

**Chapter 04**  
Proposed  
Scheme  
Description

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## 4. Proposed Scheme Description

### 4.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the Bray to City Centre Core Bus Corridor (CBC) Scheme (hereafter referred to as the Proposed Scheme).

Article 5(1)(a) of the EIA Directive<sup>1</sup> requires that the EIAR contains:

*'a description of the project comprising information on the site, design, size and other relevant features of the project'.*

Section 50(2)(b)(i) of the Roads Act 1993 (as amended) states that that the EIAR shall contain the following information:

*'a description of the proposed road development comprising information on the site, design, size and other relevant features of the development'.*

The layout of the Chapter begins with the Proposed Scheme Overview (Section 4.2). This is followed by Sections describing the Design Iteration process (Section 4.3) and the overall Design Principles applied to the Proposed Scheme (Section 4.4). Following this, there is a detailed description of the Proposed Scheme (Section 4.5) and a Section describing the key infrastructure elements associated with the Proposed Scheme (Section 4.6). These Sections should be read in their entirety in order to gain a full understanding of the Proposed Scheme and its associated key infrastructure elements.

### 4.2 Proposed Scheme Overview

The Proposed Scheme will commence at the junction of Leeson Street Lower and St Stephen's Green. The Proposed Scheme will run along Leeson Street Lower and Upper including the existing one-way system on Sussex Road. It will continue on Morehampton Road and Donnybrook Road through Donnybrook Village, and on to the Stillorgan Road. It will intersect with the Belfield / Blackrock to City Centre CBC Scheme at Nutley Lane and include the University College Dublin (UCD) Bus Interchange at the entrance to UCD. It will continue south on Stillorgan / Bray Road as far as the Loughlinstown Roundabout. The route will then proceed along the Dublin Road through Shankill and on to Bray through the Wilford Roundabout (M11 Access Roundabout), Dublin Road, and Castle Street. The Proposed Scheme will terminate at the Dargle River Crossing (Fran O'Toole Bridge).

The Proposed Scheme includes an upgrade of the existing bus priority and cycle facilities. The Proposed Scheme includes a substantial increase in the level of bus priority provided along the corridor, including the provision of additional lengths of bus lane resulting in improved journey time reliability. Throughout the Proposed Scheme bus stops will be enhanced to improve the overall journey experience for bus passengers and cycle facilities will be substantially improved with segregated cycle tracks provided along the links and protected junctions with enhanced signalling for cyclists provided at junctions.

Moreover, pedestrian facilities will be upgraded and additional signalised crossings be provided. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrians experience, an example of this can be seen in Donnybrook at Mulberry Lane.

Table 4.1 summarises the changes which will be made to the existing corridor as a result of the Proposed Scheme.

<sup>1</sup> Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter collectively referred to as the Environmental Impact Assessment (EIA Directive))

**Table 4.1: Summary of Changes as a Result of the Proposed Scheme**

<b>Total Length of Proposed Scheme</b>		<b>18.5km</b>
<b>Bus Priority</b>	<b>Existing (km)</b>	<b>Proposed Scheme (km)</b>
<b>Bus Lanes</b>		
Inbound	12.6	16.1
Outbound	12.8	17.1
<b>Bus Priority through Traffic Management</b>		
Inbound	0	2.3
Outbound	0	1.4
Total Bus Priority (both directions)	25.4	36.9 (+45%)
<b>Bus Measures</b>		
Proportion of Route with Bus Priority Measures	69%	99.6%
<b>Cycle Facilities – Segregated</b>		
Inbound	8.0	16.5
Outbound	9.4	16.9
<b>Cyclist Facilities – Non-segregated</b>		
Inbound	7.5	0.4
Outbound	7.4	0.0
<b>Cyclist Facilities – Overall</b>		
Total Cyclist Facilities (both directions)	32.3	33.8 (+5%)
Proportion Segregated (including Quiet Street Treatment)	47%	91%
<b>Other Features</b>		
Number of Pedestrian Signal Crossings	119	176
Number of Residential Properties with Land Acquisition	Not applicable	56

The description of the Proposed Scheme (Section 4.5) is supported by a series of drawings (listed in Table 4.2), which are contained in Volume 3 of the EIAR, and these should be read in conjunction with this Chapter.

