed development.

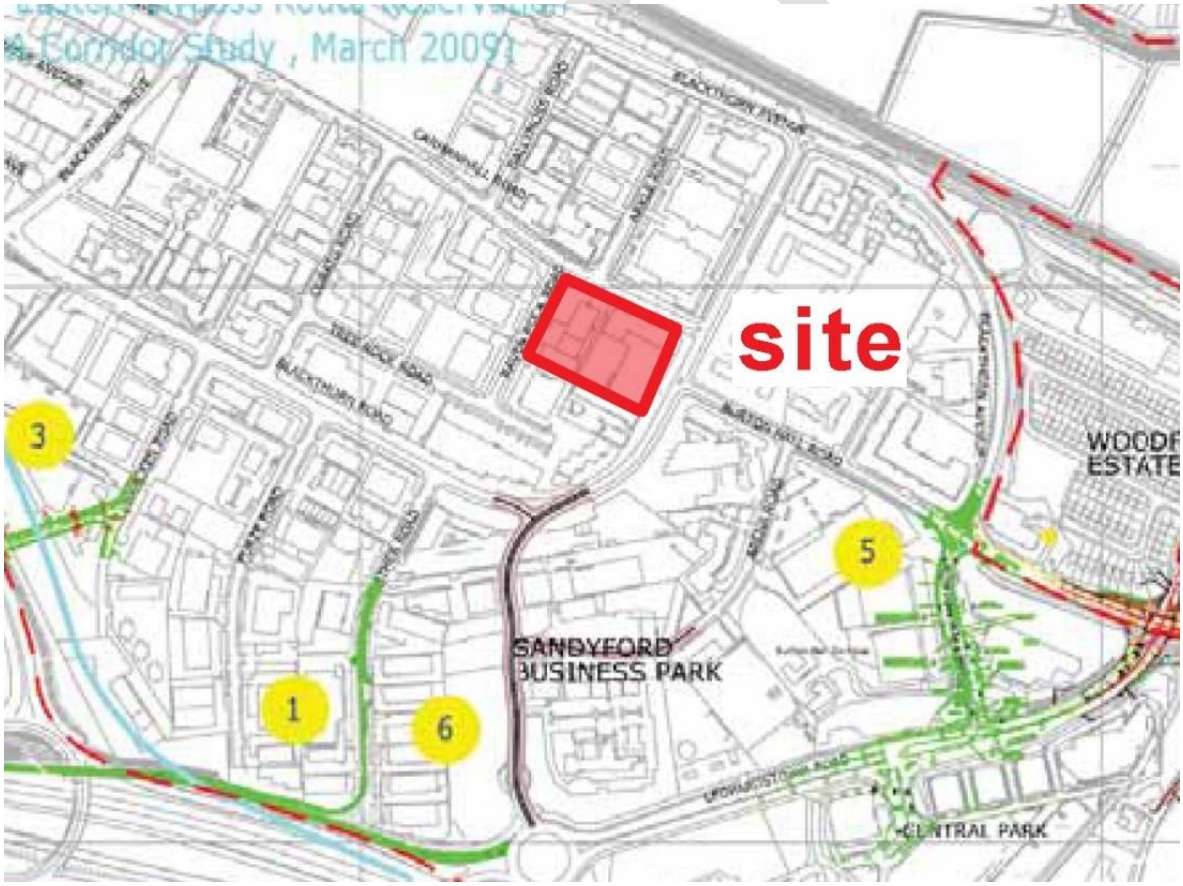


Figure 22 SUFP Six Year Road Objectives (SUFP Drawing No. 8)

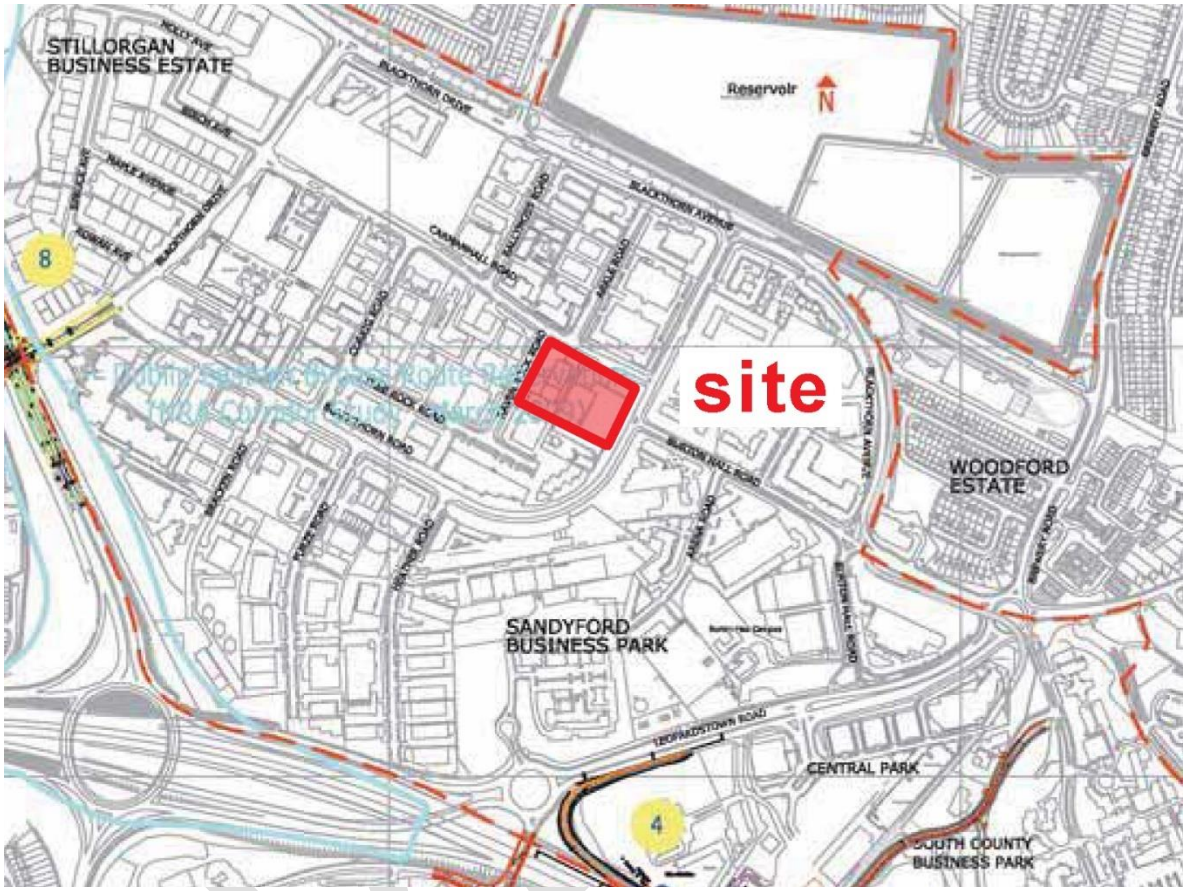


Figure 23 SUFP Long Term Road Objectives (SUFP Drawing No. 9)

8. Road and Cycle Schemes

8.1 ESB Link Roads

8.1.1 Background

A Part 8 planning application for the 0.35 km long ESB Link Road between Junction 14 at the M50 and Blackthorn Road was registered by Dun Laoghaire Rathdown County Council on 20th November 2013. See Figure 25.

The application included a Part 8 Planning Environmental Report prepared by Aecom Roughan O'Donovan in October 2013.

There has been no decision on the application at the time of writing in February 2022. It is understood nonetheless that the Scheme is progressing towards the tender stage for completion in 2023.

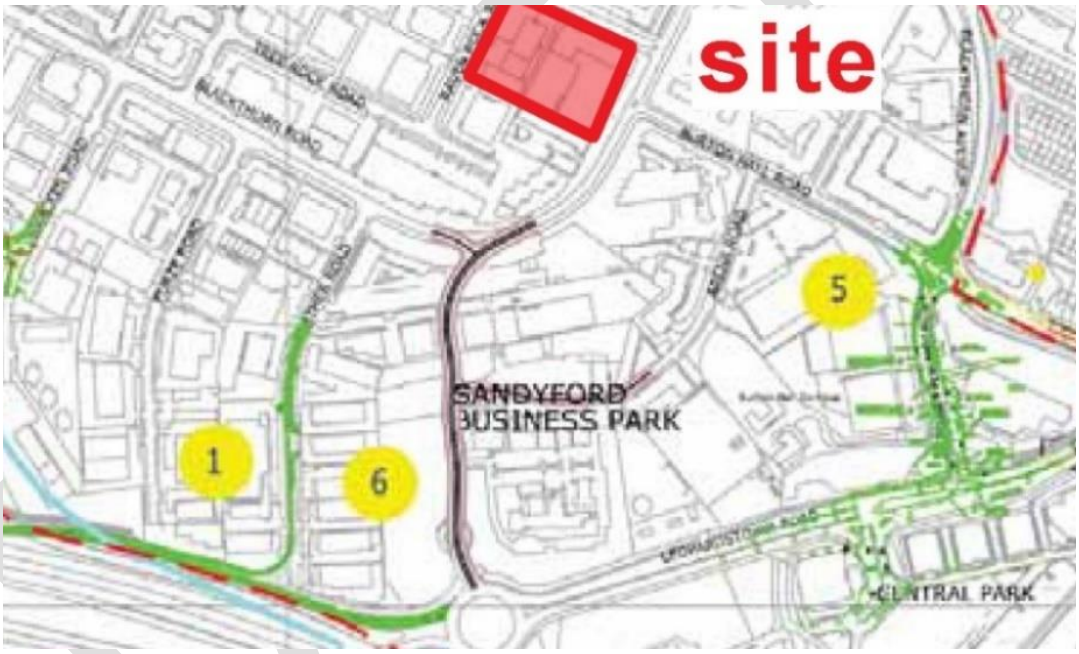


Figure 24 ESB Link Road

8.1.2 Traffic Impact

The primary traffic impact of the Scheme will be to divert traffic between Junction 14 on the M50 and Sandyford Business District from its present long route via Leopardstown Road and Burton Hall Road to the shorter ESB Link Road.

In terms of the roads surrounding the proposed development, the major impact will be at the Blackthorn Road / Burton Hall Road junction where a significant volume of traffic will be diverted from Burton Hall Road to Blackthorn Road.

8.1.3 Junction ESB Link Road and Blackthorn Road

The 2019 Forecast Junction Flows reproduce from Figure 5.2 of the Planning Environmental Report are presented in Figure 26.

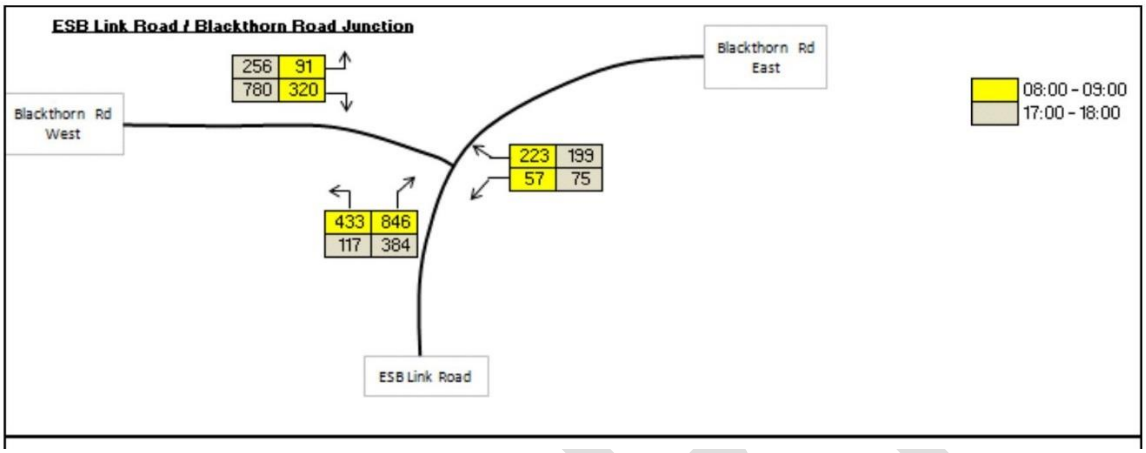


Figure 25 Junction Flows ESB Link Road and Blackthorn Road

8.2 Sandyford Business District Pedestrian and Cycle Improvement Scheme

8.2.1 Background

Dun Laoghaire Rathdown County Council, in conjunction with the National Transport Authority, is in the process of carrying out walking and cycling improvements in the Sandyford Business District on Burton Hall Road, Blackthorn Road and Carmanhall Road. See Figures 27 and 28.

The Council's Traffic & Road Safety Section undertook a Non-Statutory Public Consultation for the Sandyford Business District Pedestrian and Cycle Scheme during August and September 2021 after which a post consultation report was prepared for the Dundrum Area Committee.

The consultation process included a Preliminary Design Report and drawings prepared by Barry Transportation in August 2021.

The writer is not aware of any decision on the application at the time of writing in February 2022. It is understood nonetheless that the Scheme is progressing towards the tender stage for completion in 2023.

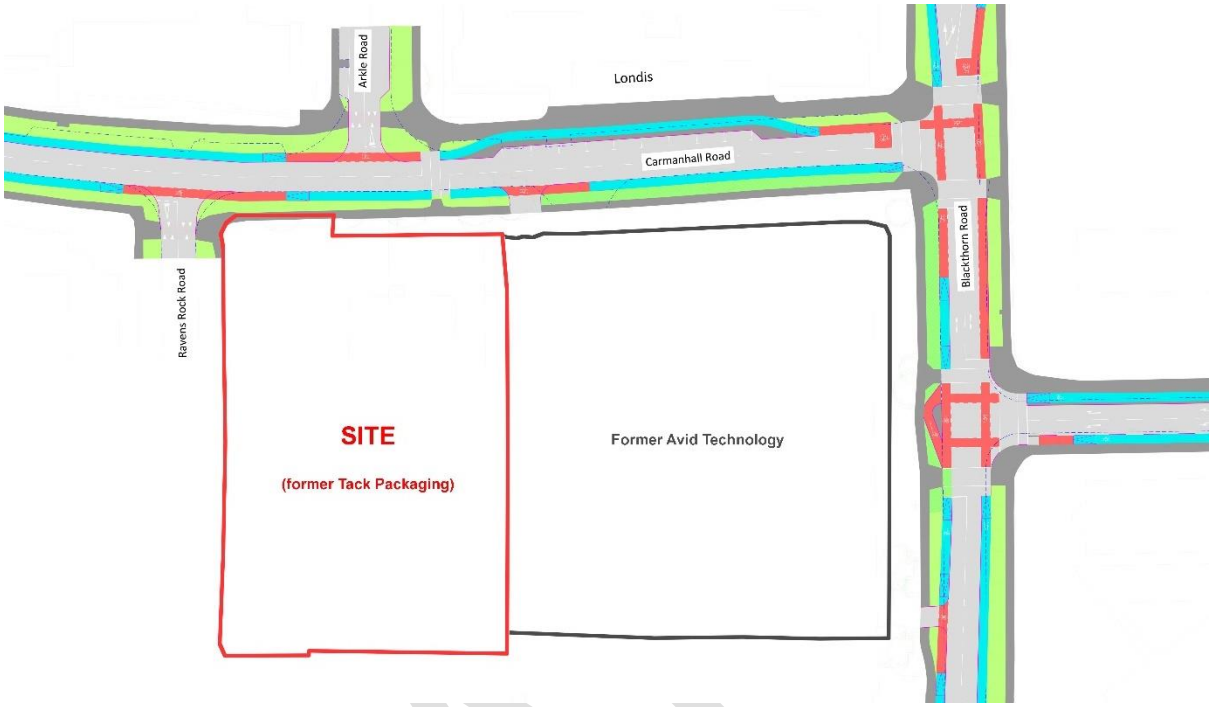


Figure 26 Sandyford Business District Pedestrian and Cycle Improvement Scheme

8.2.2 Description of Scheme

The Scheme comprises

- The provision of raised and adjacent cycle tracks on both sides of Burton Hall Road, Blackthorn Road and Carmanhall Road in accordance with the NCM.
- The provision of a traffic signalised junction at Carmanhall Road and Blackthorn Road junction.
- Crossings at some junctions are to be upgraded to toucan crossings to allow bicycles to use the signalised crossings where appropriate.
- Tightened corner radii at junctions and side roads.
- Left turn slips and pedestrian refuge islands removed in accordance with DMURS.
- Widened footpaths and increased pedestrian space.
- Increased area available for landscaping and retention of as many existing trees as possible. Areas have been identified for potential new tree planting to compensate for any losses.
- The existing on-street car parking spaces will be maintained where possible, with some car parking to be removed on Carmanhall Road.

Public consultation closed on 17th September 2021.

.

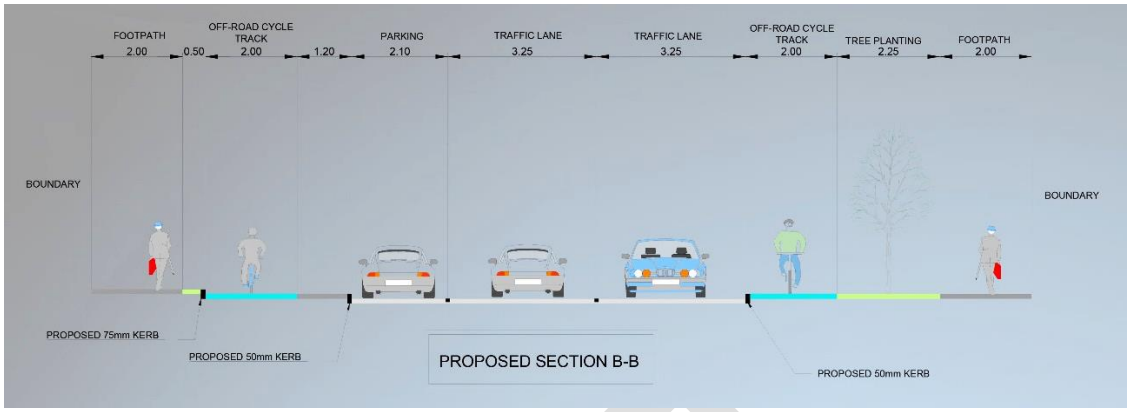


Figure 27 Crossection Sandyford Business District Pedestrian and Cycle Improvement Scheme.

8.2.3 Impact on Subject Site

The pedestrian and cycle access to the proposed development have been integrated with the proposals for the Sandyford Business District Pedestrian and Cycle Improvement Scheme. 2021 in terms of

- Footpaths and pedestrian facilities
- Cycle tracks and access to cycle parking (1.75 m wide)
- Landscape
- Carmanhall Road / Blackthorn Road junction.

The pedestrian and cycle layout on the Carmanhall Road frontage of the site are shown in Figures 27 and 28.

9. Traffic Surveys

9.1 Traffic Survey 2020

As part of the planning application for a residential development on the former Avid Technology site (Ref ABP 310104 21), a traffic survey covering nine junctions in the surrounding area was carried out by Irish Traffic Surveys (ITS) on Tuesday 25th February 2020 over a 12-hour period between 07h00 and 19h00. The survey was carried out in the month before the first Covid lockdown which started in March 2020. The results for the AM Peak Hour are presented in Figure 29.

From the results of the 2020 survey, it would appear that the Average Annual Daily Traffic (AADT) on Blackthorn Road is some 15,800 vehicles per day. The two-way traffic flow on Blackthorn Road is some 1,230 vehicles per hour (vph) during the AM peak hour reducing to 450 vph during the PM peak hour.

Similarly, the Average Annual Daily Traffic (AADT) on Carmanhall Road is some 8,800 vehicles per day The two-way traffic flow on Carmanhall Road is some 600 vehicles per hour (vph) during the AM peak hour increasing marginally to 650 vph during the PM peak hour.

No flows were recorded on Ravens Rock Road.

The full results of the traffic survey carried out in February 2020 are included in Appendix A.

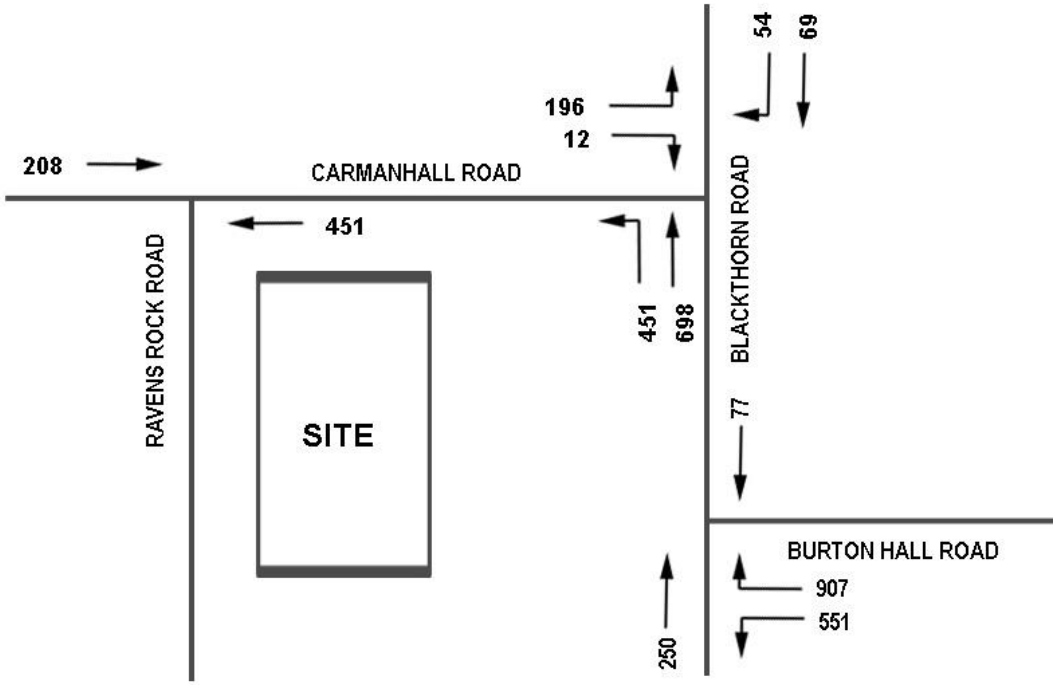


Figure 28 Surveyed Junction Movements February 2020

9.2 Impact of Covid Restrictions 2020 - 2022

At the time of writing in February 2022, there has not been a return to work for most of the businesses in the Sandyford area. As a result, traffic volumes have not recovered to pre-Covid levels and any traffic surveys in early 2022 prior to the lifting of Covid restrictions were unlikely to provide results at or near pre-Covid levels.

However, a supplementary traffic survey was carried out on a weekday over a 12-hour period between 07h00 and 19h00 in January 2022 at the junction of Carmanhall Road and Ravens Rock Road as this junction had not been included in the 2020 survey. The 2022 survey also included the junction of Carmanhall Road and Blackthorn Road for control purposes.

9.3 Traffic Survey 2022

A 12-hour traffic survey of the two junctions on Carmanhall Road was carried out in January 2022. The results of the survey for the AM Peak Hour are presented in Figure 30.

When compared with the 2020 survey, the total approach flow to the Carmanhall Road / Blackthorn Road junction was only some 65% of the 2020 surveyed flow indicating the major reduction resulting from the Covid travel and working restrictions.

The full results of the traffic survey carried out in January 2022 are included in Appendix B.

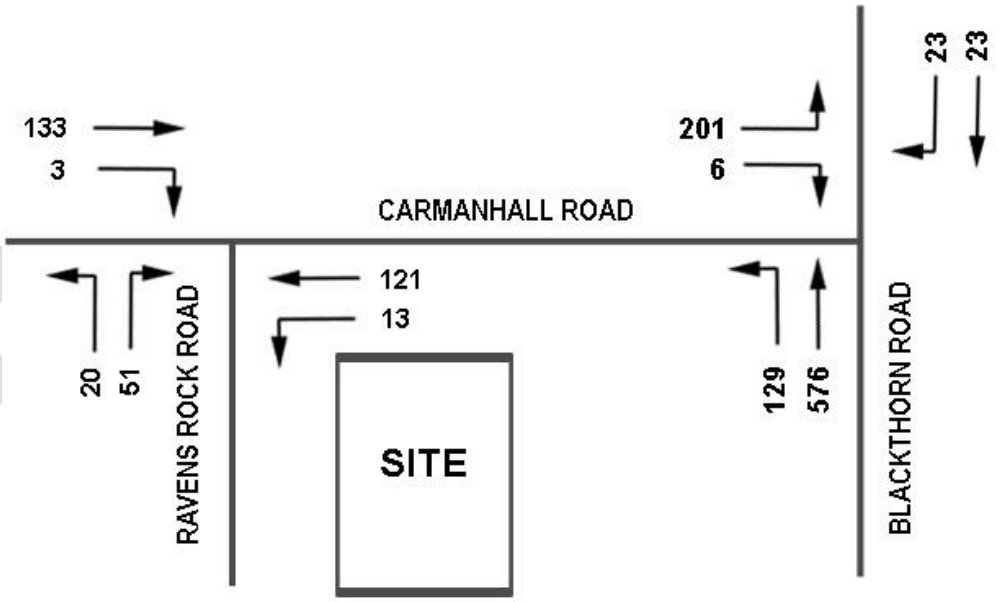


Figure 29 Surveyed Junction Movements January 2022

9.4 Base Flows 2022

The base flows for the two junctions on Carmanhall Road have been calculated on the basis that

- There was no growth in traffic between February 2020 and January 2022 due to working restrictions imposed to limit the spread of Covid-19.
- The traffic movements surveyed in February 2020 for the Blackthorn Drive / Carmanhall Road junction were unchanged in January 2022.
- The traffic movements on Ravens Rock Road surveyed in January 2022 should be increased by a factor of 50% to reflect pre-Covid levels.