**Table 4.2: List of Drawings**

<b>Drawing Series Number</b>	<b>Description</b>
BCIDB-JAC-SPW_ZZ-0013_XX_00-DR-CR-9001	Site Location Plan
BCIDB-JAC-GEO_GA-0013_XX_00-DR-CR-9001	General Arrangement
BCIDB-JAC-GEO_HV-0013_ML_00-DR-CR-9001	Mainline Plan and Profile
BCIDB-JAC-GEO_CS-0013_XX_00-DR-CR-9001	Typical Cross Sections
BCIDB-JAC-ENV_LA-0013_XX_00-DR-LL-9001	Landscaping General Arrangement
BCIDB-JAC-PAV_PV-0013_XX_00-DR-CR-9001	Pavement Treatment Plans
BCIDB-JAC-SPW_BW-0013_XX_00-DR-CR-9001	Fencing and Boundary Treatment
BCIDB-JAC-TSM_GA-0013_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDB-JAC-LHT_RL-0013_XX_00-DR-EO-9001	Street Lighting
BCIDB-JAC-TSM_SJ-0013_XX_00-DR-TR-9001	Junction System Design
BCIDB-JAC-DNG_RD-0013_XX_00-DR-CD-9001	Proposed Surface Water Drainage Works
BCIDB-JAC-UTL_UD-0013_XX_00-DR-CU-9001	IW Foul Sewer Asset Alterations
BCIDB-JAC-UTL_UE-0013_XX_00-DR-CU-9001	ESB Asset Alterations
BCIDB-JAC-UTL_UG-0013_XX_00-DR-CU-9001	GNI Asset Alterations
BCIDB-JAC-UTL_UW-0013_XX_00-DR-CU-9001	IW Water Asset Alterations
BCIDB-JAC-UTL_UX-0013_XX_00-DR-CU-9001	Telecommunications Asset Alterations
BCIDB-JAC-UTL_UC-0013_XX_00-DR-CU-9001	Combined Existing Utility Records
BCIDB-JAC-STR_GA-0013_XX_00-DR-SS-9001	Structures General Arrangement
BCIDB-JAC-ENV_LA-0013_IN_00-DR-LL-9001	UCD Bus Interchange General Arrangement
BCIDB-JAC-BLD_ZZ-0013_XX_01-DR-AA-0001	Woodbrook Side Lodge General Arrangement (Plans & Elevations)
BCIDB_JAC_SPW_AW-0013_XX_00_DR_0001	Circle K General Arrangement

## 4.3 Design Iteration

The design of the Proposed Scheme has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme, described in Chapter 1 (Introduction), undertaken throughout the option selection and design development process has been incorporated, where appropriate.

Examples of how the design evolved are as follows:

- The design along Leeson Street Lower between the start of the Proposed Scheme and Hatch Street Lower / Pembroke Street Upper junction was amended to include a bus gate and general traffic diversion to Hatch Street / Earlsfort Terrace to reduce impact on heritage kerbs and provide improved safety for cyclists;
- The design in Donnybrook between Eglinton Terrace to Belmont Avenue has been further developed. The southbound bus lane is maintained through the midway bend. Signal Controlled Priority (SCP) has been introduced at Eglinton Terrace in the northbound direction to provide buses with a level of priority through this section. This follows the review of additional topographical surveys which provided a better indication of space constraints, and consideration of SCP along narrow sections of road to improve cyclist safety and pedestrian infrastructure;
- The design of the UCD Bus Interchange facility was further developed from proposals limited to interchange bus stops at the on-slip and off-slip, to a larger facility with additional bus capacity within the UCD campus;
- The addition of a two-way cycle track connection along the R138 Stillorgan Road / Merrion Grove junction to the Coláiste Eoin School grounds to provide a more direct connection to the school for school-going cyclists in both directions;
- The design of the cycle facilities on the N11 have been further developed, particularly at St Brigid's Church Road where the design was amended to bring the cycle track behind the proposed bus stop island, along St Brigid's Church Road to bypass a pinch point on the N11 alongside a retaining wall. This design change removes the need for large-scale structural or utility interventions, while providing a safer route for cyclists;
- At Patrician Villas / St Laurence Park, the widening of the pedestrian subway and the footpath connection along the N11 was value engineered is now proposed to lengthen the subway on one side (east) and new footpaths and cycle tracks will run parallel to the N11 mainline in both directions;
- Changes to the design in order to reduce impacts on trees, specifically through the Shankill area (at Shanganagh Park and Cemetery) and at the Upper Dargle Road junction where there is a significant tree under a Tree Protection Order. Two-way cycle track run through the Shanganagh Park and Shanganagh Cemetery;
- Following further engagement with local community in Shankill, the design was amended through the village:
  - Bus lanes and segregated cycle lanes were removed and bus priority is provided through Signal Control Priority (SCP). This proposal will maintain existing footways and current village environment;
  - Two-way cycle track has been added to link Corbawn Lane to the two schools along Stonebridge Road; and
  - Move the northbound SCP from the Quinn's Road / Cherrington Drive junction to a new location between Cherrington Drive and Castle Farm, with further development in this area for the provision of a right turning lane at Olcovar;
- The design has been further developed between Ravensdale Park and Dwyer Park, at the end of the Proposed Scheme, to provide for continuous cycle lane and bus lane while minimising the impact to properties and the heritage wall on the east side at Belton Terrace and the Castle Street Shopping Centre;
- The design has been further developed to coordinate with other developments and schemes, such as the Fitzwilliam Cycle Route scheme (Dublin City Council (DCC) 2023) at Fitzwilliam Place including the urban realm regeneration at the kiosk corner, the Dodder Greenway scheme interface