The Base Flows for the three junctions in 2022 are presented in Figure 31.

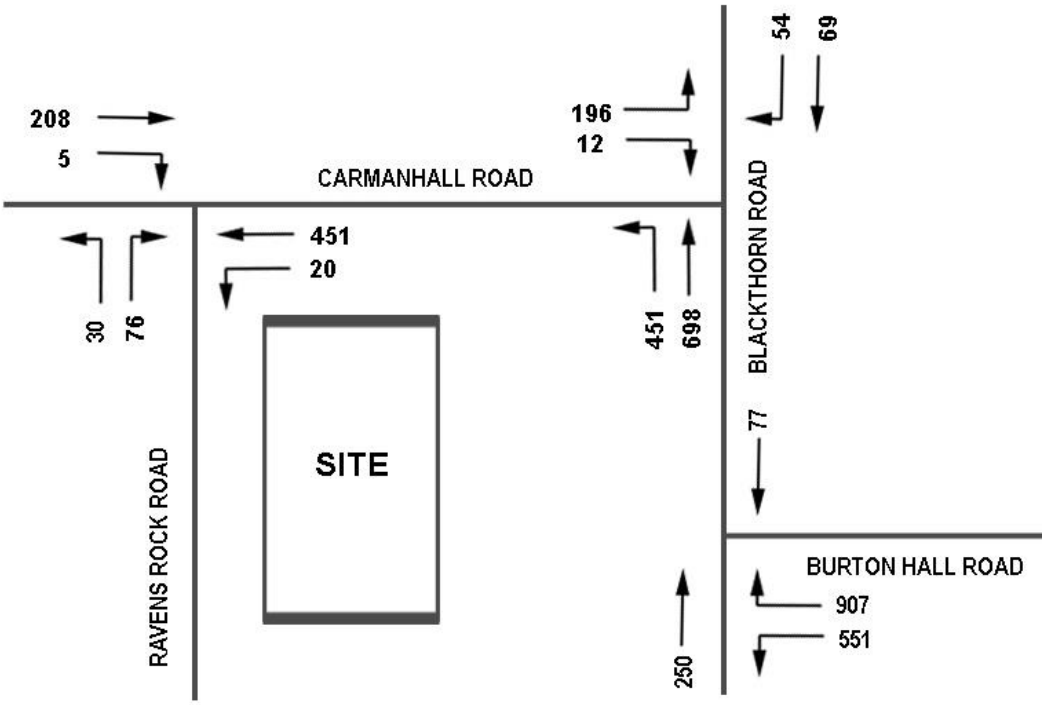


Figure 30 Base Flows 2022.

9.5 Growth Factors

To account for future traffic growth after 2022, Annual Growth Factors based on the Project Appraisal Guidelines: Unit 5.5 Traffic Growth Forecasting, TII, 2011, have been applied to the 2022 Base Flows to calculate the projected flows for 2026 (Opening Year), 2031 (Opening Year + 5) and 2041 (Opening Year + 15).

The annual growth rates used for each of the periods 2022– 2026, 2022 - 2031 and 2027 – 2041 were the LV Central Growth rates from Table 5.3.2 for the Dublin of 1.0134 per annum for the period 2013 – 2030 and 1.0038 or the period 2030- 2050.

The overall growth factors for the Opening Year 2026, Design Year 2031, and Future Year 2041 are set out in Table 8.

Table 8 Overall Traffic Growth Factors

Period	Overall Growth Factor
2022 - 2026	1.054
2022 - 2031	1.116
2022 - 2041	1.159

9.6 Base Flows Opening Year 2026

The junction movements for the Opening Year 2026 were obtained by increasing the Base Flows for 2022 by the factor of 1.054 from Table 7. The Base Flows for the Opening Year 2026 are presented in Figure 32.

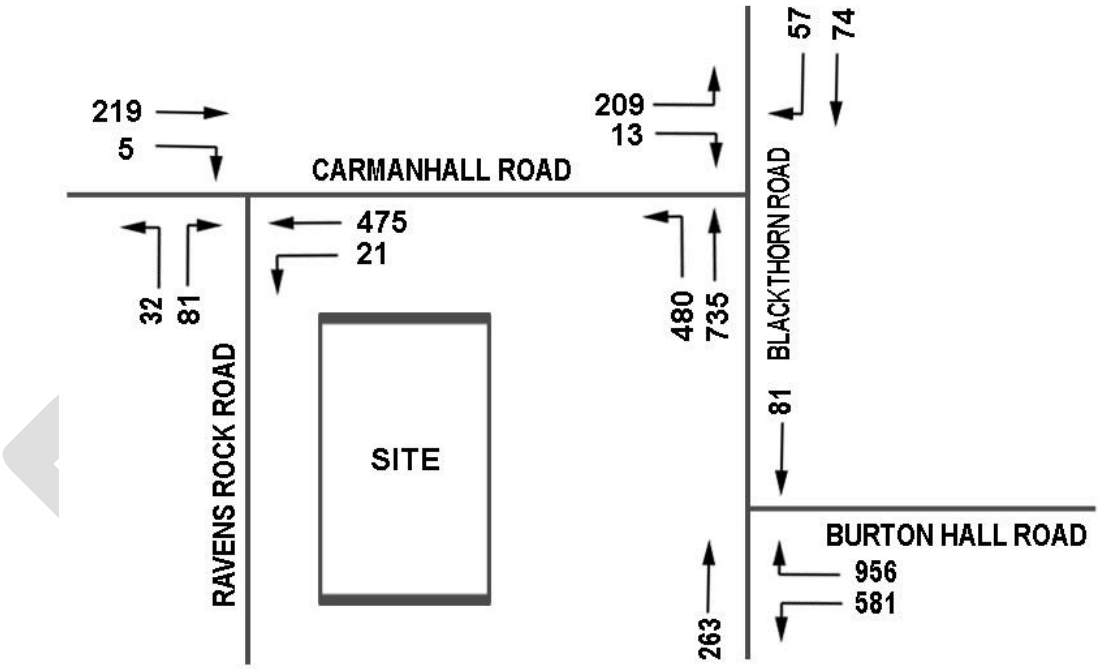


Figure 31 Base Flows - Opening Year 2026

9.7 Base Flows for Design Year 2031 (Opening Year + 5)

The junction movements for the Design Year 2031 were obtained by increasing the Base Flows for 2022 by the factor of 1.116 from Table 7. The Base Flows for the Design Year 2031 are presented in Figure 33.

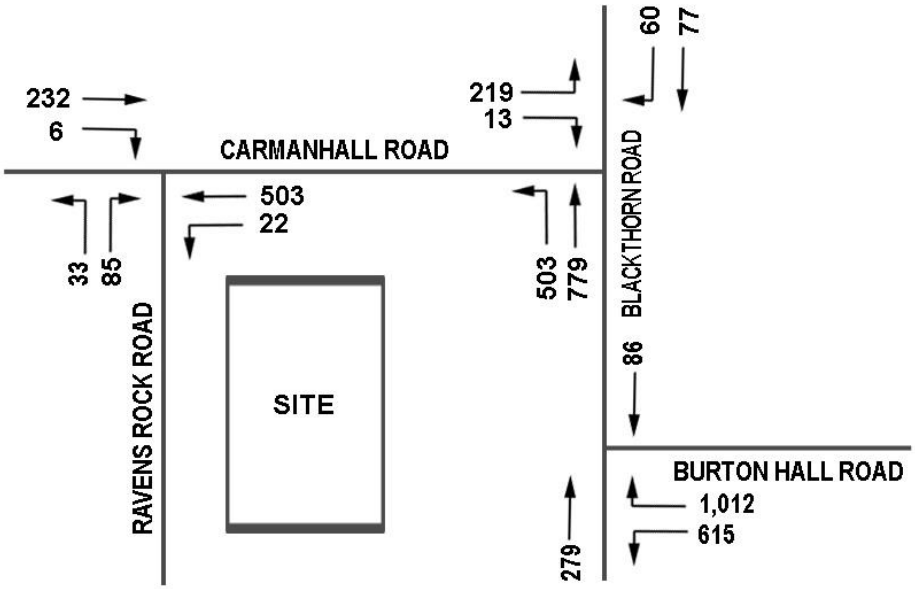


Figure 32 Base Flows - Design Year 2031

9.8 Base Flows for Future Year 2041 (Opening Year + 15)

The junction movements for the Future Year 2041 were obtained by increasing the Base Flows for 2022 by the factor of 1.159 from Table 11.

The Base Flows for the Future Year 2041 are presented in Figure 34.

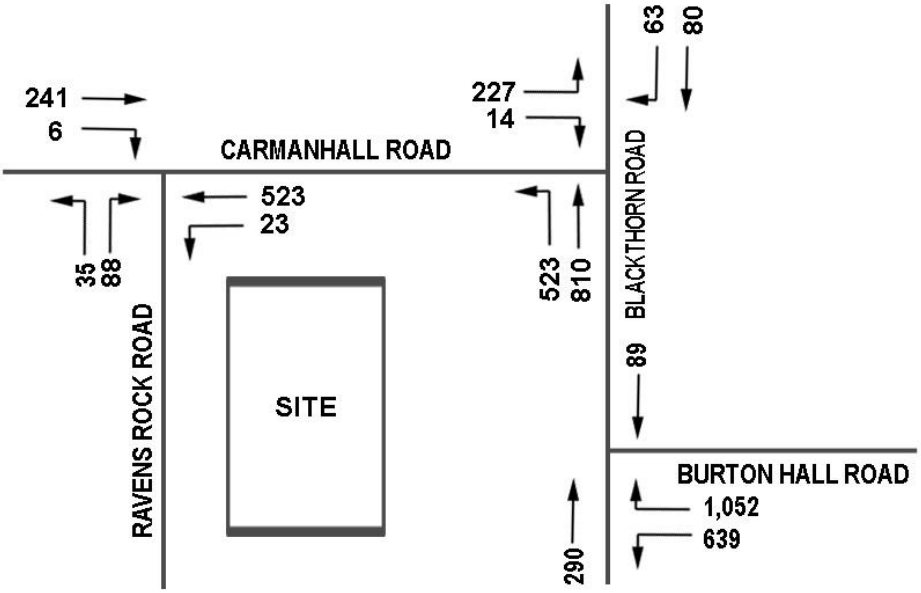


Figure 33 Base Flows - Future Year 2041

9.9 ESB Link Road

As described in Section 8.2 of this T & TA, the major impact of this Scheme will be at the Blackthorn Road / Burton Hall Road junction where a significant volume of traffic will be diverted from Burton Hall Road to Blackthorn Road.

The traffic impact during the AM Peak Hour 08.00 – 09.00 is expected to be: -

(a) A diversion of 699 vehicles per hour from the right turn on Burton Hall Road to the ESB Link Road and then northbound on Blackthorn Road (east). The rate of diversion will increase to 780 vehicles in 2031 and 810 vehicles in 2041.

(b) A diversion of 338 vehicles per hour from the left turn on Burton Hall Road to the ESB Link Road and then on to local destinations. The rate of diversion will increase to 377 vehicles in 2031 and 392 vehicles in 2041.

On the basis of a projected completion in 2023, the ESB Link Road will have no impact on the Base Flow for 2022 but will have an impact on the Base Flows for 2026, 2031 and 2041.

The Base Flows including the ESB Link Road for the Opening Year 2026, Design Year 2031 and Future Year 2041 are presented in Figures 35, 36 and 37.

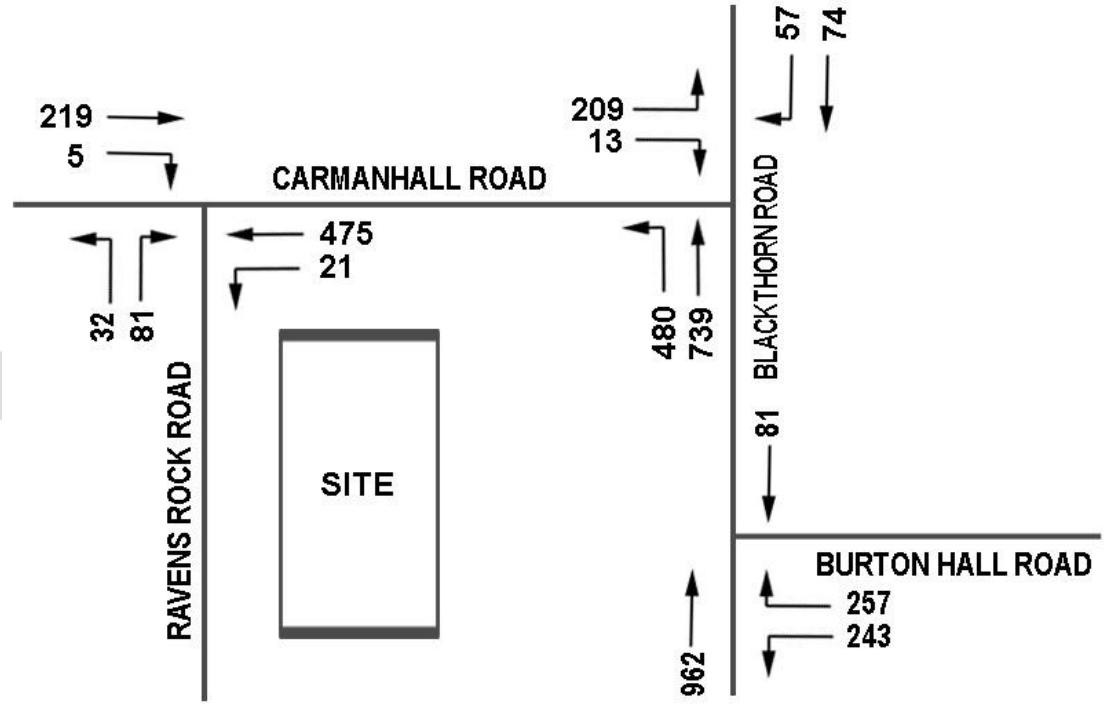


Figure 34 Base Flow Opening Year 2026 including ESB Link Road

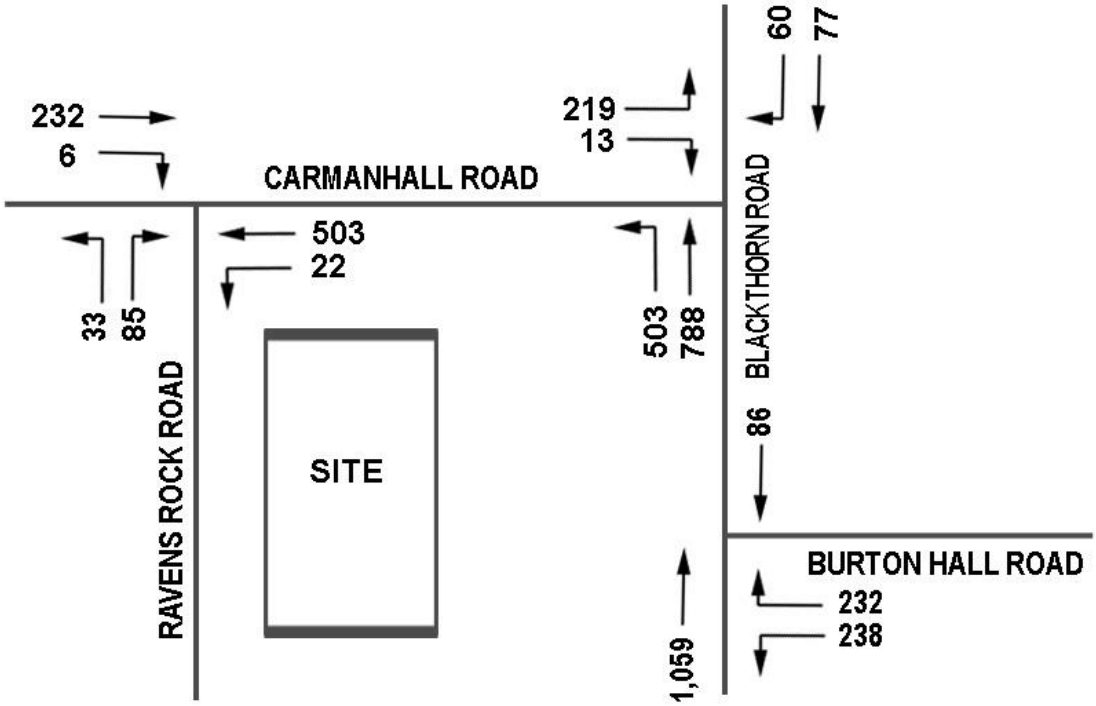


Figure 35 Base Flow for Design Year 2031 including ESB Link Road

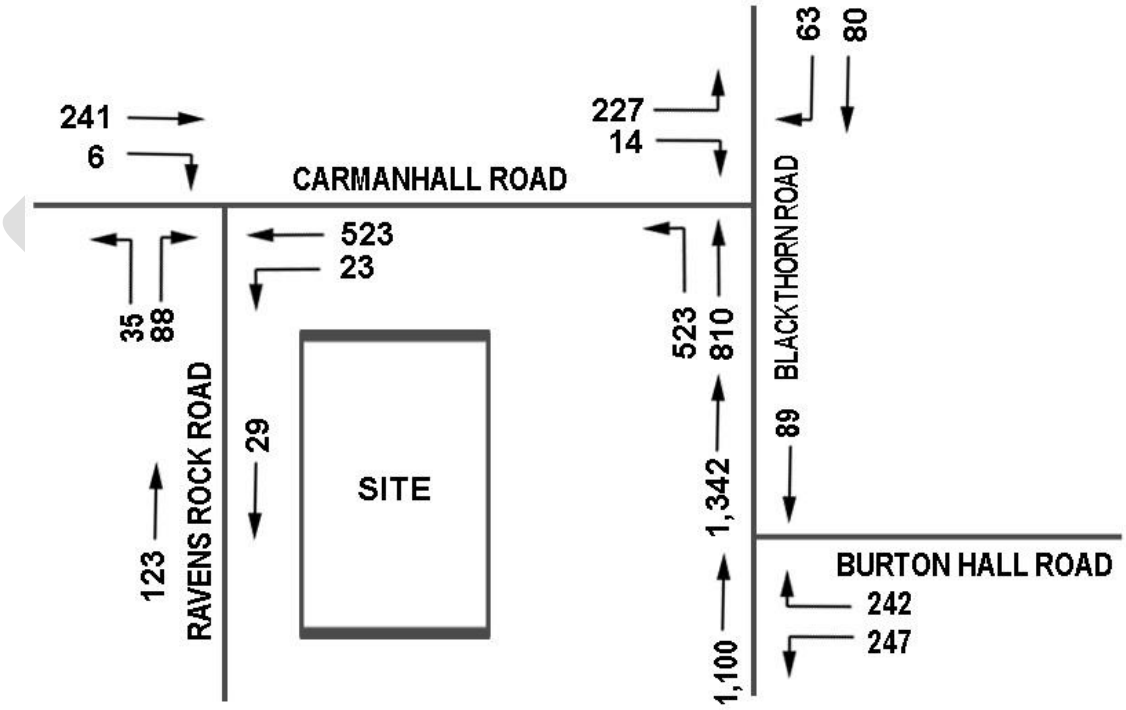


Figure 36 Base Flow Future Year 2041 including ESB Link Road

10. Car Parking

10.1 County Development Plan 2016-2022

Table 8.2.3 of the DLR County Development Plan 2016-2022 prescribes the '*standard*' car parking provision for apartments as follows

- 1 space per 1-bed unit
- 1.5 spaces per 2-bed unit
- 2 spaces per 3-bed unit

Section 8.2.4.5 notes that '*Reduced car parking standards (residential and non-residential) may be acceptable dependant on*

- *The location of the proposed development and specifically its proximity to Town Centre and District Centres and high density commercial / business areas.*
- *The proximity of the proposed development to public transport.*
- *The precise nature and characteristics of the proposed development.*
- *Appropriate mix of land uses within and surrounding the proposed development.*
- *The availability of on-street parking controls in the immediate area.*
- *The implementation of a Travel Plan for the proposed development where a significant modal shift towards sustainable transport modes can be achieved.*
- *Other agreed circumstances where it can be justified on sustainability grounds.*

10.2 Car Parking Calculation

If the standards set out in the Development Plan were to be applied to the proposed development, the car parking requirement would be 237 spaces as calculated in Table 9 equivalent to 1.15 spaces per unit.

Table 9 Car Parking Requirement Development Plan 2016 – 2022

Type	No	Standard	Spaces
Studio	49	1 space per unit	49
1-bed	102	1 space per unit	102
2-bed	56	1.5 space per unit	84
3-bed	1	2.0 space per unit	2
Total	208	1.14 spaces per unit	237

10.3 Design Standards for New Apartments, 2018

A revised version of the document "*Sustainable Urban Housing: Design Standards for New Apartments"* was published by the Department of Housing Planning and Local Government in December 2020.

The parking standards set out in this document see to achieve a considerably lower parking ratio for new residential apartments than those prescribed in the Dun Laoghaire-Rathdown County Development Plan 2016-2022.

The guidelines for parking are summarised in the following extracts from that document:

Car Parking

4.18 The quantum of car parking or the requirement for any such provision for apartment developments will vary, having regard to the types of location in cities and towns that may be suitable for apartment development, broadly based on proximity and accessibility criteria.

1) Central and/or Accessible Urban Locations

4.19 In larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances. The policies above would be particularly applicable in highly accessible areas such as in or adjoining city cores or at a confluence of public transport systems such rail and bus stations located in close proximity.

4.20 These locations are most likely to be in cities, especially in or adjacent to (i.e. within 15 minutes walking distance of) city centres or centrally located employment locations. This includes 10 minutes walking distance of DART, commuter rail or Luas stops or within 5 minutes walking distance of high frequency (min 10 minute peak hour frequency) bus services.

2) Intermediate Urban Locations

4.21 In suburban/urban locations served by public transport or close to town centres or employment areas and particularly for housing schemes with more than 45 dwellings per hectare net (18 per acre), planning authorities must consider a reduced overall car parking standard and apply an appropriate maximum car parking standard. 3) Peripheral and/or Less Accessible Urban Locations

4.22 As a benchmark guideline for apartments in relatively peripheral or less accessible urban locations, one car parking space per unit, together with an element of visitor parking, such as one space for every 3-4 apartments, should generally be required.

3) Peripheral and/or Less Accessible Urban Locations

4.22 As a benchmark guideline for apartments in relatively peripheral or less accessible urban locations, one car parking space per unit, together with an element of visitor parking, such as one space for every 3-4 apartments, should generally be required.

4.23 For all types of location, where it is sought to eliminate or reduce car parking provision, it is necessary to ensure, where possible, the provision of an appropriate number of drop off, 25 service, visitor parking spaces and parking for the mobility impaired. Provision is also to be

made for alternative mobility solutions including facilities for car sharing club vehicles and cycle parking and secure storage. It is also a requirement to demonstrate specific measures that enable car parking provision to be reduced or avoided.

4.24 As well as showing that a site is sufficiently well located in relation to employment, amenities and services, it is important that access to a car sharing club or other non-car based modes of transport are available and/or can be provided to meet the needs of residents, whether as part of the proposed development, or otherwise. 'Car free' development is permissible and if developed, must be fully communicated as part of subsequent apartment sales and marketing processes.

4.25 Where any underground car parking is proposed, such facilities must be well lit and adequately ventilated. Where surface parking is provided, it should be clearly accessible to the entrance to, and where appropriate, overlooked by, the units it serves. Car parking may be provided on-street at the edge(s) of a development site in some locations.

4.26 Decked or multi-storey car parking may also be considered but should not be compromise the quality of amenity space, building design or streetscape. At least one principal façade of multi-storey car parks should be fronted by development, for example a south-facing elevation and such structures may also provide an opportunity for rooftop amenity space. In all cases, designated parking spaces for disabled drivers should be provided.

4.27 For building refurbishment schemes on sites of any size or urban infill schemes on sites of up to 0.25ha, car parking provision may be relaxed in part or whole, on a case-by-case basis, subject to overall design quality and location.

The recommendation in the Design Standards that car parking '*be minimised, substantially reduced or wholly eliminated in certain circumstances'* can be applied to the subject site which is located in an *Intermediate Urban Location* within 10 minutes walking distance of Luas.

10.4 Chief Executive's Report on Draft Plan Consultation, 2021

At the time of writing in January 2022, Dun Laoghaire Rathdown County Council were at an advanced stage in the process of reviewing and preparing a new County Development Plan for the period 2022 – 2028. The process of reviewing the 2016-2022 County Development Plan and preparation of the new Plan formally commenced in January 2020.