at Eglinton Road, the UCD Masterplan, Stillorgan Movement Plan, and the Strategic Housing Developments at Shanganagh Castle and Woodbrook in Shankill and tie-in with the Fran O'Toole Bridge Improvement Scheme at Bray end; and

- The junction layouts were modified over the course of the design process to provide more protection for cyclists along the length of the Proposed Scheme, including the addition of separately signalised stages for cyclists at large junctions.

## 4.4 Design Principles

The design of the Proposed Scheme was developed with reference to the Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors (PDGB) (refer to Appendix A4.1 in Volume 4 of this EIAR). This guidance document was prepared to ensure that a consistent design approach for the Core Bus Corridor Infrastructure Works was adopted based on the objectives of the Proposed Scheme. The project objectives are described in full in Chapter 2 (Need for the Proposed Scheme).

The purpose of the PDGB is to complement existing guidance documents / design standards relating to the design of urban streets, bus facilities, cycle facilities and urban realm, which include the following:

- The Design Manual for Urban Roads and Streets (DMURS) (Government of Ireland 2013);
- The National Cycle Manual (NCM) (NTA 2011);
- National Road Design Standards (Transport Infrastructure Ireland (TII));
- The Traffic Signs Manual (TSM) (Department of Transport, Tourism and Sport 2019);
- Guidance on the Use of Tactile Paving Surfaces (UK Department for Transport (DfT) 2007);
- Building for Everyone: A Universal Design Approach (National Disability Authority (NDA) 2020); and
- Greater Dublin Strategic Drainage Study (Irish Water 2005).

An example of the application of the design principles for the Proposed Scheme can be seen at the junction of Donnybrook Road with Anglesea Road / Beaver Row / Ailesbury Road where an existing signalised junction facilitates the movement of vehicles, but provides poor facilities for pedestrians, cyclists and buses. Dedicated pedestrian crossing are not present on all arms along the Donnybrook Road. Cyclists have no dedicated cycle tracks and the existing arrangement leads to conflict with the left turning traffic, in particular the inbound left turn to Eglinton Road, resulting in unsafe conditions for these vulnerable road users. While buses on the main corridor can pass through the junction with relative ease, there are not dedicated bus lanes to provide for bus priority. The junction has to accommodate turning movement in and out from Anglesea Road / Beaver Row / Ailesbury Road / Eglinton Road.

Having considered the objectives for the Proposed Scheme and using the principles set out in the PDGB, a traffic revised signal-controlled junction arrangement was developed to address the issues outlined above. This layout could be used to control the flow of traffic and provide a high level of priority for buses. In addition, high quality signal-controlled pedestrian crossing facilities can be provided on all arms of the junction, close to the pedestrian desire lines. The junction also accommodates the integration with the proposed Dodder Greenway scheme. For cyclists, taking into account the high traffic volumes and speeds, a segregated facility is provided where cyclists are segregated in both space and time from moving vehicles. Separator kerbs / islands are also provided where required to segregate from the buses at the junction which significantly enhances the safety of these vulnerable road users. The revised layout is typical of junctions along the corridor that have been developed to meet the objectives of the Proposed Scheme.

Accessibility for mobility impaired users is a core element of the Proposed Scheme design and it has been informed by the principles of DMURS (Government of Ireland 2013), Building for Everyone: A Universal Design Approach (NDA 2020), How Walkable is Your Town? (NDA 2015); Shared Space, Shared Surfaces and Home Zones from a Universal Design Approach for the Urban Environment in Ireland (NDA 2012); Best Practice Guidelines, Designing Accessible Environments (Irish Wheelchair Association 2020); Inclusive Mobility (UK DfT 2005); Guidance on the Use of Tactile Paving Surfaces (UK DfT 2007); and BS 8300-1:2018 Design of an Accessible and Inclusive Built Environment – External Environment – Code of Practice (British Standards Institution (BSI) 2018). Accessibility is also addressed in Chapter 12 of the PDGB. Further detail on accessibility for mobility impaired users is given in Section 4.6.5.



The Proposed Scheme, which has been developed after the consideration of reasonable alternatives and which achieves the aim and objectives for the Proposed Scheme, is described in detail in Section 4.5. Further detail on the key infrastructure elements that comprise the Proposed Scheme is provided in Section 4.6.

## **4.5 Description of the Proposed Scheme by Section**

The Proposed Scheme commences at the St Stephen's Green / Leeson Street Lower Junction and runs along the R138 (Leeson Street Lower / Leeson Street Upper / Sussex Road / Morehampton Road / Donnybrook Road / Stillorgan Road), and includes a bus interchange facility at the Stillorgan Road entrance to UCD. It continues along the N11 (Stillorgan Road / Bray Road), R837 Dublin Road, R119 Dublin Road and R761 (Dublin Road / Castle Street), ending at the northern side of the Fran O'Toole Bridge in Bray, where it will tie into the proposed Bray Bridge Improvement Scheme.

For the purposes of describing the Proposed Scheme it has been split into four sections as follows:

- Section 1: Leeson Street to Donnybrook (Anglesea Road Junction);
- Section 2: Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout;
- Section 3: Loughlinstown Roundabout to Bray North (Wilford Roundabout); and
- Section 4: Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge).

### **4.5.1 Section 1 – Leeson Street to Donnybrook (Anglesea Road Junction)**

#### **4.5.1.1 General Overview of the Proposed Scheme**

The section runs along Leeson Street Lower and Upper from the junction with St Stephen's Green, providing continuous bus priority and segregated cycle tracks in each direction. A bus gate has been located at the end of Leeson Street Lower before the St Stephen's Green junction. General inbound traffic is now to be directed from Leeson Street Lower on to Hatch Street Lower, and then on to Earlsfort Terrace in order to reach St Stephen's Green. There will be two-way general traffic introduced on Earlsfort Terrace between the Hatch Street Lower Junction and St Stephen's Green to facilitate this. This will require the northbound bus lane on Earlsfort Terrace to be made a general traffic lane. The existing left turning ban at Earlsfort Terrace towards Stephen's Green North has been removed to facilitate the general traffic movement.

The one-way system on Sussex Road and the adjacent section of Leeson Street Upper have been retained, with a reduced number of general traffic lanes in each direction to allow for full bus and cycle lane provision and retain existing parking. The proposed junction at Fitzwilliam Place and Leeson Street Lower from the Fitzwilliam Cycle Route (DCC 2023) has been incorporated into the Proposed Scheme, while revised junction layouts at Appian Way, Waterloo Road, and Wellington Place have been designed to improve road user throughput and safety.

The full cycle track and bus lane provision continues along Morehampton Road, where in places the cycle tracks are brought behind the tree line. This will impact a number of on-street parking bays between Wellington Place and Belmont Avenue. A 'No Right Turn' restriction has been added from Morehampton Road onto Auburn Avenue to reduce crossing point conflicts.

From Mulberry Lane to Rampart Lane the northbound bus lane has been removed to allow for two reduced width segregated cycle tracks in both directions, while the southbound bus lane has been retained along this narrow section. SCP at the Eglinton Terrace junction on Donnybrook Road will provide northbound bus priority over this length. The perpendicular parking spaces south of Mulberry Lane have been converted to parallel spaces, while the echelon parking spaces on the other side of the road have been retained. From Eglinton Terrace southwards to Eglinton Road a dedicated bus lane, segregated cycle track, and general traffic lane are provided in each direction. The tie in for the proposed Dodder Greenway, designed and built by others, has been included in the design at the Eglinton Road junction on Donnybrook Road.