A Draft Plan was placed on public display for a period of over 13 weeks between January and April 2021. The DLR Chief Executive's Report on the Draft Plan Consultation 2021 noted in Section 4.4.3 *Car Parking*

'The reason for limiting the supply of car parking spaces (i.e. applying maximum car parking standards) is to limit car-borne commuting and thereby limit its unsustainable carbon and congestion impacts. In the current Plan, all non-residential uses have maximum car parking standards. Residential use on the other hand have parking norms. The Section 28 Apartment Guidelines recommend an approach of reducing car parking provision to standards which are lower than the existing County Development Plan, while at the same time seeking car clubs and increased cycle parking in quantitative and qualitative terms. This is a complex area. The Council are working with the NTA and other Dublin authorities to advance this issue'.

The report recommends that these issues be considered further in the preparation of the Draft Plan.

10.5 Draft County Development Plan 2022-2028

Car parking zones and standards are set out in Table 12.6 of the Draft County Development Plan 2022-2028. The subject site is located in Parking Zone 2 within 10-minute walk of not just one but two Luas Stops.

However, in the current draft, the line for apartment and sheltered housing in Table 12.6 is blank.

Notwithstanding, Section 12.4.5.6 advises that

For the purposes of the parking standards set out in Table 12.6 below, Built to Rent developments are considered to be residential apartments. Where a Built to Rent scheme avails of lower car parking based on the nature of the use, a condition should be attached to any grant of permission to state that planning permission shall be sought for a change of tenure to another tenure model following the period specified in the covenant. A lower car parking standard may be acceptable for Shared Living having regard to the assessment criteria for parking provision and location in terms of parking zones as set out above.

10.6 The SHD Experience

In a number of recent decisions, An Bord Pleanala has approved a much-reduced provision of car parking when compared with the maximum standards set out in the various Development Plans.

A summary of the parking provision in similar residential developments approved under the SHD provision is set out in Table 10.

The contents of Table 10 are in broad agreement with the experience of existing BTR schemes where the demand for car parking is approximately 0.3 spaces per unit.

Table 10 Car Parking Ratios – Strategic Housing Development Residential Projects

Ref No	Scheme	Units	Parking	Ratio
300520	Blakes Stillorgan	282 units	143 spaces	0.50
301909	Belgard Gardens, Tallaght	428 units	129 spaces	0.30
303435	Dulux Factory, Davitt Road	265 units	109 spaces	0.41
305176	Stillorgan Leisureplex	232 units	95 spaces	0.41
305345	The Grange, Brewery Road	287 units	100 spaces	0.35
305725	Fourth Avenue, Cookstown	245 units	79 spaces	0.32
306167	Rathoath Road, Pelletstown	435 units	196 spaces	0.45
306506	Gort Muire, Dundrum	730 units	296 spaces	0.40
306705	Gallaher Factory, Greenhills Road	502 units	202 spaces	0.40
306987	Swiss Cottage, Swords Road, Santry	112 units (BTR)	36 spaces	0.30
307011	Omni Park, Swords Road, Santry	324 units	152 spaces	0.47
307092	Palmerstown Retail Park, Palmerstown	250 units (BTR)	125 spaces	0.50

10.7 Former Avid Technology Site

10.7.1 DLRCC 2021 (SHD 310104)

The SHD planning application lodged by Atlas GP Ltd.in April 2021 comprised a build-to-rent residential development with 428 no. Apartments, childcare facility, resident's amenities, and associated siteworks on the Former Avid Technology Site, Carmanhall Road, Sandyford Industrial Estate, Dublin 18 (Reg Ref: SHD 310104).

The application incorporated a single vehicular access from Carmanhall Road with 145 on-site car parking spaces equivalent to 0.34 spaces per unit.

The report on the application submitted by DLR to ABP in June 2021 set out the planning authority's recommendations as to whether the application should be granted or refused.

This report also incorporated an internal report from DLR Transportation Planning dated 10th June 2021.

One of the primary transportation conclusions of both reports related to car parking:

"*Transportation Planning recommends the provision of 1 car parking space per apartment unit. This would equate to 428 spaces for this development. A typical alternative to this requirement would be to provide compensatory club-car parking".*

10.7.2 An Bord Pleanala 2021 (SHD 310104)

The SHD planning application lodged by Atlas GP Ltd.in April 2021 on the former Avid Technology site at Carmanhall Road comprised a build-to-rent residential development with 428 no. Apartments, childcare facility, resident's amenities, and associated siteworks on the Former Avid Technology International Site, Carmanhall Road, Sandyford Industrial Estate, Dublin 18.

The application incorporated a single vehicular access from Carmanhall Road with 145 on-site car parking spaces.

The Inspector's report dated 29th July 2021 assessed the car parking elements of the proposed development as follows:

10.8.7. While the concerns of the Planning Authority are acknowledged, I consider the subject site to be suitable for the accommodation of reduced car-parking standards in accordance with the outlined national policies, while also having regard to Objective TAM1 of the SUFP, which is to require all future development in the Sandyford Business District to achieve a peak hour transport mode split of 45% trips by car drivers (maximum) and 55% trips by walking, cycling and public transport and other sustainable modes (minimum targets). The implementation of a Mobility Management Plan will encourage alternative transport modes and the development will be centrally managed via a management company that will make prospective occupiers clearly aware of the parking management strategy. Furthermore, the development will incorporate dedicated car club spaces which have the potential to replace a significant number of private car journeys. In this context, the reduction in provision can be justified and I consider that proposals are generally acceptable

10.8 Car Parking Proposed – Current Application

Having regard to the location of the subject site within a 10-minute walk of Luas in a high density commercial / business area with on-street parking controls, a car parking provision of 0.35 space per apartment (74 spaces for 208 apartments) is proposed

DRCC have indicated that the planning authority could accept some reduction in Development Plan standards due to proximity to public transport infrastructure but that the proposed number of car parking spaces is an insufficient provision

The Council concerns could be mitigated in part by the provision of compensatory club parking where one GoCar space is deemed to be the equivalent of 15 standard car parking spaces.

10.9 Details of Car Parking

The 74 spaces to be provided within the proposed development will be allocated as shown in Table 11.

Table 11 Allocation of Car Parking

Use	Standard	Spaces
General Residential	0.35 spaces per unit	61 spaces
Electric Charging	10% of total	8 spaces
Disabled	4% of total	3 spaces
Car Club (GoCar)	None	2 spaces
Visitor	None	0 spaces
	Total	74 spaces

10.10 Compliance with Development Plan

The compliance of the proposed development with Section 8.2.4.5 *Car Parking Standards* of the DLR County Development Plan 2016 – 2022 is demonstrated in Table 12 below.

This section of the Development Plan provides for reduced car parking standards for any development (residential and non-residential) on the basis of compliance with the criteria in Table 11.

Table 12 Parking Compliance with Section 8.2.4.5 of DLR County Development Plan n

Criterion	Compliance
The location of the proposed development and specifically its proximity to Town Centres and District Centres and high density commercial/ business areas.	The Sandyford Business District in which the development is to be located is described in the Sandyford Urban Framework Plan primarily as *'an employment area but with complementary mixed-uses including residential, commercial, retail and open space. The Plan-led strategy will ensure that development takes place in a manner that will attract investment and employment and provide for sustainable living'*.
The proximity of the proposed development to public transport	The proposed development is located within 10 minutes walk of two stops on the Luas Green Line and a number of city bus services.
The precise nature and characteristics of the proposed development	The proposed development is a build -to-rent of 544 apartments in 7 blocks.
Appropriate mix of land uses within and surrounding the proposed development.	The surrounding area includes residential, commercial, retail and open space in addition to high capacity public transport.
The availability of on-street parking controls in the immediate area.	Pay and Display car parking under the auspices of Dun Laoghaire Rathdown County Council is operational on the surrounding streets
The implementation of a Travel Plan for the proposed development where a significant modal shift towards sustainable travel modes can be achieved.	The proposed development includes a Travel Plan prepared in accordance with in accordance with Section 8.2.4.3 of Dun Laoghaire Rathdown County Development Plan 2016 – 2022.
Other agreed special circumstances where it can be justified on sustainability grounds	Car parking is being provided at the same rate as other SHD developments.

11. Cycle Parking

11.1 Cycle Parking Required

Standards for residential cycle parking are set out '*Standards for Cycle Parking and associated Cycling Facilities for New Developments*, Dun Laoghaire Rathdown County Council, January 2018.

The cycle parking standards for residential developments are reproduced below.

Table 4.1 Cycle parking for residential development

Residential Development type	1 short stay (visitor) parking space per: (Minimum of 2 spaces)	1 long stay parking space per: (Minimum of 2 spaces)
Apartments, Flats, Sheltered housing	5 units	1 unit
Houses - 2 bed dwelling	5 units	1 unit
Houses - 3+ bed dwelling	5 units	1 unit
Sheltered housing	5 units	1 unit
Student Accommodation	5 bedrooms	2 bedrooms

Calculations for the quantum of cycle parking both short-term (visitor) and long-term (residents) required for the proposed development are set out in Tables 13 and 14.

Table 13 Cycle Parking Required – Short Stay (visitor)

Land Use	Units	Standard	Required
Studio	49	1 per 5 units	10
1 - Bed	102	1 per 5 units	20
2 - Bed	56	1 per 5 units	11
3 - Bed	1	1 per 5 units	1
Total	208		42

Table 14 Cycle Parking - Long Stay (Residents)

Land Use	Units	Standard	Required
Studio	49	1 per unit	49
1 - Bed	102	1 per unit	102
2 - Bed	56	1 per unit	56
3 - Bed	1	1 per unit	1
Total	208		208

11.2 Cycle Parking Provided

Cycle parking is proposed at Lower Ground Level as follows:

Short Stay (Visitor)	42 spaces
Long Stay (Residents)	208 spaces
Total	250 spaces

11.3 Access to Cycle Parking

Access to the cycle parking on the former Tack Packaging site will be from a 1.75 metre wide dedicated access directly off Ravens Rock Road contiguous to the new cycle track to be provided by DLRCC on Carmanhall Road as part of the Sandyford Business District Pedestrian and Cycle Improvement Scheme.

12. Trip Generation and Assignment

12.1 Scenario Assessed

During the preparation of this T & TA, two alternative scenarios were considered as part of the assessment of the traffic impact of this development.

Firstly, to assess the traffic impact of a residential development on the subject site.

Secondly, to assess the subject site in conjunction with the adjoining site as a single development for traffic purposes. For reasons of this latter option was selected and the developments on the two sites assessed as a single development on a single site.

Accordingly, the development assessed in terms of traffic impact comprised

- A total of 544 residential units.
- A total of 192 car parking spaces.
- Entrances from Ravens Rock Road and from Carmanhall Roads.
- Exits onto Carmanhall Road and onto Blackthorn Road.
- Internal road layout connecting both developments.

12.2 Modal Split

The target modal split for the combined development reproduced from the Travel Plans for the two individual developments is presented in Table 15 for 2026 and 2031. A total of 151 persons are predicted to drive to work in 2026 reducing to 148 persons in 2031 compared to 587 persons travelling by public transport in 2026 increasing to 591 persons in 2031.

Table 15 Predicted Modal Split for the Combined Developments

	2026		2031	
	Modal Split	Persons	Modal Split	Persons
Walk	20.0%	245	21.0%	257
Cycle	6.0%	73	7.0%	86
Bus	20.0%	245	19.3%	236
Luas	28.0%	342	29.0%	355
Motorcycle	0.3%	4	0.3%	4
Car Driver	12.3%	151	10.0%	122
Car Passenger	3.0%	37	3.0%	37
Go Car (Car Share)	0.4%	5	0.4%	5
Work at Home	10.0%	122	10.0%	122
Total	100.0%	1,224	100.0%	1,224

12.3 Trip Generation

The assumed trip generation for the proposed development is presented in Table 16. The trip rates are based on the TRICS database adjusted for projected modal split, reduced provision of car parking and high availability of public transport services.

Table 16 Trip Generation

Time	Size	Trip Rate per Unit		Trips	
		Arrivals	Departures	Arrivals	Departures
AM Peak	544 units	0.057	0.182	31	99
PM Peak		0.140	0.068	76	37

The totals of arrivals and departures is predicted to be 130 vehicles per hour in the AM Peak and 113 vehicles per hour in the PM Peak.

12.4 Trip Assignment

The assumed trip distribution and assignment for the proposed development for this development is set out below and illustrated in Figure 38.

Arrivals

Carmanhall Road Entrance: 61%

51% from Blackthorn Road and 10% from Carmanhall Road (west).

Ravens Rock Road Entrance: 39%

32% from Carmanhall Road and 6% from Three Rock Road.

Departures

Carmanhall Road Entrance: 38%

28% to Blackthorn Road and 10% to Carmanhall Road (west).

Blackthorn Road Entrance: 62%

62% to Blackthorn Road (north).

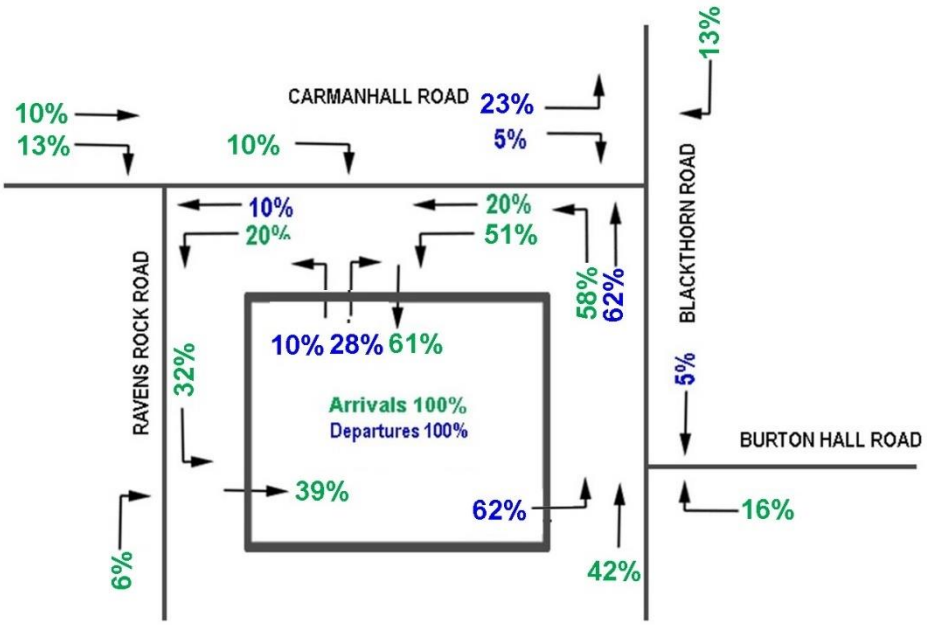


Figure 37 Trip Distribution and Assignment

12.5 Development Generated Trips

The development generated trips from Table 16 for the AM Peak Hour allocated to the surrounding road network in accordance with the trip distribution for arrivals and departures illustrated in Figure 38 are presented in Figure 38.

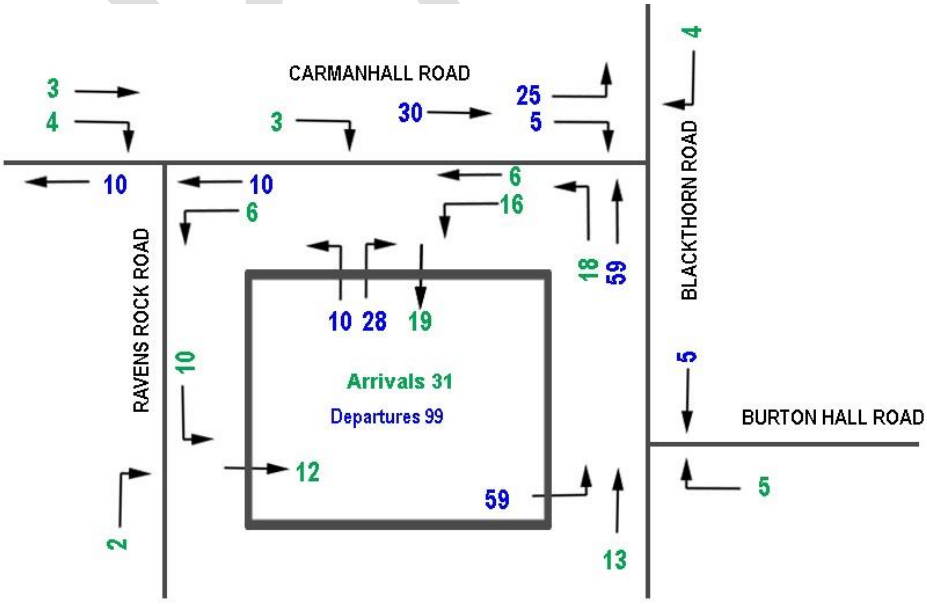


Figure 38 Development Generated Trips – AM Peak Hour

12.6 Junction Flows Post Development excluding ESB Link Road

The junction movements post development excluding the traffic diversion impact of the ESB Link Road are presented in Figures 39 – 41 for the Opening Year 2026, Design Year 2031 and Future Year 2041.

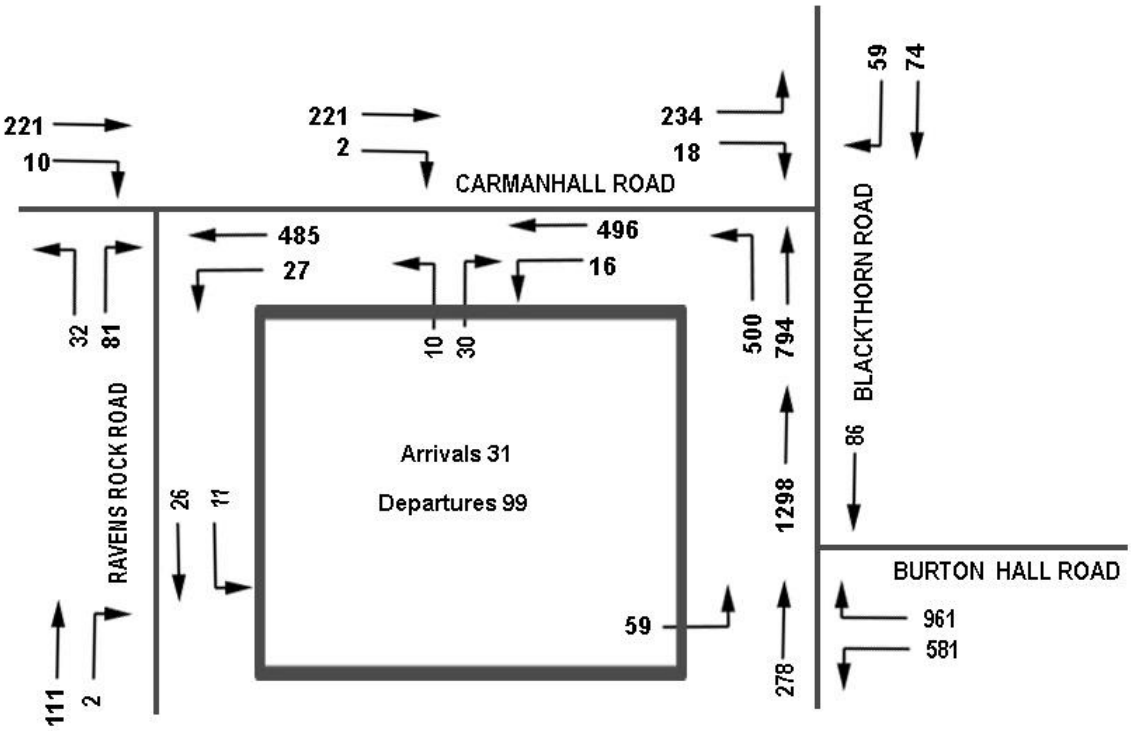


Figure 39 Junction Flows Post Development 2026 excluding ESB Link Road

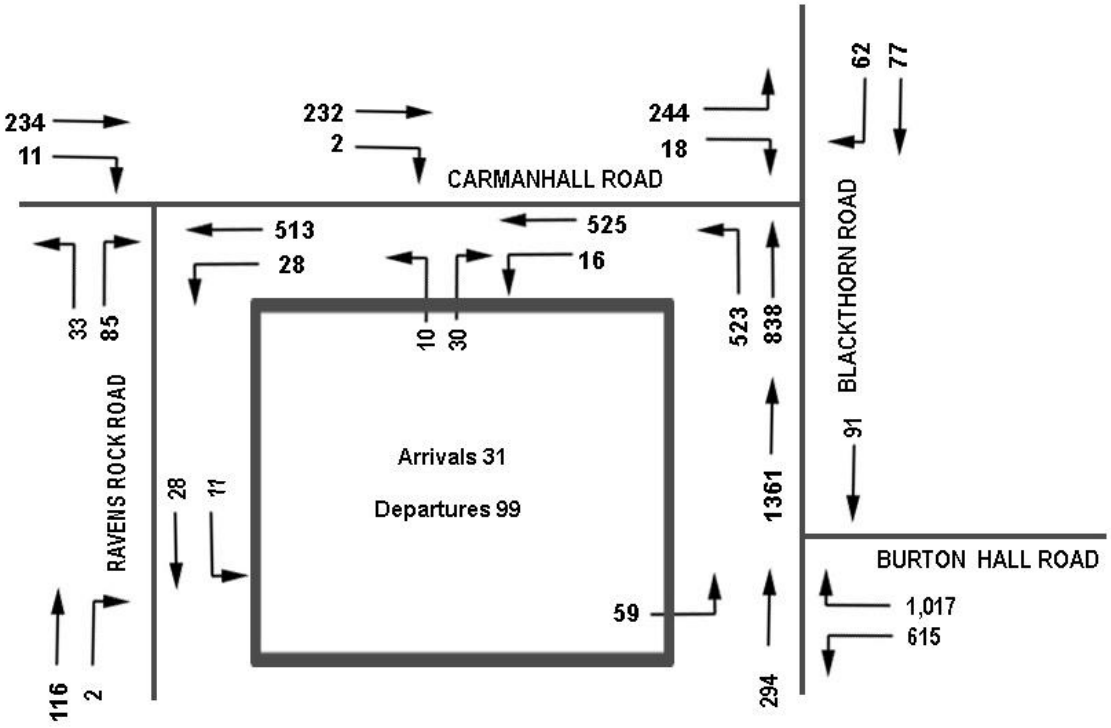


Figure 40 Junction Flows Post Development 2031 excluding ESB Link Road

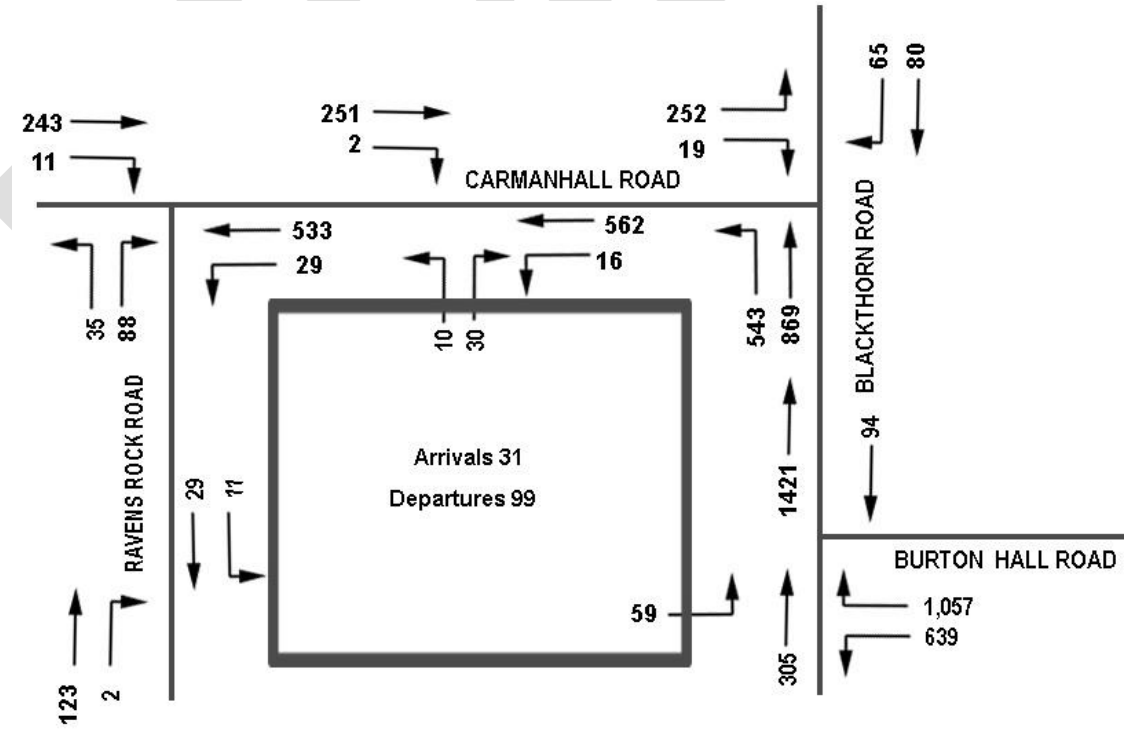


Figure 41 Junction Flows Post Development 2041 excluding ESB Link Road

13. Junction Assessment

13.1 Junctions Assessed

The junctions assessed for traffic movements post development in the Opening Year 2026, Design Year 2031 and Future Year 2041 were:

- Junction 1: Ravens Rock Road / Carmanhall Road
- Junction 2: Carmanhall Road / Blackthorn Road
- Junction 3: Blackthorn Road / Burton Hall Road
- Junction 4: Site Access – Ravens Rock Road
- Junction 5: Site Access – Carmanhall Road
- Junction 6: Site Access – Blackthorn Road

13.2 Junction Layouts

The layouts for the six junctions assessed are presented in Figures 42 - 47 below.