On Donnybrook Road between Eglinton Road and Anglesea Road in the southbound direction, there is a straight ahead and left-turn lane, a straight ahead general traffic lane, a bus lane, and a cycle track provided. The northbound approach on the Stillorgan Road towards Beaver Row has a cycle track, bus lane, a combined left and ahead general traffic lane, and a right-turn lane to Ailesbury Road. Between Beaver Row and Eglinton Road there is a cycle track, bus lane, and a combined left and ahead traffic lane.

Coach laybys have been proposed at certain locations to reduce instances of loading coaches blocking the bus lane.

It is proposed that, where possible along Section 1 of the Proposed Scheme, existing kerb lines will be retained and the BusConnects Design Guide will be adhered to. SCP shall be employed at certain locations where full segregated bus lane provision has not been possible due to space constraints.

#### 4.5.1.2 Deviations from Standard Cross Sections

The width of the cross-sectional elements as outlined in Section 4.6 have been reduced at a number of constrained locations across the Proposed Scheme. The deviations within Section 1 – Leeson Street to Donnybrook (Anglesea Road Junction) are detailed in Table 4.3.

**Table 4.3: Reduced Standard Cross Sections on Section 1 of the Proposed Scheme**

Location	Design Element	DMURS	Design	Justification
B10 – B75	Cycle Track (southbound)	2.0m	Varies Approx. 1.5m – 1.75m	Cycle track narrows to between 1.5m – 1.75m over a length of 60m behind combined bus and coach stop to reduce cyclist speed.
A535 – A560	Footpath (northbound)	2.0m	1.5m	Footpath narrows locally to 1.5m at pinch point on Leeson Street canal bridge. Ties in to existing.
A640 – A690	Cycle Track (northbound)	2.0m	1.5m	Cycle track narrows to 1.5m over a length of 40m behind bus stop and coach stop to reduce cyclist speed.
A1015 – A1050	Cycle Track (southbound)	2.0m	1.5m	Cycle track narrows locally to 1.5m over a length of 10m to tie into existing kerbs and avoid impacting trees.
A1615 – A1690	Cycle track (both directions)	2.0m	Varies Approx. 1.5m – 2m	Cycle track narrows locally to 1.8m over a length of 30m southbound to tie into existing kerbs, and narrows locally to 1.5m over a length of 40m northbound on approach to and behind combined bus stop to reduce cyclist speed.
A1730 – A1790	Cycle track (both directions)	2.0m	1.5m	Cycle track narrows to 1.5m over a length of 60m northbound and southbound to tie into existing kerbs.
A1790 – A1840	Footpath (northbound)	2.0m	1.8m	Footpath narrows to 1.8m over a length of 50m due to space constraints.
A1790 – A1910	Cycle Track (southbound)	2.0m	Varies Approx. 1.5m	Cycle track narrows to 1.5m over a length of 150m to tie into existing kerbs.
A1910 – A2000	Cycle track (both directions)	2.0m	Varies Approx. 1.5m	Cycle track narrows to 1.5m over a length of 40m southbound to tie into existing kerbs, and narrows to 1.5m over a length of 90m northbound on the approach to and behind combined bus stop to reduce cyclist speed.
A2025 – A2045	Cycle Track (northbound)	2.0m	1.5m	Cycle track narrows to 1.5m over a length of 20m due to space constraints.
A2115 – A2250	Cycle track (both directions)	2.0m	Varies Approx. 1.3m – 1.75m	Cycle track narrows to 1.5m over a length of 135m southbound and 60m northbound to tie into existing kerbs. Cycle track narrows at pinch points to between 1.3 – 1.5m width.
A2115 – A2310	Footpath (both directions)	2.0m	Approx. 1.5m	Various pinch point locations along Donnybrook Road.
A2310 – A2360	Cycle Track (southbound)	2.0m	1.5m	Cycle Track narrows locally to avoid impacting existing tree.
A2360 – A2460	Cycle Track (northbound)	2.0m	1.5m	Cycle Track narrows locally to provide full width footpath.
A2520 – A2580	Cycle Track (northbound)	2.0m	1.7m	Cycle Track tapers from full width to reduced width through junction.
A2520 – A2580	Footpath (southbound)	2.0m	1.5m	Footpath narrows to 1.5m to tie into existing bridge boundary, to match existing.
A2630 – A2650	Cycle Track (northbound)	2.0m	1.6m	Cycle Track narrows locally at pinch point.