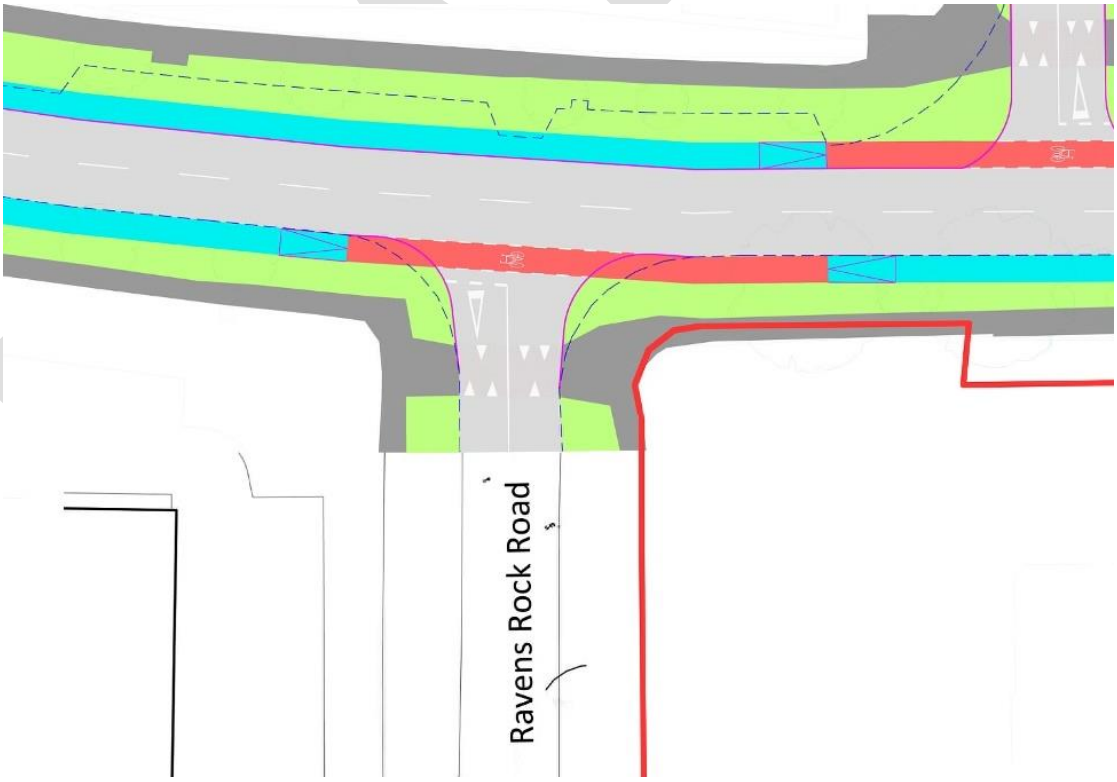


Figure 42 Junction 1: Ravens Rock Road / Carmanhall Road

(Priority junction with traffic lane width of 3.25 m)

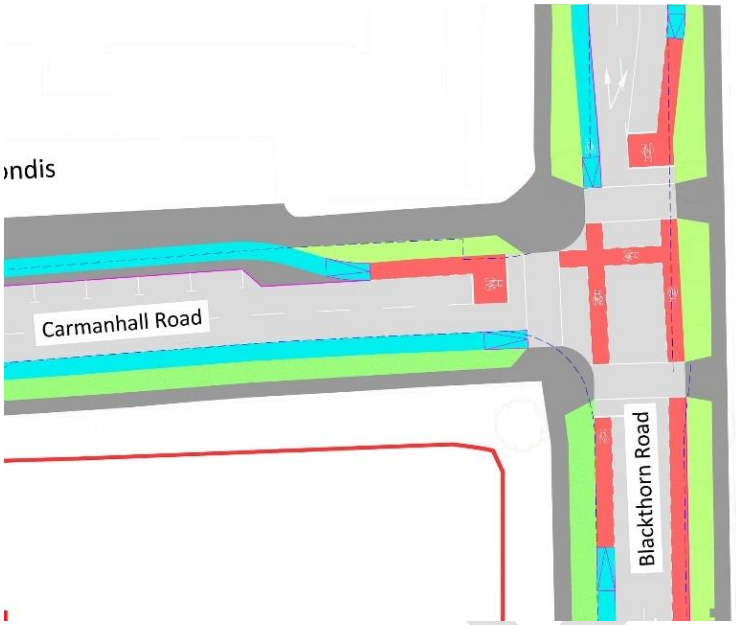


Figure 43 Junction 2: Carmanhall Road / Blackthorn Road

(Signalised junction with traffic lane width of 3.25 m)

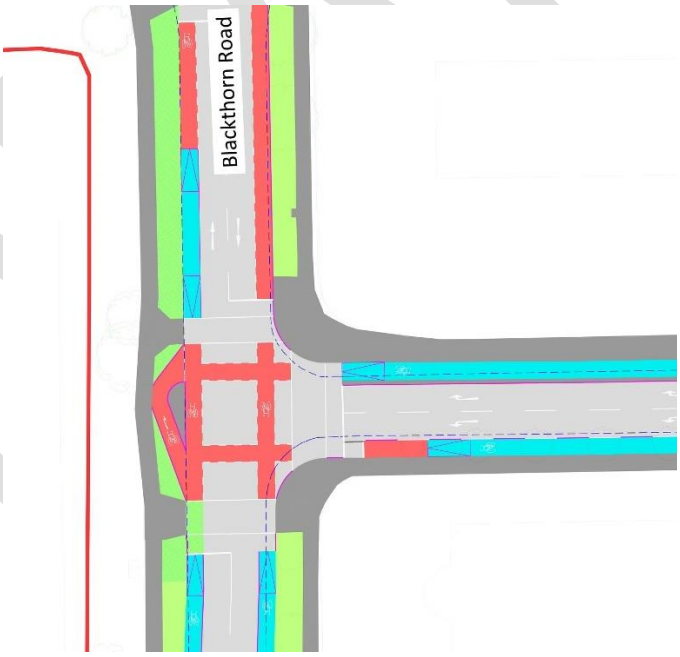


Figure 44 Junction Blackthorn Road / Burton Hall Road

(Signalised Junction with traffic lane width of 3.25 m)

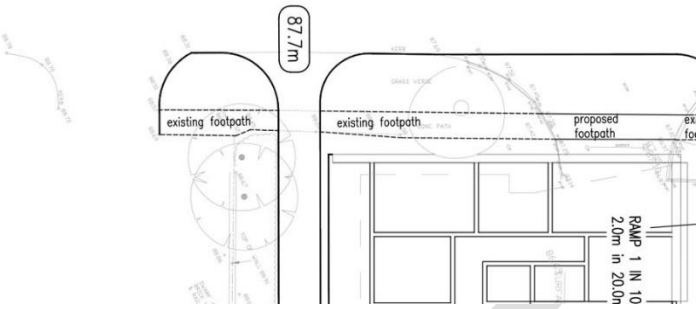


Figure 45 Junction 4: Site Access - Ravens Rock Road

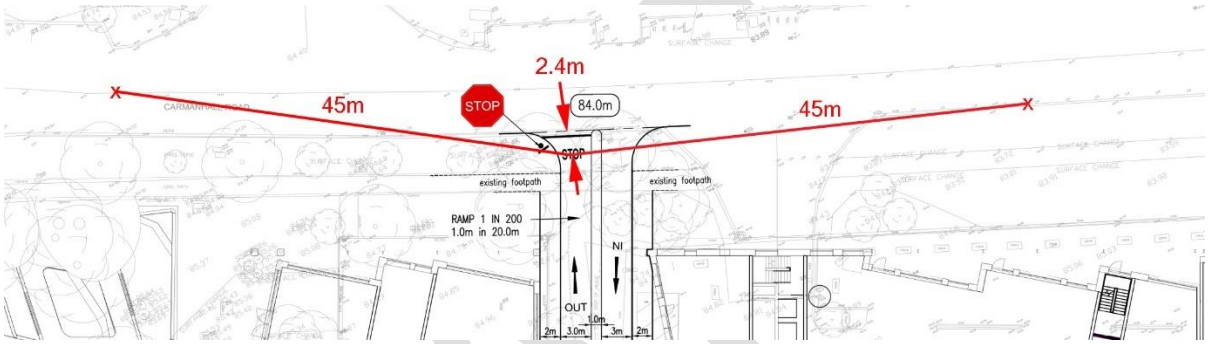


Figure 46 Junction 5: Site Access – Carmanhall Road

(Traffic lane widths 3.0m internal and 3.25m external)

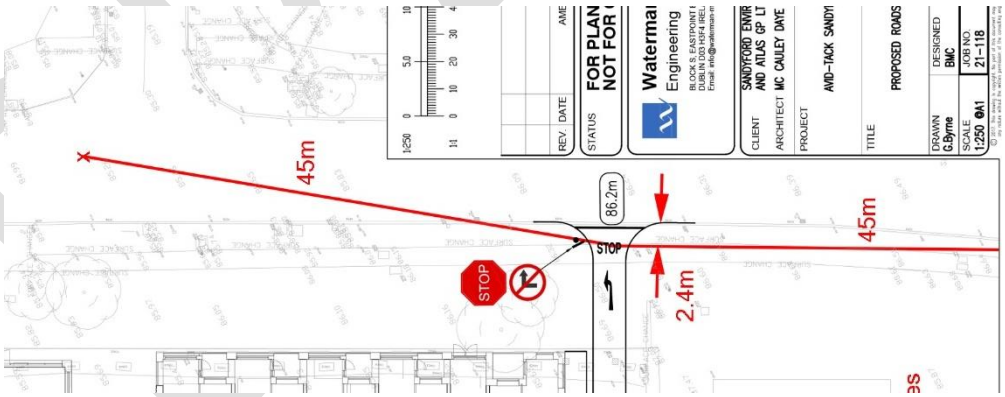


Figure 47 Junction 6: Site Access – Blackthorn Road

(Traffic lane widths 3.0m internal and 3.25m external)

13.3 Junction Movements

The junction movements for the junctions in the Opening Year 2026, Design Year 2031 and Future Year 2041 are presented in Figures 48 – 50 below.

These movements were obtained by adding the development generated flows from Figure 38 to the base flows from Figures 34 – 36.

Figures 34- 36 and 48 – 50 include the traffic diversion impact of the ESB Link Road

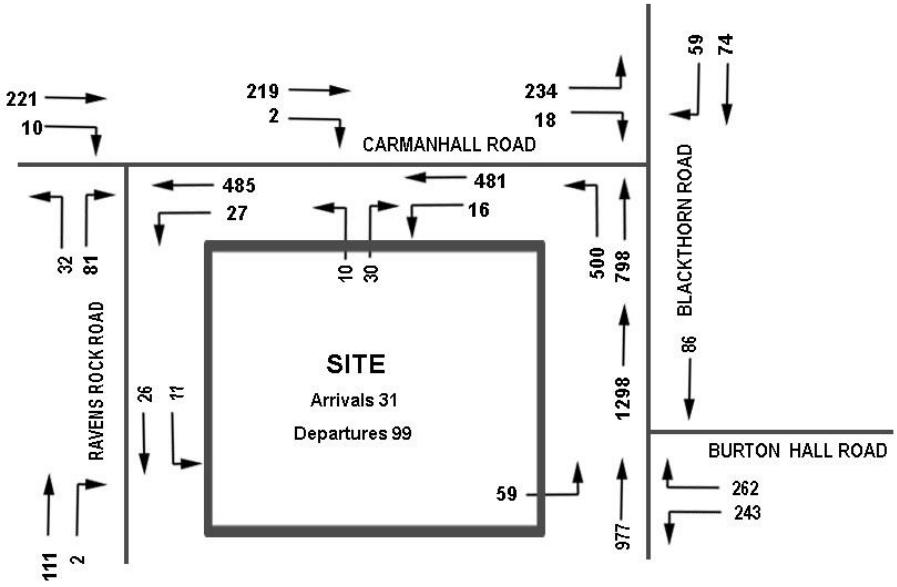


Figure 48 Traffic Flows Post Development - AM Peak - Opening Year 2026

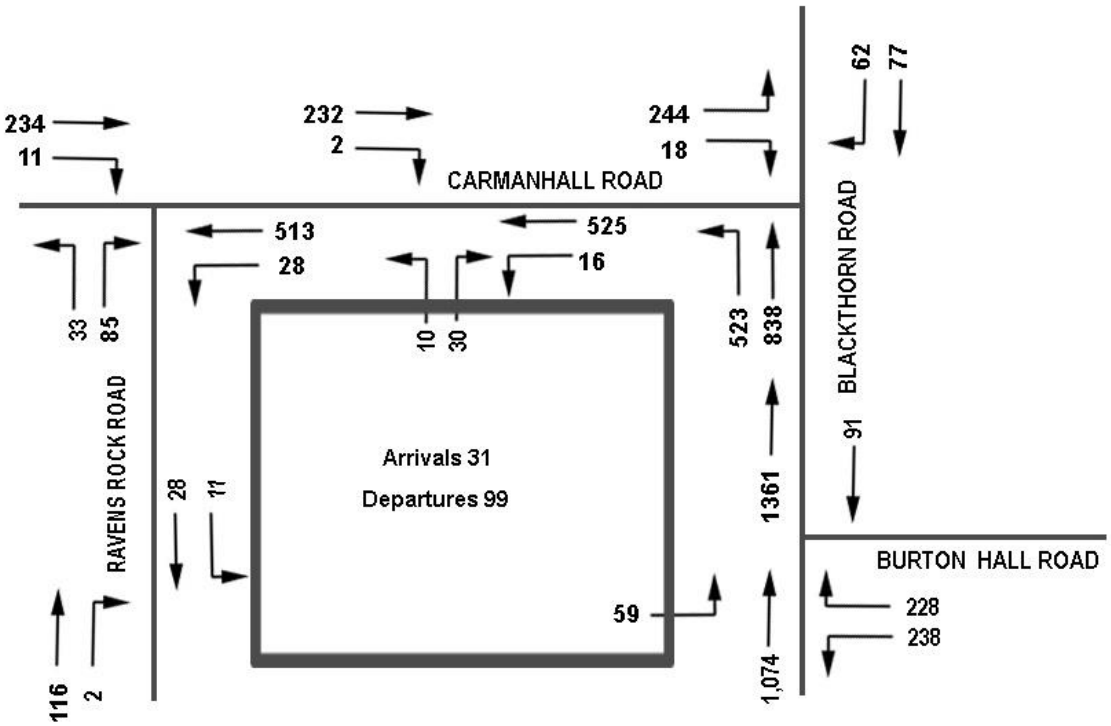


Figure 49 Traffic Flows Post Development - AM Peak – Design Year 2031

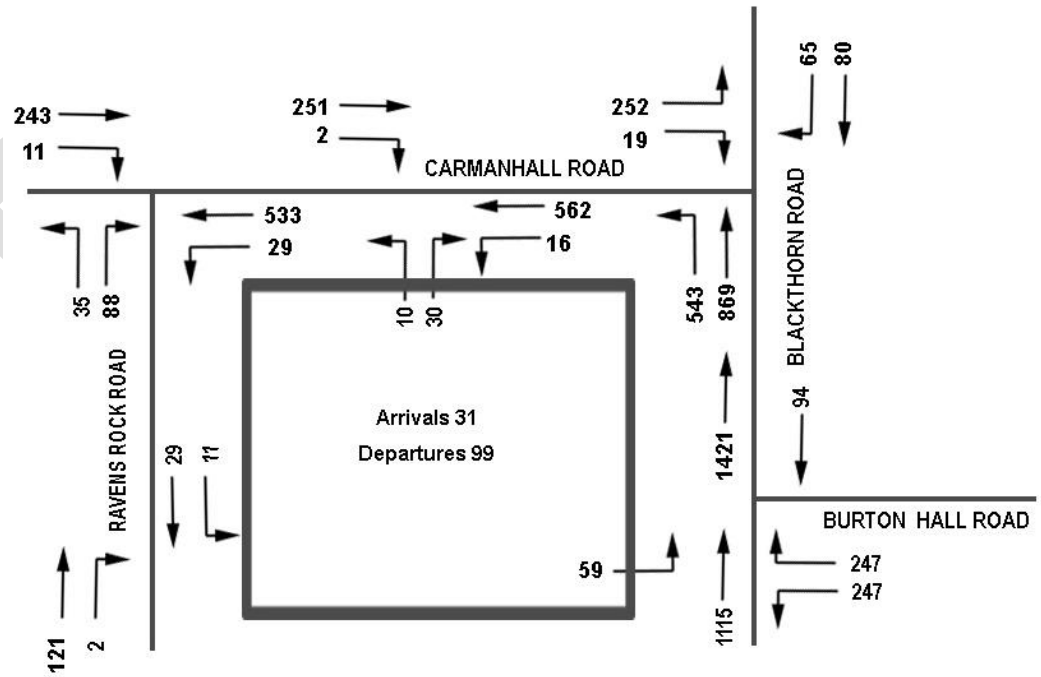


Figure 50 Traffic Flows Post Development - AM Peak – Future Year 2041

13.4 Junction Assessment – Priority Junctions

13.4.1 Priority Junctions

The operation of the priority junctions was modelled using the computer program PICADY.

The input comprised the junction layout for Junctions 1, 4, 5, and 6 from Figures 42 and 45 - 47 together with the traffic movements from Figures 48 - 50.

PICADY (Priority Intersection CApacity and DelaY) is a software package for predicting capacities, queue lengths and delays (both queueing and geometric) at non-signalised major/minor priority junctions. It models three and four-arm unsignalised give-way intersections using well-established capacity relationships which take into account key geometries such as road widths, visibility, the space available for traffic making an offside turn, and so on.

The output report from a PICADY model includes a number of results to evaluate an assessed junction, such as Ratio of Flow to Capacity (RFC), Queue and Delay for each lane approaching the junction.

13.4.2 Signalised Junctions

The operation of signalised junction assessed using the computer program TRANSYT.

The input comprised the junction layout for Junctions 2 and 3 from Figures 43 and 44 together with the traffic movements from Figures 48 - 50.

The output report of a TRANSYT model includes a number of results to evaluate an assessed junction, such as Degree of Saturation percentage (DOS%) figure, Mean Maximum Queue (MMQ) and Mean Delay per Vehicle for each lane approaching the junction.

Degree of Saturation (DOS):

DOS is a measure of performance which represents the capacity of a junction/traffic lane/link to accommodate the vehicular demand and indicates how near the network is to the maximum capacity available. A DOS less than 85% generally indicates that adequate capacity is available, and vehicles are not expected to experience significant queues and delays. As the DOS approaches 100%, traffic flow may become unstable, and delay and queuing conditions may occur.

Mean Maximum Queue (MMQ):

MMQ is the highest estimated mean number of Passenger Car Units (pcu) queued in any lane of a junction approach link, averaged over the entire analysis period.

Mean Delay per Vehicle (seconds):

Mean Delay per vehicle is the average delay experienced by a vehicle on a junction traffic stream as a result of having to queue at signals.12.4.2 Signalised Junction at Junction Blackthorn Road and Carmanhall Road.

13.5 Results of Junction Assessment

13.5.1 Priority Junction 1 (Junction Carmanhall Road and Ravens Rock Road)

Junction 1 is an existing priority junction between Ravens Rock Road and Carmanhall Road. The junction has been modelling in its current configuration using PICADY. The arms of the junction were labelled as follows:

- Arm A: Carmanhall Road (West)
- Arm B: Raven Rock Road
- Arm C: Carmanhall Road (East)

The results of the assessment are presented in Table 17. From this table, it will be seen that, post development, the junction will remain under capacity from the Opening Year of 2026 through to the Future Year of 2041 with the development in place. The maximum RFC predicted in 2041 some 19 years ahead was 0.27 with a corresponding maximum queue of 14 vehicles.

Table 17 Junction 1 - PICADY Results

Junction 1 – Ravens Rock Road / Carmanhall Road			
Stream	**Queue (PCU)**	**Delay (s)**	**RFC**
	Baseline 2022		
Stream B-C	0.1	7.76	0.07
Stream B-A	0.3	11.49	0.21
Stream C-AB	0.0	5.37	0.01
	Baseline 2026		
Stream B-C	0.1	7.97	0.07
Stream B-A	0.3	12.04	0.23
Stream C-AB	0.0	5.37	0.01
	Baseline 2031		
Stream B-C	0.1	8.19	0.08
Stream B-A	0.3	12.68	0.25
Stream C-AB	0.0	5.36	0.01
	Baseline 2041		
Stream B-C	0.1	8.39	0.08
Stream B-A	0.4	13.18	0.26
Stream C-AB	0.0	5.36	0.02
	Baseline 2026 with Development		
Stream B-C	0.1	8.04	0.07

Stream B-A	0.3	12.28	0.23
Stream C-AB	0.0	5.42	0.02
	Baseline 2031 with Development		
Stream B-C	0.1	7.87	0.07
Stream B-A	0.3	11.81	0.22
Stream C-AB	0.0	5.38	0.02
	Baseline 2041 with Development		
Stream B-C	**0.1**	**8.46**	**0.08**
Stream B-A	**0.4**	**13.47**	**0.27**
Stream C-AB	**0.0**	**5.42**	**0.03**

13.5.2 Signalised Junction 2 (Junction Carmanhall Road / Blackthorn Road)

Junction 2 is an existing priority junction between Carmanhall Road and Blackthorn Road.

As part of the Sandyford Business District Pedestrian and Cycle Priority Scheme being developed by DLRCC for 2023, it is proposed that this junction would be upgraded to a signalised junction.

Priority Option

In this T&TA, the junction was first modelled in its current priority configuration using PICADY. The arms of the junction were labelled out as follows:

- Arm A: Blackthorn Road (South)
- Arm B: Carmanhall Road
- Arm C: Blackthorn Road (North)

The results of the assessment are presented in Table 18. From this table, it will be seen that, post development under priority control, the junction will remain under capacity from the Opening Year of 2026 through to the Future Year of 2041 with the development in place. The maximum RFC predicted in 2041 some 19 years ahead was 0.56 with a corresponding maximum queue of 19 vehicles.

Table 18 Junction 2 - PICADY Results

Junction 2 – Carmanhall Road/Blackthorn Road			
Stream	**Queue (PCU)**	**Delay (s)**	**RFC**
	Baseline 2022		
Stream B-C	0.7	12.62	0.42
Stream B-A	0.1	15.63	0.05
Stream C-AB	0.3	11.17	0.18
	Baseline 2026		
Stream B-C	1.0	15.57	0.49
Stream B-A	0.1	18.82	0.07
Stream C-AB	0.3	12.54	0.21
	Baseline 2031		
Stream B-C	0.7	12.62	0.42
Stream B-A	0.1	15.63	0.05
Stream C-AB	0.3	11.17	0.18
	Baseline 2041		
Stream B-C	1.3	19.10	0.56
Stream B-A	0.1	22.39	0.08
Stream C-AB	0.4	13.91	0.25

Signalised Option

The junction was also assessed using the layout proposed in the Sandyford Business District Pedestrian and Cycle Improvement Scheme.

As part of the proposed the Sandyford Business District Pedestrian and Cycle Improvement Scheme, the priority junction between Carmanhall Road and Blackthorn Road is proposed to be upgraded to a signalised T-junction. Accordingly, the junction was modelled as a signalised T-junction using TRANSYT software and the layout proposed in the Scheme. The signalised junction was labelled as follows:

- Arm A: Blackthorn Road (South)
- Arm B: Carmanhall Road
- Arm C: Blackthorn Road (North)

The results of the modelling which are presented in Table 19 show that the junction will remain within capacity with a maximum DOS of 96% in 2041.

It is understood at the time of writing in February 2022, that the detailed design of the signalisation of this junction is being undertaken by the project engineers for the Sandyford Business District Pedestrian and Cycle Improvement Scheme.

Table 19 Junction 2 - TRANSYT Results

Junction 2 – Carmanhall Road/Blackthorn Road			
2026 and Development			
Arm	Direction	DOS %	Queue (Vehicles)
A	S/L	90	40.78
B	R/L	79	10.09
C	S	6	0.80
	R	53	2.36
2031 and Development			
Arm	Direction	DOS %	Queue (Vehicles)
A	S/L	88	37.89
B	R/L	79	9.77
C	S	5	0.74
	R	51	2.24
2041 and Development			
Arm	Direction	DOS %	Queue (Vehicles)
A	S/L	96	55.54
B	R/L	89	12.48
C	S	6	0.85
	R	59	2.67

13.5.3 Signalised Junction 3 (Junction Blackthorn Road / Burton Hall Road)

Junction 3 is an existing signalised T-junction between Blackthorn Road and Burton Hall Road. This junction was modelled using TRANSYT with the arms labelled as follows.