#### 4.5.1.3 Bus Lane Provision

An overview of the bus lane provision as part of the Proposed Scheme is provided in Section 4.6. As outlined within that section, full bus priority through the use of dedicated bus lanes is not possible at all locations, and SCP is used in a number of junctions in Section 1 of the Proposed Scheme as listed in Table 4.4.



**Table 4.4: Proposed SCP Junctions in Section 1 of the Proposed Scheme**

Junction Location	Reason for Signal Priority
Leeson Street Lower / Hatch Street Junction	Traffic in the southbound direction is already a bus and local access only route. Northbound straight-ahead traffic will be limited to buses and local access only, with SCP provided for buses at the junction. Northbound general traffic will be diverted along Hatch Street Lower and Earlsfort Terrace. Approx. Chainage A20 to A230 both directions.
Leeson Street Lower / Fitzwilliam Place Junction	SCP is provided here where the cross section is constrained at the existing canal bridge and on approach, to provide dedicated cycle tracks and maximise footpath widths in a high-volume pedestrian area. Approx. Chainage A460 to A570 Southbound.
Leeson Street Lower / Grand Parade Junction	SCP is provided here where the cross section is constrained at the existing canal bridge, to provide dedicated cycle tracks and retain existing footpath widths in a high-volume pedestrian area. Approx. Chainage A530 to A570 Northbound.
Leeson Street Upper / Wellington Place Junction	The provision of 2.0m cycle tracks northbound on Morehampton Road has shifted the contraflow road markings and paved traffic-signal island alignment. Available carriageway width alongside these contraflow road provisions is locally narrowed. SCP is adopted locally here to avoid reductions in footpath and cycle track widths. Approx. Chainage A1300 to A1370 Southbound.
Donnybrook Road / Belmont Avenue Junction	SCP has been provided in the northbound direction at this junction to maximise available footway space for pedestrians and a time-plated loading bay in this busy location. Southbound traffic lanes have also been widened to provide minimum desired lane width, and to provide a dedicated right turn lane onto Belmont Avenue. Approx. Chainage A1950 to A2000 Northbound.
Donnybrook Road from Eglinton Terrace to the Crescent	Bus priority by provision of SCP in the northbound direction has been adopted over this section of the corridor to minimise impacts to existing property, noting the constrained cross section of the existing corridor at this location. Approx. Chainage A2100 to A2320 Northbound.

#### 4.5.1.4 Bus Stops

The different types of bus stop (island, shared landing area and inline) are described in Section 4.6. Seven of the 25 proposed bus stops within this section of the Proposed Scheme are Island Bus Stops. The bus stop locations and types are outlined in Table 4.5 and shown in the General Arrangement series of drawings (BCIDB-JAC-GEO\_GA-0013\_XX\_00-DR-CR-9001) in Volume 3 of this EIAR. Further details of bus stop design are included in the PDGB (NTA 2021) in Appendix A4.1 in Volume 4 of this EIAR.