- Arm A: Blackthorn Road (North)
- Arm B: Burton Hall Road
- Arm C: Blackthorn Road (South)

The results of the assessment are presented in Table 20. From this table, it will be seen that, post development, the junction will remain under capacity from the Opening Year of 2026 through to the Future Year of 2041 with the development. The maximum DOS predicted was 86% in 2026, xx% in 2031 and 94% in 2041.

Table 20 Junction 3 - TRANSYT Results

Junction 3 – Blackthorn Road / Burton Hall Road			
Baseline 2022			
Arm	Direction	DOS %	Queue (Vehicles)
A	S	64	3.03
B	L	48	9.55
	R	79	9.35
C	S	79	23.08
Baseline 2026			
Arm	Direction	DOS %	Queue (Vehicles)
A	S	68	3.29
B	L	68	8.11
	R	84	27.32
C	S	71	8.79
Baseline 2041			
Arm	Direction	DOS %	Queue (Vehicles)
A	S	74	3.85
B	L	82	9.64
	R	94	38.84
C	S	81	9.29
2026 and Development			
Arm	Direction	DOS %	Queue (Vehicles)
A	S	72	3.63
B	L	68	8.11
	R	86	28.52
C	S	73	9.09
	2031 and Development		
Arm	Direction	DOS %	Queue (Vehicles)
A	S		
B	L		
	R		
C	S		

2041 and Development			
Arm	Direction	DOS %	Queue (Vehicles)
A	S	78	4.31
B	L	87	10.43
	R	94	39.36
C	S	87	10.43

13.5.4 Priority Junction 4 (Site Access – Ravens Rock Road)

Junction 4 is the proposed site access point on Ravens Rock Road. This is proposed to be a one-way access point into the proposed development and the configuration is based on the proposed layout of the junction. The layout was labelled as follows:

- Arm A: Raven's Rock Road (North)
- Arm B: Site Access Road
- Arm C: Raven's Rock Road (South)

The results of this assessment are presented in Table 21. From this table, it will be seen that, post development, the junction will remain under capacity from the Opening Year of 2026 through to the Future Year of 2041 with the development.

Table 21 Junction 4 - PICADY Results

Junction 4 – Raven's Rock Road Site Access			
Stream	**Queue (PCU)**	**Delay (s)**	**RFC**
	2026 and Development		
Stream B-AC	0.0	0.00	0.00
Stream C-AB	0.0	5.64	0.00
	2031 and Development		
Stream B-AC	0.0	0.00	0.00
Stream C-AB	0.0	5.26	0.00
	2041 and Development		
Stream B-AC	0.0	0.00	0.00
Stream C-AB	0.0	5.21	0.00

13.5.5 Priority Junction 5 (Site Access Carmanhall Road)

Junction 4 is the proposed site access point on Carmanhall Road and the configuration is based on the proposed layout of the junction. The layout was labelled as follows:

- Arm A: Carmanhall Road (East)
- Arm B: Site Access Road
- Arm C: Carmanhall Road (West)

The results of this assessment are presented in Table 22. From this table, it will be seen that this junction will remain within capacity from 2026 through to 2041 with the development in place. The max RFC is predicted to be 0.13 with a corresponding queue of 0.1 vehicles.

Table 22 Junction 5 - PICADY Results

Junction 5 – Carmanhall Site Access Road			
Stream	**Queue (PCU)**	**Delay (s)**	**RFC**
	2026 and Development		
Stream B-AC	0.1	11.33	0.12
Stream C-AB	0.0	5.40	0.00
	2031 and Development		
Stream B-AC	0.1	11.31	0.12
Stream C-AB	0.0	5.42	0.00
	2041 and Development		
Stream B-AC	0.1	12.27	0.13
Stream C-AB	0.0	5.37	0.01

13.5.6 Priority Junction 6 (Site Access – Blackthorn Road)

Junction 4 is the proposed site access point on Blackthorn Road. This is a proposed site access, and the configuration is based on the proposed layout of the junction. The layout was labelled as follows:

- Arm A: Blackthorn Road (South)
- Arm B: Site Access Road
- Arm C: Blackthorn Road (North)

The results of this assessment are presented in Table 23. From this table, it will be seen that the junction will remain under capacity in 2026 through to 2041 with the development in place. The max with an RFC predicted is 0.18 with a corresponding queue of 0.2 vehicles.

Table 23 Junction 6 - PICADY Results

Junction 6 – Blackthorn Road – Site Access			
Stream	**Queue (PCU)**	**Delay (s)**	**RFC**
	2026 and development		
Stream B-AC	0.2	11.04	0.17
Stream C-AB	0.0	0.00	0.00
	2031 and development		
Stream B-AC	0.2	11.19	0.17
Stream C-AB	0.0	0.00	0.00
	2041 and development		
Stream B-AC	0.2	12.22	0.18
Stream C-AB	0.0	0.00	0.00

14. Traffic Impact

14.1 Road Junctions

The results of the assessment in Section 13 confirm that the three junctions on the surrounding road network will remain within capacity post development in the Opening Year 2026 through the Design Year in 2031 to the Future Year 2041.

The three junctions are

- Junction 1: Ravens Rock Road / Carmanhall Road
- Junction 2: Carmanhall Road / Blackthorn Road
- Junction 3: Blackthorn Road / Burton Hall Road

It is understood that Junction 2 at Carmanhall Road / Blackthorn Road is to be signalised as part of the Sandyford Business District Pedestrian and Cycle Improvement Scheme.

It is understood at the time of writing in February 2022 that the detailed design of the signalisation of this junction is being undertaken by the project engineers for the Sandyford Business District Pedestrian and Cycle Improvement Scheme.

This junction was demonstrated to work satisfactorily under priority control or signal control up to and including 2041 with the development in place.

14.2 Public Transport – Luas

Following completion of the Green Line Capacity Enhancement Scheme in 2019, the passenger capacity on the Green Line comfortably exceeds passenger demand in the AM and PM Peak

Following completion of the Green Line Capacity Enhancement Scheme in 2019, the current capacity of the Green Line during the AM Peak is 6,300 passengers per hour in both directions compared to a peak loading of 4,648 passengers per hour inbound between Milltown and Cowper.

Based on a modal split of 28%, the peak demand from the proposed development is 342 passengers per hour equivalent to 2.7 % of the Green Line Capacity of 12,600 passengers per hour.

14.3 Public Transport - Bus Services

The projected demand for bus services during the AM Peak generated by the proposed development is some 245 persons in the Opening Year 2026 decreasing to 236 persons six years later in 2031. Of these, 50% can be expected to travel during the AM Peak Hour 08.00 – 09.00

This demand of 111 – 109 passengers per hour is well within the capacity of the existing bus services being 6% of the capacity of 1,840 persons per hour provided on the bus services in the surrounding area.

The capacity of 1,840 persons after the implementation of the Bus Connects service improvements is based on

(a) 10 x double deck buses per hour in each direction x 80 passengers per bus (1,600 passengers)

(b) 3 coaches per hour in each direction x 40 passengers per coach (240 passengers).

14.4 Public Transport

The overall impact of the proposed development on the public transport services in the surrounding area is an increase of 2.7% on Luas services and 6% on bus services. These increases are well within the capacity of both services.

15. Summary

Introduction

This Traffic and Transport Assessment (T&TA) has been prepared by Waterman Moylan on behalf of Sandyford Environmental Construction Ltd to accompany a planning application to An Bord Pleanala (ABP) for a residential development on a brownfield site at the junction of Carmanhall Road and Ravens Rock Road, Sandyford, Dublin 18.

Description of Site

The subject site is located at Sandyford in south County Dublin. The site which has an area of 0.56ha (1.4 acre) is located at the junction of Carmanhall Road and Ravens Rock Road, Sandyford, Dublin 18. The existing vehicular access to the site is from Ravens Rock Road.

The site was formerly occupied by Tack Packaging but at the time of writing in February 2022, it was unoccupied save for a number of empty buildings.

The adjoining site to the east at the junction of Carmanhall Road and Blackthorn Road was formerly occupied by Avid Technology. It extends to 0.81 ha ((2.0 acre).

Proposed Development

The proposed development will comprise some 208 Build-to-Rent residential units. See Figure 3.

Car parking with a total of 74 car spaces will be provided at Lower Ground Level and Basement. Cycle parking with 250 spaces will be provided at Lower Ground Level. Access is proposed from Ravens Rock Road with egress onto Carmanhall Road.

The public realm around the site will incorporate an upgrade of the pedestrian and cycle environment including integration with the Sandyford Business District Pedestrian and Cycle Improvement Scheme.

The development includes all associated infrastructure to service the development including access junctions, footpaths and cycle paths together with a network of watermains, foul water drains and surface water drains.

Contiguous Development

A concurrent development with a separate Traffic & Transport Assessment on the former Avid Technology site to the east will comprise 336 Build-to-Rent residential units and 118 car parking spaces at Lower Ground Level and Basement. Access is proposed from Carmanhall Road and egress onto Blackthorn Road.

The traffic impact from this contiguous development has been incorporated into this T&TA.

Development Assessed

During the preparation of the T & TA for this development, two alternative scenarios were considered as part of the assessment of the traffic impact of this development. Firstly, to assess the traffic impact of a residential development on the subject site. Secondly, to assess the subject site in conjunction with the adjoining site as a single development for traffic purposes. For reasons of this latter option was selected and the developments on the two sites assessed as a single development on a single site.

Program

At the time of writing in February 2022, it is likely that construction of the proposed development could commence in 2023 for completion in 2026.

Projections are included for Design Year 2031 (Opening Year + 5) and Future Year 041 (Opening Year + 15).

Future Road and Cycle Schemes

During the preparation of this T & TA, consultations were held with the project engineers for two schemes. The two schemes which are being developed by Dun Laoghaire Rathdown County Council are: -

(a) ESB Link Road – Junction 14 Roundabout to Blackthorn Road.

(b) Sandyford Business District Pedestrian and Cycle Improvement Scheme.

Both schemes and their impact on the road network in the area of the subject site are described in this T & TA.

It is understood at the time of writing in February 2022, that both schemes are progressing to the tender stage for completion in 2023.

DLR County Development Plan 2016 – 2022

The requirements of the DLR County Development Plan in relation to Sustainable Travel and Transportation including roads, car parking, cycling and walking are identified in this report and their application in relation to the proposed development clarified.

Likewise, the requirements of the Sandyford Urban Framework Plan in relation to Sustainable Infrastructure Policies and Objectives.

Car Parking

The proposed provision of car parking will be 74 spaces calculated at the rate of 0.35 space per unit per unit for 208 units.

The provision of 74 spaces will include 3 spaces for disabled drivers (4%), 8 spaces with charging facilities for electric vehicles (10%) and 2 spaces for car sharing (GoCar).

Compliance is also demonstrated with development with Section 8.2.4.5 *Car Parking Standards* of the DLR County Development Plan 2016 – 2022 which provides for reduced car parking standards for any development (residential and non-residential) complying with certain criteria.

Public Transport - Luas

The proposed development will be located adjacent to the Luas Green Line. The nearest Luas stops are Stillorgan and Sandyford both located on Blackthorn Avenue less than 0.5km to the north of the proposed development. Both stops are within 6 minutes walking distance.

Following completion of the Green Line Capacity Enhancement Scheme in 2019, the current capacity of the Green Line during the AM Peak is 6,300 passengers per hour in both directions compared to a peak loading of 4,648 passengers per hour inbound between Milltown and Cowper.

Based on a modal split of 28%, the peak demand from the proposed development is 342 passengers per hour equivalent to 2.7 % of the Green Line Capacity of 12,600 passengers per hour.

Public Transport - Bus

The combined development will be well served by stage bus services operated by a number of companies in the surrounding area. Bus stops are located on Burton Hall Road, Blackthorn Road, and Blackthorn Avenue less than 6 minutes' walk from the proposed development.

The projected demand for bus services during the AM Peak is some 110 passengers per hour. This demand is well within the capacity of the existing bus services being 6% of the capacity of 1,840 persons per hour provided on the bus services in the surrounding area.

Traffic Impact

During the preparation of this T & TA, two alternative scenarios were considered as part of the assessment of the traffic impact of this development.

Firstly, to assess the traffic impact of a residential development on the subject site.

Secondly, to assess the subject site in conjunction with the adjoining site as a single development for traffic purposes. For reasons of this latter option was selected and the developments on the two sites assessed as a single development on a single site.

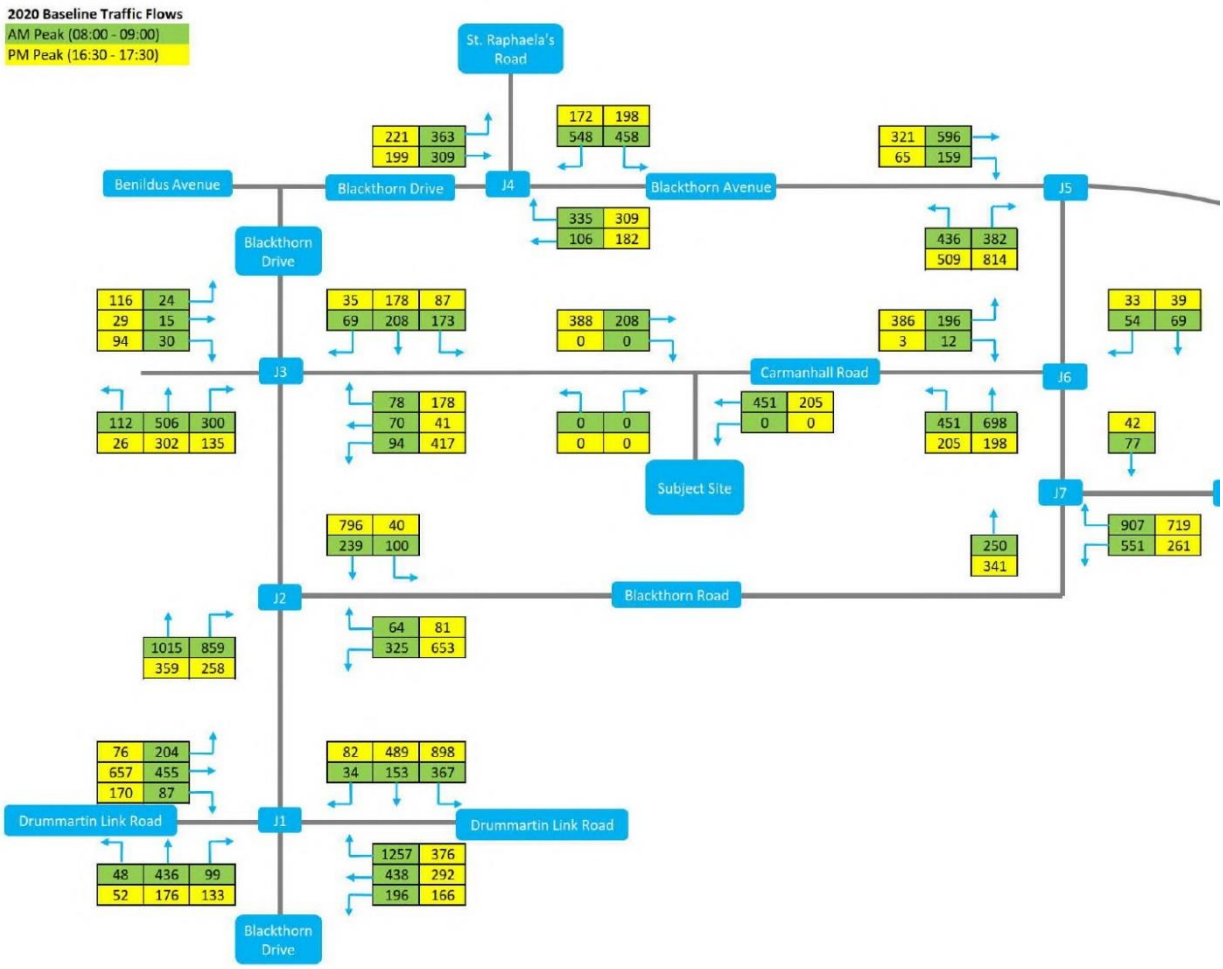
The results of the assessment confirmed that the junctions on the surrounding road network would remain within in capacity post development in in the Opening Year 2026 through the Design Year in 2031 to the Future Year 2041.

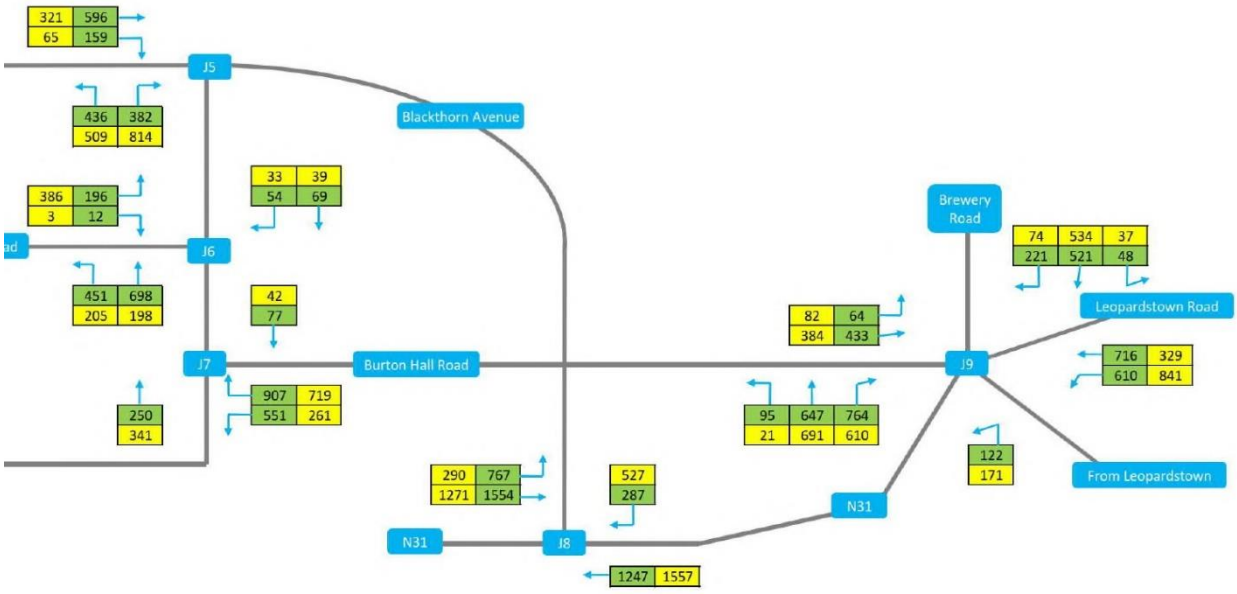
Summary

This T & TA demonstrates that the proposed development will be consistent with the objectives for Sustainable Travel and Transport set out in the DLR County Development Plan and the Sandyford Urban Framework Plan.

APPENDICES

A. Traffic Survey 2020


2020 Baseline Traffic Flows
AM Peak (08:00 - 09:00)
PM Peak (16:30 - 17:30)
St. Raphaela's Road
Benildus Avenue
Blackthorn Drive
J4
Blackthorn Avenue
J5
Blackthorn Drive
J3
Carmanhall Road
J6
Subject Site
J7
J2
Blackthorn Road
Drummartin Link Road
J1
Drummartin Link Road
Blackthorn Drive
221 363
199 309
172 198
548 458
321 596
65 159
335 309
106 182
436 382
509 814
116 24
29 15
94 30
35 178 87
69 208 173
388 208
0 0
386 196
3 12
33 39
54 69
112 506 300
26 302 135
78 178
70 41
94 417
0 0
0 0
451 205
0 0
451 698
205 198
42
77
796 40
239 100
907 719
551 261
250
341
64 81
325 653
1015 859
359 258
76 204
657 455
170 87
82 489 898
34 153 367
48 436 99
52 176 133
1257 376
438 292
196 166


321 596
65 159
J5
436 382
509 814
Blackthorn Avenue
386 196
3 12
33 39
54 69
J6
451 698
205 198
42
77
J7
Burton Hall Road
907 719
551 261
250
341
290 767
1271 1554
527
287
N31
J8
1247 1557
82 64
384 433
95 647 764
21 691 610
Brewery Road
J9
74 534 37
221 521 48
Leopardstown Road
716 329
610 841
122
171
From Leopardstown
N31

B. Traffic Survey 2022

Data Analysis Services
Traffic-Transportation-Commercial Innovation

012 21459 Avid & TAC Packaging Site - Traffic Surveys

with compliments

IDASO

Survey Name: 012 21459 Avid & TAC Packaging Site - Traffic Surveys
Date: Tue 11 Jan 2022

IDASO

Survey Name: 012 21459 Avid & TAC Packaging Site - Traffic Surveys
Site: Site 1
Location: Blackthorn Road/Carmanhall Road
Date: Tue 11-Jan-2022

	A => A										A => B										A => C									
TIME	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	3	3	0	0	1	0	1	1	0	0	3	3.5
07:15	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	4	4	0	0	5	0	1	0	0	0	6	6
07:30	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	6	6	0	0	1	0	1	0	0	0	2	2
07:45	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	7	7	1	0	8	0	1	0	0	0	10	9.2
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	17	0	3	0	0	0	20	20	1	0	15	0	4	1	0	0	21	20.7
08:00	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	12	12	1	0	7	0	0	0	0	0	8	7.2
08:15	0	0	0	0	0	0	0	0	0	0	0	0	12	0	1	0	0	0	13	13	0	0	10	0	2	0	0	0	12	12
08:30	0	0	0	0	0	0	0	0	0	0	0	0	13	0	2	0	0	0	15	15	0	0	5	0	1	0	0	0	6	6
08:45	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	18	18	0	1	7	1	1	1	0	0	11	10.9
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	55	0	3	0	0	0	58	58	1	1	29	1	4	1	0	0	37	36.1
09:00	0	0	0	0	0	0	0	0	0	0	0	0	11	0	2	0	0	0	13	13	0	1	8	0	0	0	0	0	9	8.4
09:15	0	0	0	0	0	0	0	0	0	0	0	1	7	0	2	0	0	0	10	9.4	0	0	7	0	1	0	0	0	8	8
09:30	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	0	0	5	1	2	0	0	0	8	8
09:45	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	0	0	5	5.5	0	0	6	0	2	2	0	0	10	11
H/TOT	0	0	0	0	0	0	0	0	0	0	0	1	24	0	4	1	0	0	30	29.9	0	1	26	1	5	2	0	0	35	35.4
10:00	0	0	0	0	0	0	0	0	0	0	0	1	4	0	1	1	0	0	7	6.9	0	0	1	0	3	1	0	0	5	5.5
10:15	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	4	4	0	0	5	0	0	1	0	0	6	6.5
10:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3	3	0	0	1	0	2	0	0	0	3	3
10:45	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	1	0	0	6	6.5	0	0	4	0	2	0	0	0	6	6
H/TOT	0	0	0	0	0	0	0	0	0	0	0	1	11	1	5	2	0	0	20	20.4	0	0	11	0	7	2	0	0	20	21
11:00	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5	0	0	3	0	0	0	0	0	3	3
11:15	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5	0	0	6	0	1	0	0	0	7	7
11:30	0	0	0	0	1	0	0	0	1	1	0	0	3	0	0	0	0	0	3	3	0	0	0	0	1	0	0	0	1	1
11:45	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	5	5	0	0	5	0	0	0	0	0	5	5
H/TOT	0	0	0	0	1	0	0	0	1	1	0	0	17	0	1	0	0	0	18	18	0	0	14	0	2	0	0	0	16	16
12:00	0	0	0	0	0	0	0	0	0	0	1	0	5	0	1	1	0	0	8	7.7	0	0	6	1	0	0	0	0	7	7
12:15	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	6	6	0	0	3	0	1	1	0	0	5	5.5
12:30	0	0	0	0	0	0	0	0	0	0	0	0	6	1	3	0	0	0	10	10	0	0	4	0	1	0	0	0	5	5
12:45	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4	1	0	8	1	3	0	0	0	13	12.2
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	20	1	5	1	0	0	28	27.7	1	0	21	2	5	1	0	0	30	29.7
13:00	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	0	0	5	0	3	0	0	0	8	8
13:15	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	4	4	0	0	1	0	0	0	0	0	1	1
13:30	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	6	6	0	0	9	0	3	0	0	0	12	12
13:45	0	0	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	0	9	9	0	0	4	0	1	0	0	0	5	5
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	19	2	1	0	0	0	22	22	0	0	19	0	7	0	0	0	26	26
14:00	0	0	0	0	0	0	0	0	0	0	0	0	5	0	3	0	0	0	8	8	0	0	2	0	1	0	0	0	3	3
14:15	0	0	0	0	0	0	0	0	0	0	0	0	5	0	2	0	0	0	7	7	0	0	2	0	0	0	0	0	2	2
14:30	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	1	0	0	6	6.5	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	8	0	2	0	0	0	10	10	0	0	6	1	1	0	0	0	8	8
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	23	0	7	1	0	0	31	31.5	0	0	10	1	2	0	0	0	13	13
15:00	0	0	0	0	0	0	0	0	0	0	0	1	7	1	0	0	0	0	9	8.4	0	0	4	0	2	0	0	0	6	6
15:15	0	0	0	0	0	0	0	0	0	0	0	0	7	0	3	0	0	0	10	10	1	0	3	0	3	0	0	0	7	6.2
15:30	0	0	0	0	0	0	0	0	0	0	0	0	11	0	2	0	0	0	13	13	0	1	8	0	0	0	0	0	9	8.4
15:45	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	8	8	0	0	3	0	1	0	0	0	4	4
H/TOT	0	0	0	0	0	0	0	0	0	0	0	1	32	1	6	0	0	0	40	39.4	1	1	18	0	6	0	0	0	26	24.6
16:00	0	0	0	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	7	7	0	0	9	0	1	0	0	0	10	10
16:15	0	0	0	0	0	0	0	0	0	0	0	1	4	1	2	0	0	0	8	7.4	0	0	4	0	6	0	1	0	11	12.3
16:30	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5	0	0	3	0	1	0	0	0	4	4
16:45	0	0	0	0	0	0	0	0	0	0	0	0	4	0	2	1	0	0	7	7.5	0	0	6	0	1	0	0	0	7	7
H/TOT	0	0	0	0	0	0	0	0	0	0	0	1	19	1	5	1	0	0	27	26.9	0	0	22	0	9	0	1	0	32	33.3
17:00	0	0	0	0	0	0	0	0	0	0	0	1	13	0	0	0	0	0	14	13.4	0	0	10	0	1	0	0	0	11	11
17:15	0	0	0	0	0	0	0	0	0	0	0	0	4	1	1	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	8	0	2	0	0	0	10	10	0	0	6	0	0	0	0	0	6	6
17:45	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	3	3	0	0	5	1	0	0	0	0	6	6
H/TOT	0	0	0	0	0	0	0	0	0	0	0	1	27	1	4	0	0	0	33	32.4	0	0	21	1	1	0	0	0	23	23
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	1	0	0	0	6	6
18:15	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	1	0	4	1	0	0	0	0	6	5.2
18:30	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	4	4	0	0	2	0	0	0	0	0	2	2
18:45	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3	3	0	0	3	0	0	0	0	0	3	3
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	6	0	3	0	0	0	9	9	1	0	13	2	1	0	0	0	17	16.2
12 TOT	0	0	0	0	1	0	0	0	1	1	1	5	270	7	47	6	0	0	336	335.2	5	3	219	8	53	7	1	0	296	295

B => A										B => B										B => C									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	1	34	1	2	1	0	5	44	48.9	0	0	0	0	0	0	0	0	0	0	0	0	22	1	8	1	2	0	34	37.1
1	0	43	1	9	3	0	3	60	63.7	0	0	0	0	0	0	0	0	0	0	2	0	26	0	10	1	0	0	39	37.9
1	0	74	1	7	3	0	5	91	96.7	0	0	0	0	0	0	0	0	0	0	0	0	28	0	12	1	2	0	43	46.1
1	0	126	2	15	1	1	5	151	157	0	0	0	0	0	0	0	0	0	0	0	0	41	0	10	1	0	0	52	52.5
3	1	277	5	33	8	1	10	346	366.3	0	0	0	0	0	0	0	0	0	0	2	0	117	1	40	4	4	0	168	173.6
2	0	133	2	10	5	0	4	156	160.9	0	0	0	0	0	0	0	0	0	0	1	0	49	1	5	5	1	0	62	65
2	0	95	3	10	0	0	3	113	114.4	0	0	0	0	0	0	0	0	0	0	1	0	58	0	10	3	0	0	72	72.7
0	1	93	4	8	3	0	3	112	115.9	0	0	0	0	0	0	0	0	0	0	2	1	64	2	9	3	1	0	82	82.6
2	0	81	4	8	3	0	2	100	101.9	0	0	0	0	0	0	0	0	0	0	1	1	54	1	9	0	3	0	69	71.5
8	1	402	13	36	11	0	12	481	493.1	0	0	0	0	0	0	0	0	0	0	5	2	225	4	33	11	5	0	285	291.8
3	0	65	5	14	4	0	3	94	96.6	0	0	0	0	0	0	0	0	0	0	1	0	50	1	16	2	1	0	71	72.5
1	1	73	7	15	4	0	3	104	107.6	0	0	0	0	0	0	0	0	0	0	2	0	31	4	8	4	2	0	51	54
0	1	74	2	13	3	0	2	95	97.9	0	0	0	0	0	0	0	0	0	0	0	0	25	1	16	5	0	0	47	49.5
2	1	68	3	10	2	2	2	90	93.4	0	0	0	0	0	0	0	0	0	0	0	0	44	1	13	3	1	0	62	64.8
6	3	280	17	52	13	2	10	383	395.5	0	0	0	0	0	0	0	0	0	0	3	0	150	7	53	14	4	0	231	240.8
0	0	60	2	16	1	0	1	80	81.5	0	0	0	0	0	0	0	0	0	0	1	0	24	1	13	1	0	0	40	39.7
1	0	75	3	14	2	0	2	97	99.2	0	0	0	0	0	0	0	0	0	0	1	0	31	1	8	2	3	0	46	50.1
1	1	71	9	13	4	1	2	102	105.9	0	0	0	0	0	0	0	0	0	0	0	0	33	0	12	4	1	0	50	53.3
0	1	99	5	12	7	1	2	127	133.2	0	0	0	0	0	0	0	0	0	0	0	0	34	0	15	0	1	0	50	51.3
2	2	305	19	55	14	2	7	406	419.8	0	0	0	0	0	0	0	0	0	0	2	0	122	2	48	7	5	0	186	194.4
0	2	93	3	10	3	1	1	113	115.6	0	0	0	0	0	0	0	0	0	0	0	2	35	0	12	4	2	0	55	58.4
0	2	90	7	15	2	0	1	117	117.8	0	0	0	0	0	0	0	0	0	0	1	0	33	2	7	3	0	0	46	46.7
0	1	80	3	10	2	0	2	98	100.4	0	0	0	0	0	0	0	0	0	0	1	1	34	0	12	2	1	0	51	51.9
1	0	96	3	13	3	0	2	118	120.7	0	0	0	0	0	0	0	0	0	0	0	1	35	1	19	2	1	0	59	60.7
1	5	359	16	48	10	1	6	446	454.5	0	0	0	0	0	0	0	0	0	0	2	4	137	3	50	11	4	0	211	217.7
1	1	88	5	13	2	0	1	111	111.6	0	0	0	0	0	0	0	0	0	0	2	1	38	0	9	5	0	0	55	55.3
2	1	103	4	14	5	0	1	130	131.3	0	0	0	0	0	0	0	0	0	0	1	1	25	1	9	5	1	0	43	45.4
2	0	95	2	14	4	0	1	118	119.4	0	0	0	0	0	0	0	0	0	0	0	0	26	2	10	5	0	0	43	45.5
0	2	107	7	8	4	1	2	131	135.1	0	0	0	0	0	0	0	0	0	0	1	0	35	0	13	6	2	0	57	61.8
5	4	393	18	49	13	1	5	490	497.4	0	0	0	0	0	0	0	0	0	0	4	2	124	3	41	21	3	0	198	208
1	1	130	3	11	5	1	2	154	158.4	0	0	0	0	0	0	0	0	0	0	2	2	37	5	12	0	1	0	59	57.5
3	6	117	4	13	7	0	1	151	149.5	0	0	0	0	0	0	0	0	0	0	1	0	32	2	9	1	0	0	45	44.7
0	1	105	2	10	1	0	1	120	120.9	0	0	0	0	0	0	0	0	0	0	0	1	32	3	12	2	1	0	51	52.7
0	1	90	1	9	0	1	2	104	106.7	0	0	0	0	0	0	0	0	0	0	0	0	28	3	12	1	2	0	46	49.1
4	9	442	10	43	13	2	6	529	535.5	0	0	0	0	0	0	0	0	0	0	3	3	129	13	45	4	4	0	201	204
1	2	98	2	11	5	0	1	120	121.5	0	0	1	0	0	0	0	0	1	1	0	0	28	2	11	1	0	0	42	42.5
0	0	96	5	14	0	1	3	119	123.3	0	0	0	0	0	0	0	0	0	0	0	0	29	3	7	0	1	0	40	41.3
1	1	98	3	12	5	1	1	122	125.4	0	0	1	0	0	0	0	0	1	1	0	0	24	5	8	2	0	0	39	40
0	1	112	4	19	2	0	2	140	142.4	0	0	0	0	0	0	0	0	0	0	0	0	21	2	5	1	0	0	29	29.5
2	4	404	14	56	12	2	7	501	512.6	0	0	2	0	0	0	0	0	2	2	0	0	102	12	31	4	1	0	150	153.3
0	1	115	3	10	2	2	2	135	140	0	0	0	0	0	0	0	0	0	0	1	1	32	1	8	1	1	0	45	45.4
1	2	99	8	17	2	1	2	132	134.3	0	0	0	0	0	0	0	0	0	0	0	0	26	1	13	2	0	0	42	43
2	1	97	3	15	2	0	2	122	122.8	0	0	0	0	0	0	0	0	0	0	0	0	32	6	9	5	0	0	52	54.5
1	0	108	5	19	3	0	5	141	146.7	0	0	0	0	0	0	0	0	0	0	1	0	30	0	11	3	0	0	45	45.7
4	4	419	19	61	9	3	11	530	543.8	0	0	0	0	0	0	0	0	0	0	2	1	120	8	41	11	1	0	184	188.6
1	1	139	1	16	0	0	3	161	162.6	0	0	0	0	0	0	0	0	0	0	0	0	38	2	6	0	0	0	46	46
3	0	100	4	11	1	0	2	121	121.1	0	0	0	0	0	0	0	0	0	0	1	1	27	2	3	0	0	0	34	32.6
5	2	117	2	7	0	0	4	137	135.8	0	0	0	0	0	0	0	0	0	0	0	1	25	1	2	1	0	0	30	29.9
1	1	109	1	6	1	1	2	122	124.4	0	0	0	0	0	0	0	0	0	0	0	0	40	3	2	1	0	0	46	46.5
10	4	465	8	40	2	1	11	541	543.9	0	0	0	0	0	0	0	0	0	0	1	2	130	8	13	2	0	0	156	155
4	0	148	3	9	0	0	6	170	172.8	0	0	0	0	0	0	0	0	0	0	1	0	36	1	0	0	0	0	38	37.2
0	0	131	2	7	2	0	2	144	147	0	0	0	0	0	0	0	0	0	0	1	0	25	1	1	0	0	0	28	27.2
1	0	127	4	5	2	0	3	142	145.2	0	0	0	0	0	0	0	0	0	0	0	0	30	2	2	0	0	0	34	34
3	2	109	2	4	2	0	0	122	119.4	0	0	0	0	0	0	0	0	0	0	1	0	24	2	1	1	0	0	29	28.7
8	2	515	11	25	6	0	11	578	584.4	0	0	0	0	0	0	0	0	0	0	3	0	115	6	4	1	0	0	129	127.1
0	0	88	1	4	0	0	7	100	107	0	0	0	0	0	0	0	0	0	0	0	0	22	3	3	0	0	0	28	28
2	3	84	1	6	0	0	3	99	98.6	0	0	0	0	0	0	0	0	0	0	1	0	24	0	0	0	0	0	25	24.2
2	1	78	0	0	0	0	4	85	86.8	0	0	0	0	0	0	0	0	0	0	0	0	23	0	1	0	1	0	25	26.3
0	0	71	6	2	0	0	3	82	85	0	0	0	0	0	0	0	0	0	0	2	0	25	2	1	0	0	0	30	28.4
4	4	321	8	12	0	0	17	366	377.4	0	0	0	0	0	0	0	0	0	0	3	0	94	5	5	0	1	0	108	106.9
55	43	4582	158	510	113	15	121	5597	5724.2	0	0	2	0	0	0	0	0	2	2	30	14	1565	72	404	90	32	0	2207	2261.2

C => A										C => B										C => C									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	6	1	1	0	0	0	8	8	0	0	1	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	0	7	0	3	0	0	0	10	10	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	0	10	2	6	0	0	0	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	17	1	6	0	0	0	24	24	0	0	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	0	40	4	16	0	0	0	60	60	0	0	2	0	3	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
0	0	16	1	8	5	0	0	30	32.5	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1
0	0	21	1	10	0	0	0	32	32	0	0	1	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	0	22	0	4	2	0	0	28	29	1	0	1	0	0	0	0	0	2	1.2	0	0	0	0	0	0	0	0	0	0
0	0	17	1	1	2	1	0	22	24.3	1	0	0	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0	0	0
0	0	76	3	23	9	1	0	112	117.8	2	0	3	0	1	0	0	0	6	4.4	0	0	1	0	0	0	0	0	1	1
0	0	15	1	7	0	0	0	23	23	0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	0	20	2	6	0	0	0	28	28	0	0	4	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0
0	0	17	1	5	2	0	0	25	26	0	0	5	1	3	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0
0	0	25	2	18	2	1	0	48	50.3	0	0	2	0	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
0	0	77	6	36	4	1	0	124	127.3	0	0	13	1	4	0	0	0	18	18	0	0	0	0	0	0	0	0	0	0
0	1	8	0	6	5	1	0	21	24.2	0	0	1	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	1	20	0	13	3	0	0	37	37.9	0	0	2	0	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
0	0	16	2	8	5	0	0	31	33.5	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	0	19	0	9	2	0	0	30	31	0	0	1	0	2	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
0	2	63	2	36	13	1	0	119	126.6	0	0	5	0	4	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0
0	2	25	2	14	2	0	0	45	44.8	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	1	25	1	6	1	1	0	35	36.2	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	1	23	3	8	3	0	0	38	38.9	0	0	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	1	24	2	10	4	0	0	41	42.4	1	0	4	0	0	0	0	0	5	4.2	0	0	0	0	0	0	0	0	0	0
0	5	97	8	38	10	1	0	159	162.3	1	0	4	0	4	0	0	0	9	8.2	0	0	0	0	0	0	0	0	0	0
0	0	22	2	7	0	0	0	31	31	1	0	2	0	0	0	0	0	3	2.2	0	0	0	0	0	0	0	0	0	0
0	1	31	1	8	4	0	0	35	36.4	0	0	1	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	1	32	2	13	3	0	0	51	51.9	0	0	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
0	0	26	2	13	3	0	0	44	45.5	0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	2	101	7	41	10	0	0	161	164.8	1	0	8	0	1	0	0	0	10	9.2	0	0	0	0	0	0	0	0	0	0
0	1	29	0	13	1	1	0	45	46.2	1	0	4	0	1	0	0	0	6	5.2	0	0	0	0	0	0	0	0	0	0
0	2	42	3	9	3	0	0	59	59.3	3	0	1	0	1	0	0	0	5	2.6	0	0	0	0	0	0	0	0	0	0
0	0	29	1	13	2	1	0	46	48.3	0	0	3	0	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0
0	2	38	1	13	1	0	0	55	54.3	0	0	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
0	5	138	5	48	7	2	0	205	208.1	4	0	11	0	3	0	0	0	18	14.8	0	0	0	0	0	0	0	0	0	0
0	0	31	2	7	0	1	0	41	42.3	0	0	0	0	0	1	0	0	1	1.5	0	0	0	0	0	0	0	0	0	0
0	1	32	4	4	1	0	0	42	41.9	0	0	3	1	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0
0	2	25	1	12	1	0	0	41	40.3	1	0	0	0	1	0	0	0	2	1.2	0	0	0	0	0	0	0	0	0	0
1	1	34	7	9	4	0	0	56	56.6	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1
1	4	122	14	32	6	1	0	180	181.1	1	0	4	1	1	1	0	0	8	7.7	0	0	1	0	0	0	0	0	1	1
0	0	21	5	5	1	0	0	32	32.5	1	0	1	0	1	0	0	0	3	2.2	0	0	0	0	0	0	0	0	0	0
0	0	23	3	17	0	0	0	43	43	0	0	3	0	1	0	1	0	5	6.3	0	0	0	0	0	0	0	0	0	0
0	0	37	3	17	1	0	0	58	58.5	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	0	30	1	8	0	0	0	39	39	1	0	2	0	0	0	0	0	3	2.2	0	0	0	0	0	0	0	0	0	0
0	0	111	12	47	2	0	0	172	173	2	0	7	0	2	0	1	0	12	11.7	0	0	0	0	0	0	0	0	0	0
1	1	43	1	9	6	0	0	61	62.6	1	0	2	0	2	0	0	0	5	4.2	0	0	0	0	0	0	0	0	0	0
0	0	47	2	5	1	0	0	55	55.5	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
1	1	48	2	9	1	0	0	62	61.1	1	0	1	0	0	0	0	0	2	1.2	0	0	0	0	0	0	0	0	0	0
0	0	38	0	9	1	0	0	48	48.5	1	0	2	1	2	0	0	0	6	5.2	0	0	0	0	0	0	0	0	0	0
2	2	176	5	32	9	0	0	226	227.7	3	0	6	1	4	0	0	0	14	11.6	0	0	0	0	0	0	0	0	0	0
0	0	48	1	4	1	0	0	54	54.5	1	0	0	1	0	0	0	0	2	1.2	0	0	0	0	0	0	0	0	0	0
0	1	47	2	6	0	0	0	56	55.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	45	1	0	0	0	0	47	46.4	0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	1	38	2	3	0	0	0	44	43.4	2	0	0	0	0	0	0	0	2	0.4	0	0	0	0	0	0	0	0	0	0
0	3	178	6	13	1	0	0	201	199.7	3	0	2	1	0	0	0	0	6	3.6	0	0	0	0	0	0	0	0	0	0
0	1	33	0	2	0	0	0	36	35.4	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	0	35	3	2	0	0	0	40	40	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	0	24	1	1	0	0	0	26	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	26	1	2	0	1	0	30	31.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	118	5	7	0	1	0	132	132.7	0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
3	24	1297	77	369	73	8	0	1851	1881.1	17	0	67	4	27	1	1	0	117	105.2	0	0	2	0	0	0	0	0	2	2

IDASO

Survey Name: 012 21459 Avid & TAC Packaging Site - Traffic Surveys
Site: Site 2
Location: Carmanhall Road/Ravens Rock Road
Date: Tue 11-Jan-2022

	A => A										A => B										A => C									
TIME	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	0	0	7	2	3	1	3	0	16	20.4	0	0	6	0	5	0	0	0	11	11
07:15	0	0	0	0	0	0	0	0	0	0	2	0	10	0	5	1	0	0	18	16.9	0	0	11	0	4	0	0	0	15	15
07:30	0	0	0	0	0	0	0	0	0	0	0	0	13	0	4	1	1	0	19	20.8	1	0	9	0	6	0	0	0	16	15.2
07:45	0	0	0	0	0	0	0	0	0	0	0	0	25	0	2	0	0	0	27	27	1	0	19	0	4	1	0	0	25	24.7
H/TOT	0	0	0	0	0	0	0	0	0	0	2	0	55	2	14	3	4	0	80	85.1	2	0	45	0	19	1	0	0	67	65.9
08:00	0	0	1	0	0	0	0	0	1	1	1	0	33	0	1	2	1	0	38	39.5	0	0	10	0	2	3	0	0	15	16.5
08:15	0	0	0	0	0	0	0	0	0	0	2	0	40	1	6	0	0	0	49	47.4	0	0	14	0	2	1	0	0	17	17.5
08:30	0	0	0	0	0	0	0	0	0	0	2	0	43	2	8	3	1	0	59	60.2	0	0	9	0	2	1	0	0	12	12.5
08:45	0	0	0	0	0	0	0	0	0	0	0	0	40	2	4	1	3	0	50	54.4	1	0	11	0	3	1	0	0	16	15.7
H/TOT	0	0	1	0	0	0	0	0	1	1	5	0	156	5	19	6	5	0	196	201.5	1	0	44	0	9	6	0	0	60	62.2
09:00	0	0	0	0	0	0	0	0	0	0	1	0	39	1	9	0	1	0	51	51.5	1	0	11	0	7	2	0	0	21	21.2
09:15	0	0	0	0	0	0	0	0	0	0	1	0	22	2	5	2	2	0	34	36.8	0	0	11	1	2	1	0	0	15	15.5
09:30	0	0	0	0	0	0	0	0	0	0	0	0	23	2	5	5	1	0	36	39.8	0	0	11	0	11	3	0	0	25	26.5
09:45	0	0	0	0	0	0	0	0	0	0	1	0	26	1	8	6	0	0	42	44.2	0	0	8	0	7	1	1	0	17	18.8
H/TOT	0	0	0	0	0	0	0	0	0	0	3	0	110	6	27	13	4	0	163	172.3	1	0	41	1	27	7	1	0	78	82
10:00	0	0	0	0	0	0	0	0	0	0	0	0	18	1	6	1	1	0	27	28.8	0	0	5	0	8	1	0	0	14	14.5
10:15	0	0	0	0	0	0	0	0	0	0	1	0	24	1	4	1	2	0	33	35.3	1	0	11	0	2	1	1	0	16	17
10:30	0	0	0	0	0	0	0	0	0	0	0	0	25	0	7	1	1	0	34	35.8	0	0	7	0	6	2	0	0	15	16
10:45	0	0	0	0	0	0	0	0	0	0	0	0	26	0	7	1	1	0	35	36.8	0	0	6	0	7	0	0	0	13	13
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	93	2	24	4	5	0	129	136.7	1	0	29	0	23	4	1	0	58	60.5
11:00	0	0	0	0	0	0	0	0	0	0	0	2	22	0	7	1	4	0	36	40.5	0	0	12	0	4	2	0	0	18	19
11:15	0	0	1	0	0	0	0	0	1	1	1	0	25	2	4	3	0	0	35	35.7	0	0	6	0	3	0	0	0	9	9
11:30	0	0	0	0	0	0	0	0	0	0	1	0	28	0	10	1	1	0	41	42	0	0	9	0	5	2	0	0	16	17
11:45	0	0	0	0	0	0	0	0	0	0	0	1	22	1	7	1	1	0	33	34.2	0	0	17	0	10	1	0	0	28	28.5
H/TOT	0	0	1	0	0	0	0	0	1	1	2	3	97	3	28	6	6	0	145	152.4	0	0	44	0	22	5	0	0	71	73.5
12:00	0	0	0	0	0	0	0	0	0	0	1	1	34	1	8	3	0	0	48	48.1	0	0	9	0	3	1	0	0	13	13.5
12:15	0	0	0	0	0	0	0	0	0	0	1	1	18	1	4	2	0	0	27	26.6	0	0	9	0	5	3	1	0	18	20.8
12:30	0	0	0	0	0	0	0	0	0	0	0	1	26	2	7	3	0	0	39	39.9	0	0	10	0	3	2	0	0	15	16
12:45	0	0	0	0	0	0	0	0	0	0	1	0	28	1	9	5	1	0	45	48	0	0	13	0	7	3	1	0	24	26.8
H/TOT	0	0	0	0	0	0	0	0	0	0	3	3	106	5	28	13	1	0	159	162.6	0	0	41	0	18	9	2	0	70	77.1
13:00	0	0	0	0	0	0	0	0	0	0	3	2	32	5	6	0	0	0	48	44.4	0	0	9	0	3	0	0	0	12	12
13:15	0	0	0	0	0	0	0	0	0	0	1	0	27	2	6	0	1	0	37	37.5	0	0	3	0	4	0	0	0	7	7
13:30	0	0	0	0	0	0	0	0	0	0	0	1	24	2	8	1	1	0	37	38.2	0	0	16	0	5	0	0	0	21	21
13:45	0	0	0	0	0	0	0	0	0	0	0	0	22	2	6	1	2	0	33	36.1	0	0	8	0	6	0	0	0	14	14
H/TOT	0	0	0	0	0	0	0	0	0	0	4	3	105	11	26	2	4	0	155	156.2	0	0	36	0	18	0	0	0	54	54
14:00	0	0	0	0	0	0	0	0	0	0	0	0	29	2	5	0	1	0	37	38.3	0	0	8	0	5	1	0	0	14	14.5
14:15	0	0	0	0	0	0	0	0	0	0	0	0	27	2	2	0	1	0	32	33.3	0	0	10	1	4	0	0	0	15	15
14:30	0	0	0	0	0	0	0	0	0	0	0	0	24	5	7	2	0	0	38	39	0	0	3	0	1	0	0	0	4	4
14:45	0	0	0	0	0	0	0	0	0	0	0	0	17	3	2	1	0	0	23	23.5	0	0	11	1	3	1	0	0	16	16.5
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	97	12	16	3	2	0	130	134.1	0	0	32	2	13	2	0	0	49	50
15:00	0	0	0	0	0	0	0	0	0	0	0	1	27	2	4	0	2	0	36	38	0	0	13	0	5	0	0	0	18	18
15:15	0	0	0	0	0	0	0	0	0	0	1	0	25	1	9	1	0	0	37	36.7	0	0	9	0	4	1	0	0	14	14.5
15:30	0	0	0	0	0	0	0	0	0	0	0	0	40	6	4	2	0	0	52	53	0	0	5	0	7	3	0	0	15	16.5
15:45	0	0	0	0	0	0	0	0	0	0	0	0	27	1	4	1	0	0	33	33.5	0	0	7	0	7	1	0	0	15	15.5
H/TOT	0	0	0	0	0	0	0	0	0	0	1	1	119	10	21	4	2	0	158	161.2	0	0	34	0	23	5	0	0	62	64.5
16:00	0	0	0	0	0	0	0	0	0	0	0	0	37	1	3	0	0	0	41	41	0	0	7	0	4	0	0	0	11	11
16:15	0	0	0	0	0	0	0	0	0	0	0	1	25	1	2	0	1	0	30	30.7	0	0	6	0	5	0	0	0	11	11
16:30	0	0	0	0	0	0	0	0	0	0	1	1	19	1	3	0	0	0	25	23.6	0	0	7	0	2	1	0	0	10	10.5
16:45	0	0	0	0	0	0	0	0	0	0	0	0	34	2	2	0	0	0	38	38	0	0	8	1	3	1	0	0	13	13.5
H/TOT	0	0	0	0	0	0	0	0	0	0	1	2	115	5	10	0	1	0	134	133.3	0	0	28	1	14	2	0	0	45	46
17:00	0	0	0	0	0	0	0	0	0	0	1	0	44	0	1	0	0	0	46	45.2	0	0	5	0	0	0	0	0	5	5
17:15	0	0	0	0	0	0	0	0	0	0	0	0	22	1	0	0	0	0	23	23	0	0	3	0	0	0	0	0	3	3
17:30	0	0	0	0	0	0	0	0	0	0	0	2	25	1	1	0	0	0	29	27.8	0	0	0	0	2	0	0	0	2	2
17:45	0	0	0	0	0	0	0	0	0	0	0	1	18	1	2	1	0	0	23	22.9	0	0	3	0	0	0	0	0	3	3
H/TOT	0	0	0	0	0	0	0	0	0	0	1	3	109	3	4	1	0	0	121	118.9	0	0	11	0	2	0	0	0	13	13
18:00	0	0	0	0	0	0	0	0	0	0	1	0	22	0	2	0	0	0	25	24.2	0	0	0	0	1	0	0	0	1	1
18:15	0	0	0	0	0	0	0	0	0	0	1	0	23	1	0	0	0	0	25	24.2	1	0	4	0	0	0	0	0	5	4.2
18:30	0	0	0	0	0	0	0	0	0	0	2	0	25	0	1	0	0	0	28	26.4	1	0	2	0	0	0	1	0	4	4.5
18:45	0	0	0	0	0	0	0	0	0	0	1	0	19	2	1	0	0	0	23	22.2	0	0	2	0	1	0	0	0	3	3
H/TOT	0	0	0	0	0	0	0	0	0	0	5	0	89	3	4	0	0	0	101	97	2	0	8	0	2	0	1	0	13	12.7
12 TOT	0	0	2	0	0	0	0	0	2	2	28	15	1251	67	221	55	34	0	1671	1711.3	7	0	393	4	190	41	5	0	640	661.4