**Table 4.5: Proposed Bus Stop Locations in Section 1 of the Proposed Scheme**

Inbound / Outbound	Bus Stop Name	Bus Stop Number	Chainage	Bus Stop Type	Bus Shelter
Inbound	Eglinton Road (Coach)	-	A2485	Layby	New bus shelter
Inbound	Eglinton Road	773	A2475	Layby	New bus shelter
Inbound	Mount Eden	775	A1925	Island	New bus shelter
Inbound	Morehampton Terrace	776	A1630	Island	New bus shelter
Inbound	Royal Hospital	777	A1415	Shared Landing	No bus shelter
Inbound	Leeson Street Upper	906	A1170	Shared Landing	No bus shelter
Inbound	St John's Ambulance	907	A850	Shared Landing	No bus shelter
Inbound	Grand Parade	908	A675	Island	No bus shelter
Inbound	Grand Parade (Coach)	-	A645	Island	No bus shelter
Inbound	Fitzwilliam Place	909	A400	Shared Landing	No bus shelter
Inbound	Leeson Street Lower (Coach)	-	A340	Shared Landing	No bus shelter
Inbound	Embassy of Malta (Coach)	-	A215	Shared Landing	No bus shelter
Inbound	Embassy of Malta	786	A200	Shared Landing	No bus shelter
Outbound	Leeson Street Lower (Coach)	-	A115	Shared Landing	No bus shelter
Outbound	Leeson Street Lower	845	A130	Shared Landing	No bus shelter
Outbound	Fitzwilliam Place	846	A365	Shared Landing	No bus shelter
Outbound	Leeson Close (Coach)	-	A415	Shared Landing	No bus shelter
Outbound	Mespil Road	847	A620	Island	No bus shelter
Outbound	Sussex (Coach)	-	A910 (B300)	Layby	New bus shelter
Outbound	Burlington Hotel	848	A950	Island	New bus shelter
Outbound	Leeson Village	2795	A1265	Shared Landing	No bus shelter
Outbound	Morehampton Court	756	A1540	Shared Landing	New bus shelter
Outbound	Brendan Road	757	A1820	Shared Landing	New bus shelter
Outbound	Victoria Avenue	758	A2050	Shared Landing	No bus shelter
Outbound	Donnybrook Stadium	759	A2440	Shared Landing	New bus shelter

#### 4.5.1.5 Cycling Provision

The specific proposals for cycling facilities in Section 1 of the Proposed Scheme are described below. Provision for cyclists at the signal-controlled junctions are described in Section 4.6.

Cycling is to be provided from Leeson Street Lower to R138 at Donnybrook Church (approximately 4km) as follows:

- Segregated cycle track provided in each direction running adjacent to the direction of vehicle travel, which in some locations passes behind the roadside tree line; and
- Signal-controlled crossings provided at all junctions through a combination of parallel pedestrian / cycle crossings and shared toucan crossings.

These cycle tracks follow the 2013 Greater Dublin Area Cycle Network Plan (GDACNP) (NTA 2013) Primary Route number 12 (also a Primary Route under the new GDACNP 2022 (NTA 2022a)). There are existing cycle lanes in both directions along the majority of this section of the Proposed Scheme, however these will be reconfigured and upgraded to the arrangement set out in the PDGB (including 120mm upstand kerb between cycle track and traffic lane).

A tie-in is provided to a Secondary Route within the GDACNP 2022 at the Fitzwilliam Place / Adelaide Road / Leeson Street Lower junction, at the Grand Parade / Mespil Road / Leeson Street Upper junction, at the Appian Way / Leeson Street Upper junction, at the Waterloo Road / Leeson Street Upper junction, and at the Wellington Place / Leeson Street Upper junction. A tie-in is also provided to the Grand Canal Greenway route at the Wilton

Terrace / Leeson Street Lower junction, and to the Dodder Greenway route at and across from the Eglinton Road / Donnybrook Road junction.

#### 4.5.1.6 Junction Information

An overview of the approach to junction review and design is provided in Section 4.6. The major and moderate junctions (signalised) within Section 1 – Leeson Street to Donnybrook (Anglesea Road Junction) of the Proposed Scheme are outlined in Table 4.6.