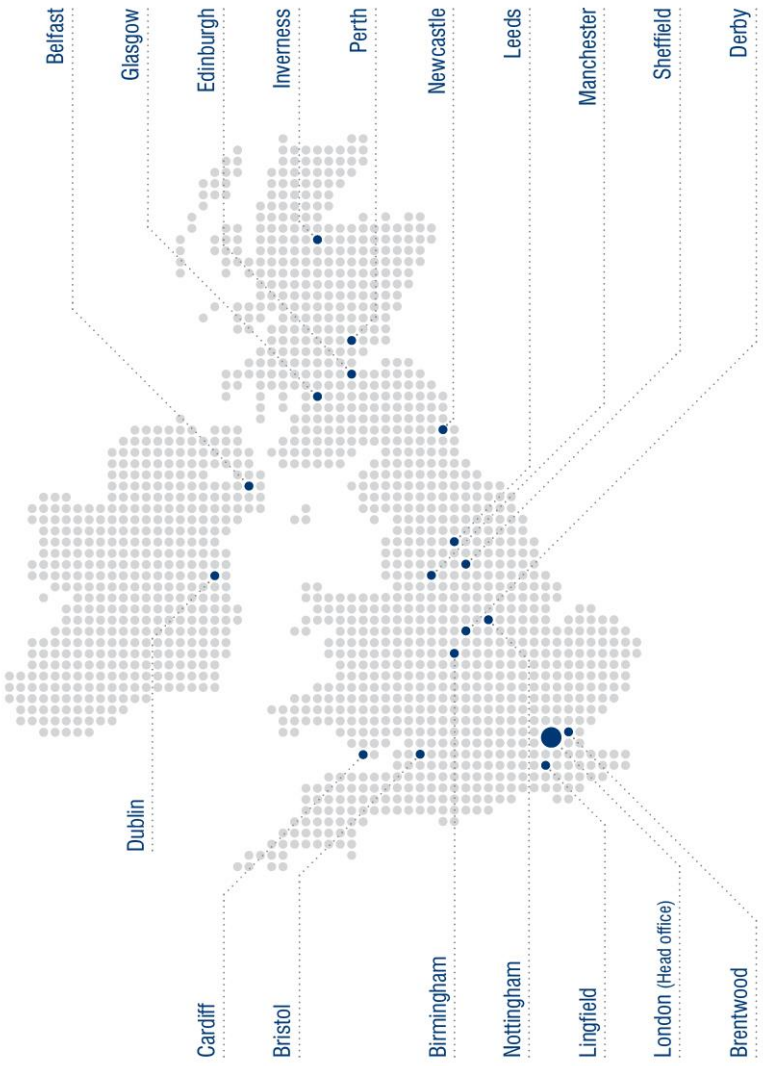
B => A										B => B										B => C									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	9	1	7	0	0	0	17	17	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	3	3.5
0	0	9	0	0	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
0	0	10	2	2	0	0	0	14	14	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	2
0	0	12	2	1	0	0	0	15	15	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	3	2.2
0	0	40	5	10	0	0	0	55	55	0	0	0	0	0	0	0	0	0	0	1	0	5	0	2	1	0	0	9	8.7
0	0	18	1	0	2	0	0	21	22	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	5	5
0	0	20	0	5	0	0	0	25	25	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	6	6
1	0	23	0	5	1	0	0	30	29.7	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	6	6
2	1	16	0	3	1	0	0	23	21.3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	4	4
3	1	77	1	13	4	0	0	99	98	0	0	0	0	0	0	0	0	0	0	0	0	16	0	5	0	0	0	21	21
0	0	13	1	5	0	0	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	1	0	0	5	5.5
0	0	18	1	2	1	2	0	24	27.1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3	3
1	0	18	1	4	1	0	0	25	24.7	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	3	3.5
0	0	15	0	6	3	2	0	26	30.1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1	0	0	5	5.5
1	0	64	3	17	5	4	0	94	100.9	0	0	0	0	0	0	0	0	0	0	0	0	6	0	7	3	0	0	16	17.5
0	1	8	0	1	4	2	0	16	20	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	1	0	0	5	5.5
0	1	16	0	5	4	0	0	26	27.4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	1	0	0	6	6.5
0	0	11	1	2	1	0	0	15	15.5	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	4	4
1	0	9	1	9	1	0	0	21	20.7	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	1	0	0	7	7.5
1	2	44	2	17	10	2	0	78	83.6	0	0	0	0	0	0	0	0	0	0	0	0	8	0	11	3	0	0	22	23.5
1	2	13	2	7	2	0	0	27	26	0	0	0	0	0	0	0	0	0	0	0	0	4	0	3	0	0	0	7	7
0	0	16	0	2	0	1	0	19	20.3	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	1	0	0	5	4.7
0	1	15	1	2	2	0	0	21	21.4	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	1	0	6	7.3
1	1	14	1	4	2	0	0	23	22.6	0	0	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0	6	6
2	4	58	4	15	6	1	0	90	90.3	0	0	0	0	0	0	0	0	0	0	1	0	12	0	9	1	1	0	24	25
1	0	13	1	2	0	0	0	17	16.2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	6	0	0	0	10	10
0	1	22	0	5	0	0	0	28	27.4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	4	5
0	1	20	2	8	3	0	0	34	34.9	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	4	4
0	0	16	1	4	1	0	0	22	22.5	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	0	0	5	5.5
1	2	71	4	19	4	0	0	101	101	0	0	0	0	0	0	0	0	0	0	0	0	11	0	9	3	0	0	23	24.5
1	1	17	1	9	0	1	0	30	29.9	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	6	6
2	2	26	2	4	3	0	0	39	37.7	0	0	0	0	0	0	0	0	0	0	0	0	4	0	3	0	0	0	7	7
0	1	27	1	6	1	1	0	37	38.2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	0	0	0	6	6
0	2	27	1	7	1	0	0	38	37.3	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	4	4
3	6	97	5	26	5	2	0	144	143.1	0	0	0	0	0	0	0	0	0	0	0	0	11	1	11	0	0	0	23	23
0	0	20	2	2	0	1	0	25	26.3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	1	0	0	6	6.5
0	0	25	3	0	0	0	0	28	28	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	1	0	0	5	5.5
0	2	17	2	1	1	0	0	23	22.3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	4	5
1	1	23	5	5	2	0	0	37	36.6	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	3	3
1	3	85	12	8	3	1	0	113	113.2	0	0	0	0	0	0	0	0	0	0	0	0	9	1	4	4	0	0	18	20
0	1	16	4	0	1	0	0	22	21.9	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	2
0	0	16	2	6	0	1	0	25	26.3	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	4	5.8
0	0	18	3	3	0	0	0	24	24	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4
1	0	25	1	4	0	0	0	31	30.2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
1	1	75	10	13	1	1	0	102	102.4	0	0	0	0	0	0	0	0	0	0	0	0	7	1	1	1	1	0	11	12.8
1	0	22	2	1	0	0	0	26	25.2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	2
0	0	23	1	3	0	0	0	27	27	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	0	0	0	6	6
2	1	36	0	4	1	0	0	44	42.3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	2
1	0	28	0	2	0	0	0	31	30.2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	4	4
4	1	109	3	10	1	0	0	128	124.7	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	0	0	0	14	14
1	1	31	2	1	1	0	0	37	36.1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	2
0	0	29	0	3	0	0	0	32	32	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	0	30	1	2	0	0	0	33	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	1	27	0	1	0	0	0	31	28.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	2	117	3	7	1	0	0	133	129.9	0	0	1	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	2	2
1	1	23	0	0	0	0	0	25	23.6	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
1	0	24	2	1	0	0	0	28	27.2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
3	0	12	0	0	0	0	0	15	12.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	22	0	3	0	0	0	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	1	81	2	4	0	0	0	93	88.4	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2
25	23	918	54	159	40	11	0	1230	1230.5	0	0	1	0	0	0	0	0	1	1	2	0	95	3	67	16	2	0	185	194

C => A										C => B										C => C									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	3	0	0	0	0	0	3	3	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	0	2	0	2	0	0	0	4	4	0	0	2	0	3	3	0	0	8	9.5	0	0	0	0	0	0	0	0	0	0
0	0	3	0	6	0	0	0	9	9	0	0	1	1	0	1	0	0	3	3.5	0	0	0	0	0	0	0	0	0	0
1	0	3	0	3	0	0	0	7	6.2	0	0	2	0	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
1	0	11	0	11	0	0	0	23	22.2	0	0	6	1	4	4	0	0	15	17	0	0	0	0	0	0	0	0	0	0
0	0	2	0	6	3	0	0	11	12.5	0	0	0	0	0	2	0	0	2	3	0	0	0	0	0	0	0	0	0	0
0	0	2	0	4	0	0	0	6	6	0	0	3	1	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
0	0	2	0	1	1	0	0	4	4.5	0	0	2	0	3	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
0	0	4	1	0	1	0	0	6	6.5	0	0	1	0	2	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
0	0	10	1	11	5	0	0	27	29.5	0	0	6	1	6	2	0	0	15	16	0	0	0	0	0	0	0	0	0	0
0	0	4	1	2	0	0	0	7	7	0	0	2	0	0	1	0	0	3	3.5	0	0	0	0	0	0	0	0	0	0
0	0	10	0	5	0	0	0	15	15	0	0	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	0	6	0	5	1	0	0	12	12.5	0	0	1	0	6	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0
1	0	4	2	7	2	0	0	16	16.2	0	0	7	1	1	2	0	0	11	12	0	0	0	0	0	0	0	0	0	0
1	0	24	3	19	3	0	0	50	50.7	0	0	10	1	9	3	0	0	23	24.5	0	0	0	0	0	0	0	0	0	0
1	0	3	0	6	1	0	0	11	10.7	0	0	0	0	1	1	0	0	2	2.5	0	0	0	0	0	0	0	0	0	0
0	0	8	0	6	1	0	0	15	15.5	0	0	2	0	3	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
0	0	4	1	6	2	0	0	13	14	0	0	2	0	6	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0
0	0	4	0	3	1	0	0	8	8.5	0	0	3	0	2	2	0	0	7	8	0	0	0	0	0	0	0	0	0	0
1	0	19	1	21	5	0	0	47	48.7	0	0	7	0	12	3	0	0	22	23.5	0	0	0	0	0	0	0	0	0	0
0	0	8	0	9	0	0	0	17	17	0	0	5	0	1	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0
0	1	8	0	2	1	0	0	12	11.9	0	0	2	1	3	1	0	0	7	7.5	0	0	0	0	0	0	0	0	0	0
0	0	7	1	5	2	0	0	15	16	0	0	0	0	3	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
0	0	13	0	8	0	0	0	21	21	0	0	3	0	3	0	1	0	7	8.3	0	0	0	0	0	0	0	0	0	0
0	1	36	1	24	3	0	0	65	65.9	0	0	10	1	10	1	1	0	23	24.8	0	0	0	0	0	0	0	0	0	0
0	0	8	0	5	0	0	0	13	13	0	0	2	0	4	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0
0	0	6	0	2	2	0	0	10	11	0	0	1	0	3	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0
0	0	15	0	6	2	0	0	23	24	0	0	3	0	2	1	0	0	6	6.5	0	0	0	0	0	0	0	0	0	0
0	0	11	1	4	2	0	0	18	19	0	0	5	0	4	1	0	0	10	10.5	0	0	0	0	0	0	0	0	0	0
0	0	40	1	17	6	0	0	64	67	0	0	11	0	13	2	0	0	26	27	0	0	0	0	0	0	0	0	0	0
0	0	13	0	4	1	1	0	19	20.8	0	0	3	0	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0
0	0	15	0	6	1	0	0	22	22.5	0	0	3	1	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
0	0	8	0	5	0	0	0	13	13	0	0	4	0	4	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0
0	0	5	0	4	0	0	0	9	9	0	0	3	1	3	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0
0	0	41	0	19	2	1	0	63	65.3	0	0	13	2	9	0	0	0	24	24	0	0	0	0	0	0	0	0	0	0
0	0	13	0	5	0	0	0	18	18	0	0	1	1	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
0	0	8	2	2	1	0	0	13	13.5	0	0	5	0	3	1	0	0	9	9.5	0	0	0	0	0	0	0	0	0	0
0	0	7	1	6	0	0	0	14	14	0	0	1	1	0	1	0	0	3	3.5	0	0	0	0	0	0	0	0	0	0
1	0	10	2	5	4	0	0	22	23.2	0	0	3	0	2	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
1	0	38	5	18	5	0	0	67	68.7	0	0	10	2	6	2	0	0	20	21	0	0	0	0	0	0	0	0	0	0
1	0	10	0	3	0	0	0	14	13.2	0	0	5	0	1	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0
0	0	5	0	8	0	0	0	13	13	0	0	3	0	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0
0	0	11	0	5	1	0	0	17	17.5	0	0	6	0	3	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0
1	0	5	1	2	2	0	0	11	11.2	0	0	1	0	3	1	1	0	6	7.8	0	0	0	0	0	0	0	0	0	0
2	0	31	1	18	3	0	0	55	54.9	0	0	15	0	8	1	1	0	25	26.8	0	0	0	0	0	0	0	0	0	0
2	1	11	0	4	1	0	0	19	17.3	0	0	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
0	0	14	0	2	0	0	0	16	16	0	0	4	0	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
0	0	18	0	4	1	0	0	23	23.5	0	0	4	0	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
0	0	8	0	8	0	0	0	16	16	1	0	7	0	1	1	0	0	10	9.7	0	0	0	0	0	0	0	0	0	0
2	1	51	0	18	2	0	0	74	72.8	1	0	18	0	3	1	0	0	23	22.7	0	0	0	0	0	0	0	0	0	0
1	0	20	0	0	0	0	0	21	20.2	2	0	5	0	2	0	0	0	9	7.4	0	0	0	0	0	0	0	0	0	0
0	0	11	0	0	0	0	0	11	11	0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
0	0	8	0	0	0	0	0	8	8	0	0	1	3	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
0	0	9	1	1	0	0	0	11	11	0	0	3	1	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0
1	0	48	1	1	0	0	0	51	50.2	2	0	11	4	3	0	0	0	20	18.4	0	0	0	0	0	0	0	0	0	0
0	0	6	0	1	0	0	0	7	7	1	0	2	0	0	0	0	0	3	2.2	0	0	0	0	0	0	0	0	0	0
0	0	6	0	1	0	0	0	7	7	1	0	3	0	1	0	0	0	5	4.2	0	0	0	0	0	0	0	0	0	0
0	0	9	0	1	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	4	0	0	0	1	0	5	6.3	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	0	25	0	3	0	1	0	29	30.3	2	0	5	0	2	0	0	0	9	7.4	0	0	0	0	0	0	0	0	0	0
9	2	374	14	180	34	2	0	615	626.2	5	0	122	12	85	19	2	0	245	253.1	0	0	0	0	0	0	0	0	0	0

C. TRANSYT Output

D. PICADY Output

UK and Ireland Office Locations



Dún Laoghaire-Rathdown County Council

Sandyford Business District Pedestrian and Cycle Improvement Scheme

Preliminary Design Report

August 2021

Document Control Sheet

Client:	Dún Laoghaire-Rathdown County Council
Project Title:	Sandyford Business District Pedestrian and Cycle Improvement Scheme
Document Title:	Preliminary Design Report
File Name:	19407-BT-00-ZZ-RP-Z-00030 Preliminary Design Report

Document Revision				**Document Verification**			
Issue Date *(DD/MM/YY)*	**Revision Code**	**Suitability Code**	**Author** *(Initials)*	**Checker** *(Initials)*	***Reviewer*** As Per PMP *(Initials)*	**Approver** *As Per PMP (Initials)*	**Peer Review** *(Initials or N/A)*
24/02/2021	P01	S3	BE	BE	RC	PM	N/A
31/05/2021	P02	S3	BE			RC	
11/08/2021	P03	S4	BE			RC	

Table of Contents

SECTION 1: INTRODUCTION

The purpose of this report is to summarise the steps taken in completing the preliminary design of the Sandyford Cycle Routes Scheme. This report should be read in conjunction with preliminary design drawings 19407-BT-00-ZZ-DR-00018 - 00 to 12.

Background

Barry Transportation (BT) were appointed by Dun Laoghaire Rathdown County Council (DLRCC) to carry-out the design of improved cycle and pedestrian facilities within the Sandyford Business District in Dublin 18.

The extents of this scheme are shown in red in Figure 1.1 below. The scheme length is approximately 2km and is made up by Carmanhall Road, Burton Hall Road and Blackthorn Road.

Figure 1.1

The Sandyford Business District is a key developing economic area in the Dún Laoghaire- Rathdown County Council area. It consists of a number of distinct areas, each with their own character; Stillorgan Industrial Estate, Sandyford Business Estate, Central Park, South County Business Park, Legionaries of Christ and Leopardstown Park Hospital.

The Sandyford Business Estate is one of six areas within the Sandyford Business District which is defined in Figure 1.2 below.

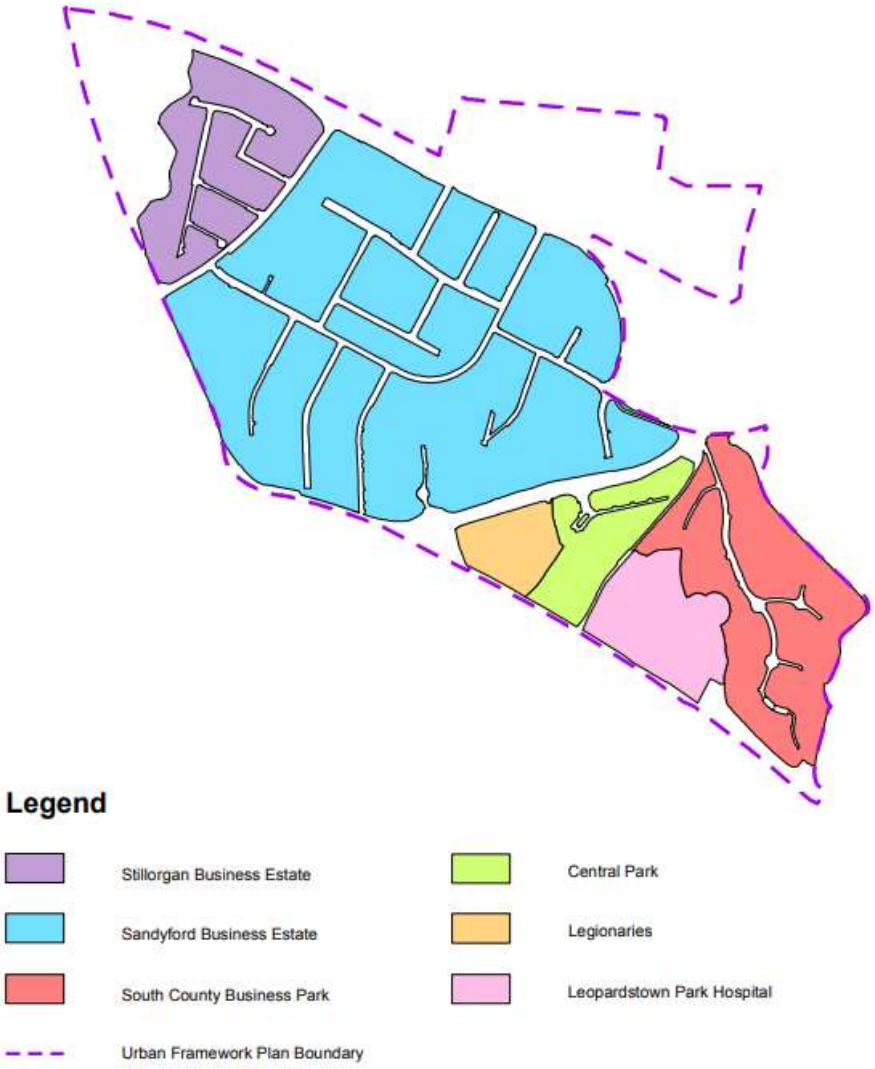


Figure 1.2

In 2010, Dún Laoghaire – Rathdown County Council chose Sandyford Business District for its first Smarter Travel Community (see www.sandyfordsmartertravel.ie). The vision of the Sandyford Smarter Travel is to develop a sustainable urban community with a strong sense of identity that provides quality of life to the people who live and work in the area, ensuring that development occurs at a pace where it is supported by sustainable transport choices. The project aims to provide for the transport needs of those living and working in the area through a holistic package of soft and hard measures aimed at achieving lasting behaviour change, reducing travel demand and the provision of new infrastructure.

A number of infrastructure schemes have been progressed in recent years in and around the Sandyford Business District to improve the facilities for pedestrians and cyclists. These include the development of the Sandyford Greenway and the provision of cycle routes along Blackthorn Avenue, Benildus Avenue and the Kilgobbin/Drummartin Link Road.

24-hour traffic speed and volume surveys were undertaken in July 2021. The highest speeds were recorded on Burton Hall Road and Blackthorn Road where 32% and 40% of drivers, respectively, were observed to be exceeding the speed limit. 16% of drivers were observed to exceed the speed limit on other roads. See Appendix A for more details of this survey. The high vehicle speeds and volumes contribute to a hostile environment for pedestrians and cyclist which this scheme aims to improve.

SECTION 2: DESIGN PRINCIPLES

The core objective underpinning the design of this scheme was to improve the pedestrian and cyclist experience in the Sandyford Business Estate. To achieve this, it was necessary to assess the existing infrastructure against the most recent guidance documents and implement changes when appropriate. The National Cycle Manual, the Design Manual for Urban Roads (DMURS) and the Traffic and Signs Manual were used throughout. DMURS defines pedestrians and cyclists at the top of the hierarchy for roads users, designers were cognisant of this in completing this layout. The following actions were taken consistently during the design of this scheme:

- Traffic lane widths were reduced in accordance with DMURS.
- Carriageway corner radii at junctions and side roads were tightened in accordance with DMURS.
- Left turn slips and pedestrian refuge islands were removed in accordance with DMURS.
- Dedicated cycle lanes provided to cater for all cycle movements in accordance with the National Cycle Manual.
- Segregation and physical protection provided to separate cyclists from motorists in accordance with the National Cycle Manual
- Pedestrian movements and desire lines were investigated with additional crossing points added where required. The crossings distances for pedestrians were reduced wherever possible.
- Crossings upgraded to toucan crossings to allow bicycles to use the signalised crossings where appropriate.
- Widened footpaths and increased pedestrian space.
- Increased the area available for landscaping and retained as many existing trees as possible. Areas were identified for potential new tree planting to compensate for any losses.
- The existing road centreline and crown was maintained where it was practical to do so. Minor alterations were made to suit site specific constraints.
- The existing on-street car parking spaces were maintained where possible.

SECTION 3: TYPICAL CROSS SECTION

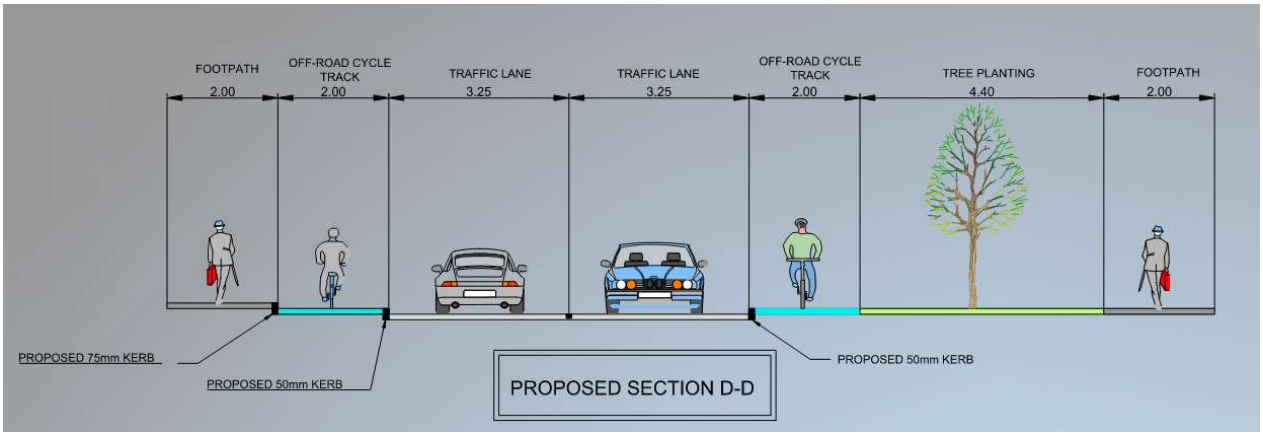


Figure 3.1 – Typical Cross Section

Figure 3.1 shows a typical proposed cross section on the scheme. The typical cross section was determined following consideration of a number of options with DLRCC at the outset of the project. It was a priority to provide additional space for pedestrians and cyclists, and a requirement to provide a width of 2 meters for cycle tracks.

The existing traffic lane widths vary between 3.5 and 4.6 meters. These were reduced to 3.25 meters, increasing to 3.5 meters around bends, which created additional space. Space was also gained by reducing the number of traffic lanes themselves and reducing the size of the grass verges. Existing footpaths will be increased in width to 2 meters where necessary.

SECTION 4: JUNCTION IMPROVEMENTS

There are five junctions located in the scheme extents, each junction was examined individually to determine the most efficient and safest solution. The proposed design maintains all turning movements which are currently permitted at each junction and has implemented guidance from DMURS to make junction improvements. The recurring changes which were made include the following:

- Introducing more direct and shorter crossings for pedestrians
- Removal of left turn slips and pedestrian refuge islands
- Tightened corner radii

Traffic signal timings have been examined and timings and sequences will be adjusted at the detailed design stage to reduce waiting times for pedestrians and cyclists.

Cycle facilities at junctions have generally been designed in accordance with the National Cycle Manual and it was a preference to have dedicated cycle lanes through each junction. Cycle-only traffic signals will be used to give cyclists a head start at junctions. A cycle-only phase will be used at the Burton Hall Road/Blackthorn Road junction to manage the conflict between right turning cyclist and left turning traffic. Junctions where the above arrangement has not been used are discussed individually below. The priority-controlled T junction at Carmanhall Road/Blackthorn Road is proposed to be converted to a signalised junction as part of the scheme.

Tactile pavings to guide the vision impaired will be provided at all pedestrian crossing points in accordance with best practice.

The two busiest and most complex junctions in the scheme are discussed individually in the sections following.

Burton Hall Road/ Blackthorn Avenue Junction

Figure 4.1 below shows the proposed layout at the Burton Hall Road/ Blackthorn Avenue Junction.

Traffic volumes are high at this junction with two lanes of fast-moving traffic travelling in the same direction on most arms, cyclists can also make many turning movements that are not permitted for general traffic due to the one-way systems. As a result, it was not considered practical or safe to have on road cycle movements as part of the main traffic signals here. Instead, cyclists making turning movements have been kept off road and will be required to use the shared areas and the signalised toucan crossings to pass through the junction. Three of the four pedestrian refuge islands are proposed to be removed and turning radii tightened to make crossings for pedestrians and cyclists more convenient.

The proposed arrangement shown below is suitable for less experienced cyclists and allows for all turning movements to be made safely and away from traffic. The change of surface type (from asphalt to concrete) on the shared surface area will indicate that cyclists will be required to yield to pedestrians in these areas, in accordance with the hierarchy of road users outlined in DMURS.

The proposed layout will not require any alterations to the existing Luas line.

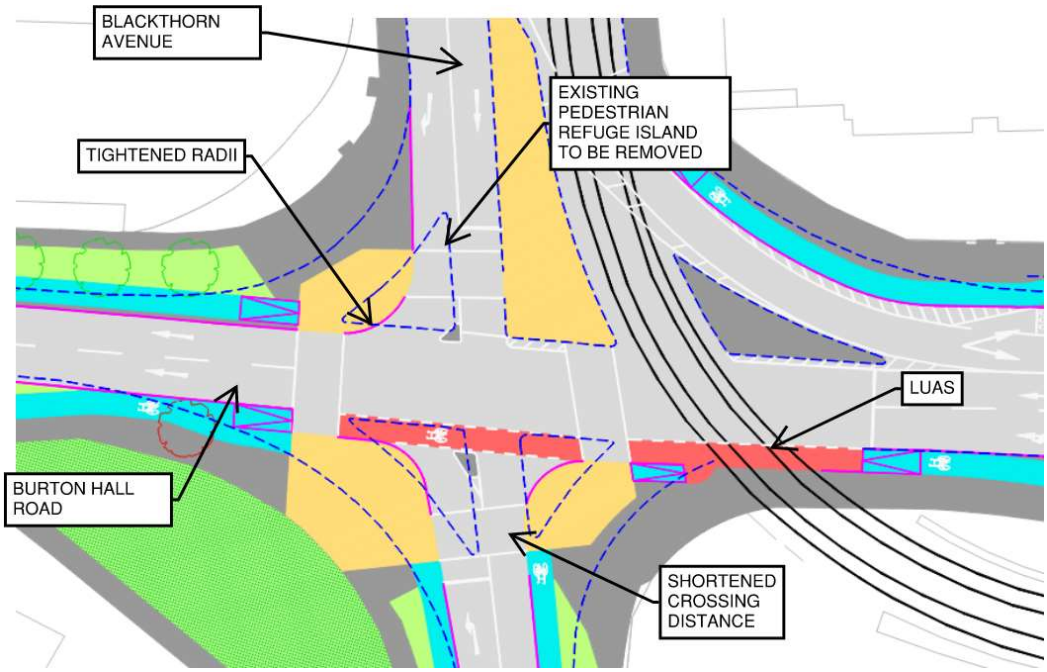


Figure 4.1 – Burton Hall Road/Blackthorn Avenue Junction

Blackthorn Road/ Blackthorn Drive Junction (at Beacon Hospital)

This is currently a busy car-oriented junction that is hostile for cyclists. There is a heavy movement of traffic, particularly in the AM and PM peaks, from Blackthorn Road (SW arm) to Blackthorn Dr (E Arm) as traffic enters and leaves the business park form the M50, there are two left turning lanes of traffic leaving the business park to cater for this volume. The right turning movement for cyclists leaving Blackthorn Dr (E Arm) was looked at in detail, as it conflicts with the primary traffic movement and presents possible safety issues.

Figs 4.2 & 4.3 below show two junction layouts that were considered for this junction.

Option 1 keeps cyclists on road with a dedicated cycle signal that would run separately to general traffic while on Option 2 cyclists making turning movements have been kept off road and would be required to use the shared areas and the signalised toucan crossings to pass through the junction. The pros and cons of each option were examined so that on balance the best option could be selected.

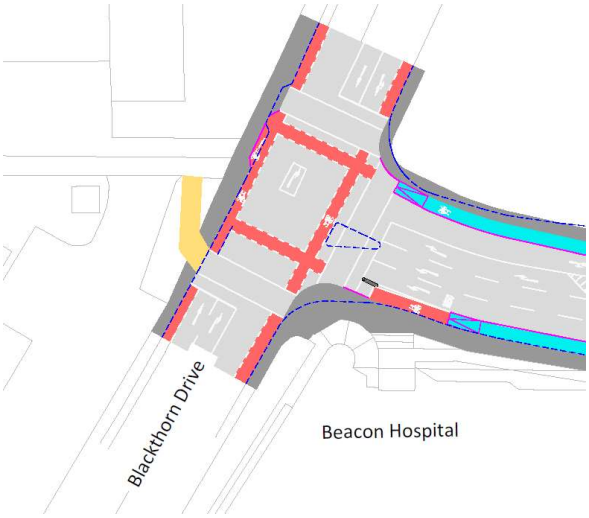


Figure 4.2 – Option 1

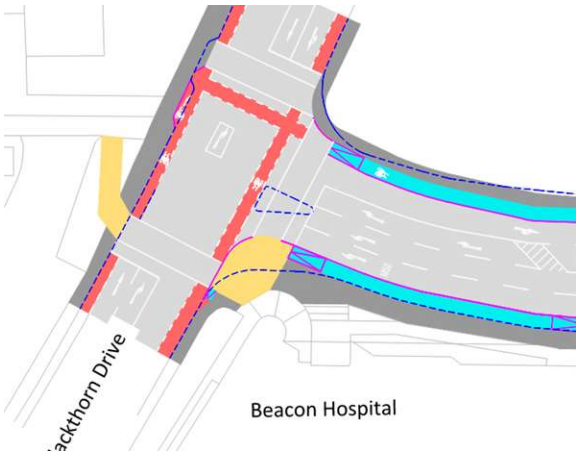


Figure 4.3 – Option 2

Option 1

Pros	Cons
• Cyclists kept on road which avoids any conflict with pedestrians • Direct route for right turning cyclists when they are given the green light	• Potential for cyclists to mistake the general traffic signal for their own and proceed into a dangerous conflict. • Separate cycle phase in the traffic will reduce capacity of junction for traffic. • Cyclists would be held while motorists proceed and could have long waiting times. Left turnings cyclists would likely ignore their light and proceed.

Option 2

Pros	Cons
• Turning cyclists kept away from traffic at all times • Left turning cyclists can proceed on red while only yielding to pedestrians	• Potential for cyclist/pedestrian collisions • Right turning cyclists required to use push button at toucan crossing

On balance the safety risks of Option 1 were considered to be greater due to the potential for collisions between right turning cyclists and left turning traffic/HGVs, Option 2 is also more convenient for left turning cyclists. For these reasons, Option 2 has been recommended as the preferred solution for this junction and is included as part of the preliminary design for this scheme.

The proposed arrangement in Option 2 is suitable for less experienced cyclists and allows for all turning movements to be made safely and away from traffic. The change of surface type (from asphalt to concrete) on the shared surface area will indicate that cyclists will be required to yield to pedestrians in these areas, this is in accordance with the hierarchy of road users outlined in DMURS.

SECTION 5: LANDSCAPING

The implementation of the proposed scheme has created an opportunity to develop the extent of existing landscaping within the study area. Where the carriageway alignment has shifted and lanes have been narrowed, designers have actively taken measure to reallocate space for the enhancement of landscaping features. Where possible it was considered preferable to include a large verge on one side of the road rather than two small verges on either side.

While every effort has been made to minimise this, it will be necessary to remove a number of existing trees to facilitate the scheme. Proposed tree planting locations have been included in the preliminary design drawings to compensate for these losses and a net positive result has been achieved. This is outlined in the table below.

Table 5.1

Item	No.
Proposed Trees	64
Trees to be removed	40
Additional Low-Level Planting (m^2)	353

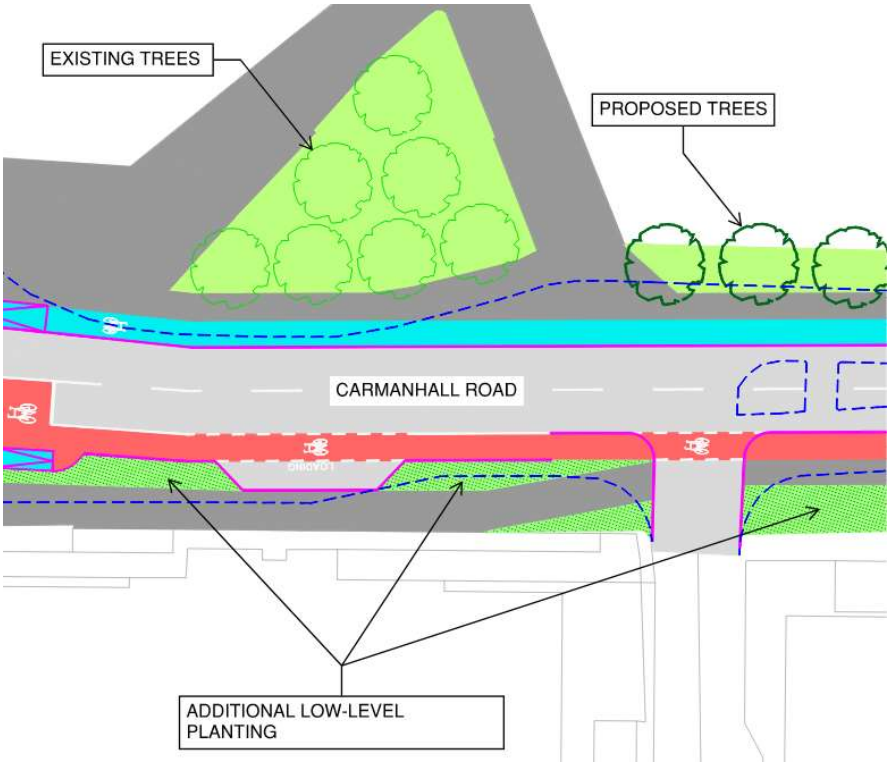


Figure 5.1

SECTION 6: DRAINAGE

Where possible the existing storm water drainage network within the study area will be maintained. The realignment of the existing carriageway will create a need for new gullies and connections to the existing mainline carrier drains. The change in total hardstanding area is negligible when considering any potential additional capacity requirements within the drainage network, the additional area is outlined in the table below. The addition of low-level planting areas will create opportunity to introduce Sustainable Urban Drainage Systems (SUDS).

Table 6.1

Scenario	Hardstanding Area (ha)
Existing	3.83
Proposed Design	3.89

SECTION 7: PAVEMENT

All road pavements will be rehabilitated to achieve a renewed design life of a minimum of ten years as part of this scheme. A pavement condition survey will be undertaken at the detailed design stage to highlight any areas where pavement defects are present. The road profile will also be regraded so that the of the crown of the road will follow the new road alignment. No areas of new road pavement will be constructed as part of this scheme.

The raised adjacent cycle track pavement build-up will be in accordance with Section 5.6 of the National Cycle Manual, details provided in Figure 6.1 below.

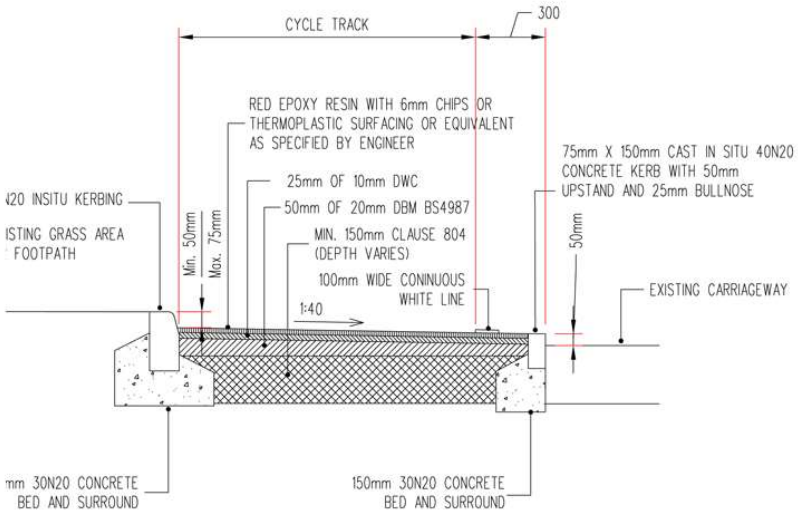


Figure 7.1 – Cycle Track Construction Detail

SECTION 8: UTILITIES

There will be a requirement to divert some sections of existing utilities, and their corresponding infrastructure (manholes, mini pillars etc) to facilitate this scheme. The following utilities are present on-site and may require diversion works

- Watermains
- Telecommunications (Including Fibre Optic Cabling)
- Foul Sewer
- Gas
- High Voltage and Low Voltage ESB
- Induction loop sensors

See example in Figures 7.1 and 7.2 below, where the existing traffic signal, mini pillar and ducting will need to be relocated to facilitate the scheme. A full design of all utility diversions required will be done at the detailed design stage.

Figure 8.1 – Area where existing utilities will need to be relocated

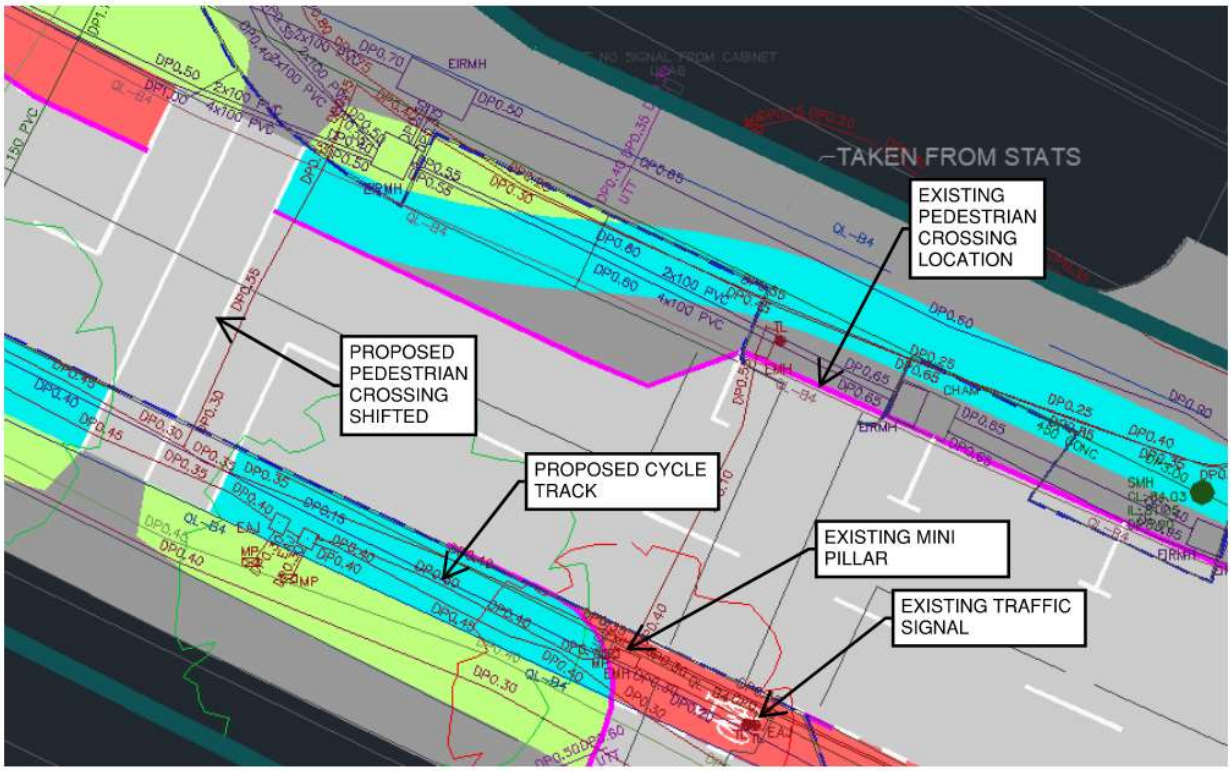


Figure 8.2 – Area where existing utilities will need to be relocated

SECTION 9: PUBLIC LIGHTING

There are currently 128 public lighting columns within the study area extents, approximately 90% of these will require relocation due to the construction of the scheme. As a result of this change an entirely new public lighting design for the study area will be prepared during the detailed design stage.

All new public lighting will be designed in accordance with best practice and will use LED energy saving lanterns.

SECTION 10: COST ESTIMATE

A preliminary cost estimate has been undertaken based on the level of design information available at this stage, and it is estimated that the construction cost of the scheme will be between **€4.2m and €4.8m.**

Note that this estimate does not contain allowances for VAT, inflation, risk or contingency.

SECTION 11: NEXT STEPS

This report summarises the steps taken in completing the preliminary design of the Sandyford Cycle Routes Scheme.

Moving forward, this scheme will be brought for non-statutory public consultation where suggestions from the public will be considered and implemented into the design where appropriate. Following this, the scheme will be subject to a Stage 1 Road Safety Audit.

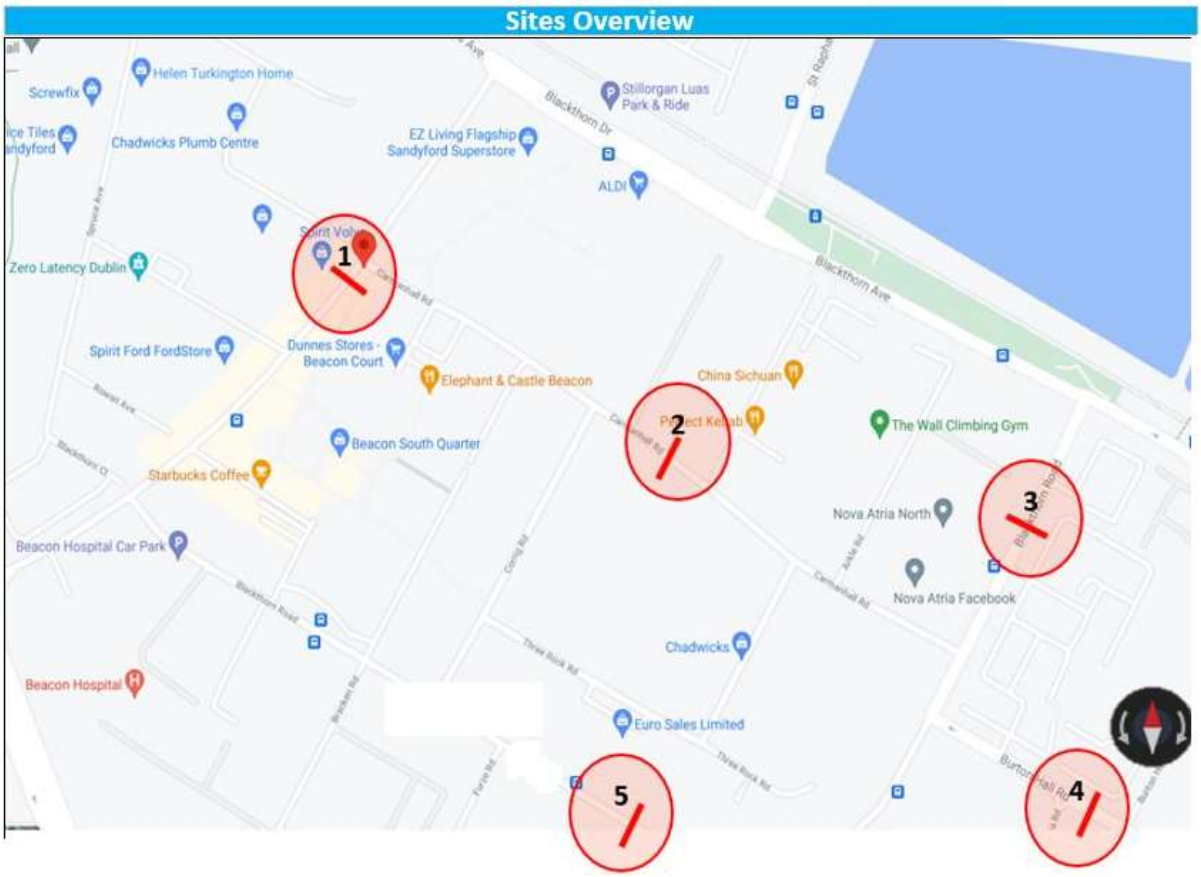
If granted approval to proceed the objective is to bring the project through the detailed design and tendering stages, with the construction stage commencing in the first half of 2022. The construction stage is expected to last approximately 9 months.

Appendix 1:
Traffic Speed and Volume Surveys

Traffic counts were undertaken by Irish Traffic Surveys over a 7-day period from 20th – 27th July 2021.

Surveys measured the speed and volume of traffic over the full 24 hours.

A plan showing the five locations where traffic counters were placed is shown below.



A table summarising the results of the surveys is show below

Site	Average Daily Traffic (ADT)	Mean Speed (km/h)	85th Percentile (km/h)	% of drivers exceeding the speed limit
1	9281	41.3	50.4	16%
2	2430	41.3	50.6	16%
3	7841	40.9	50.4	17%
4	8379	45.1	55.6	32%
5	5820	46	57.4	40%