**Table 4.6: Major and Moderate Junctions (Signalised) within Section 1 of the Proposed Scheme**

Junction Location	Description
<b>Major Junctions (Signalised)</b>	
N/A	N/A
<b>Moderate Junctions (Signalised)</b>	
Leeson Street Lower St Stephen's Green	Modified four-arm signal-controlled junction with bus priority
Hatch Street Earlsfort Terrace	Modified four-arm signal-controlled junction
Hatch Street Lower Pembroke Street Upper Leeson Street Lower	Modified four-arm signal-controlled junction with bus priority
Fitzwilliam Place Wilton Terrace Adelaide Street Leeson Street Lower	Modified four-arm signal-controlled junction with bus priority
Grand Parade Mespil Road Leeson Street Upper	Modified four-arm signal-controlled junction with bus priority
Dartmouth Road Leeson Street Upper	Modified three-arm signal-controlled junction with bus priority, northbound only
Sussex Road Sussex Terrace	New three-arm signal-controlled junction with bus priority, southbound only
Burlington Road Leeson Street Upper	Modified three-arm signal-controlled junction with bus priority, southbound only
Appian Way Leeson Street Upper	Modified three-arm signal-controlled junction with bus priority
Waterloo Road Leeson Street Upper	Modified three-arm signal-controlled junction with bus priority
Wellington Place Leeson Street Upper	Modified three-arm signal-controlled junction with bus priority
Bloomfield Avenue Morehampton Road	Modified three-arm signal-controlled junction with bus priority
Herbert Park Morehampton Road	Modified four-arm signal-controlled junction with bus priority
Belmont Avenue Victoria Avenue Morehampton Road Donnybrook Road	New four-arm signal-controlled junction with bus priority
Eglinton Terrace Donnybrook Road	New pre-signal for northbound bus priority
Eglinton Road Donnybrook Road	Modified three-arm signal-controlled junction with bus priority
Anglesea Road Beaver Row Donnybrook Road Stillorgan Road	Modified three-arm signal-controlled junction with bus priority

#### 4.5.1.7 Parking and Loading Bays

Changes to the parking and loading provisions along Section 1 – Leeson Street to Donnybrook (Anglesea Road Junction) as a result of the Proposed Scheme are shown in Table 4.7 and Table 4.8 respectively.

**Table 4.7: Section 1 – Leeson Street to Donnybrook (Anglesea Road Junction): On-Street Parking Change Impact Summary**

Location	Type of Parking	Existing	Proposed	Change
Leeson Street Lower and Upper, Sussex Road	Designated Paid	2	0	-2
	Permit	56	59	+3
	Disabled Permit	1	1	0
	Taxi	30	9	-21
Morehampton Road	Designated Paid	20	0	-20
	Permit	21	3	-18
	Disabled Permit	1	1	0
	Informal	4	0	-4
Donnybrook Road	Designated Paid	35	21	-14
	Permit	1	0	-1
	Disabled Permit	1	1	0
	Commercial (car sales)	15	5	-10
Hatch Street	Designated Paid	50	50	0
	Permit	3	3	0
	Disabled Permit	1	1	0
Approximate adjacent informal parking within 200-250m		914	914	0
Total		1155	1068	-87

**Table 4.8: Section 1 – Leeson Street to Donnybrook (Anglesea Road Junction): Existing and Proposed Loading Bays**

Location	Type of Parking	Existing	Proposed	Change
Leeson Street Lower and Upper, Sussex Road	Loading Bay	8	2	-6
Morehampton Road	Loading Bay	2	3	+1
Donnybrook Road	Loading Bay	5	3	-2
Hatch Street	Loading Bay	2	2	0
Total		17	10	-7

#### 4.5.1.8 Landscape and Urban Realm

For an overview of the design principles and approach reference should be made to Section 4.6.12. The following sections provide a description of specific landscape and urban realm design works in Section 1 of the Proposed Scheme.

##### 4.5.1.8.1 Leeson Street Lower to Eustace Bridge

**Existing Character:** City centre character with four-storey buildings with continuous frontages with some pedestrian guardrails. This section includes a wide carriageway with minimal pedestrian crossing points. The end of Leeson Street Lower, at the canal, marks a threshold between the city street and inner suburban character. Eustace Bridge junction is a complex and busy area with multiple pedestrian and cycle crossings.

**Design Proposals:** The aim is to provide an upgraded and consistent urban realm quality along this section. At the northern end of Leeson Street Lower a new combined coach and local southbound bus stop is proposed. The new kerb alignment results in a resurfaced section of footpath. It is proposed to retain the existing kerb line and footways elsewhere along this section. Where the kerb line is to be moved granite kerbs would be retained and reused where possible. High quality concrete paving is proposed to enhance footways. Priority crossing with concrete setts is proposed to enhance pedestrian priority. The street is to be de-cluttered where possible.

The design proposes urban realm improvements to enhance the Eustace Bridge threshold into the City Centre for pedestrians and cyclists (see Image 4.1). Designing the urban realm with functional delineation will also improve safety for pedestrians and cyclists. The proposed materials include high quality concrete paving and granite kerbs to unify the materials around this complex junction. Existing tree surrounds would be widened and surfaced with self-binding gravel. The island at Adelaide Road with the existing café is to be re-designed and surfaced with a new paving layout as part a separate scheme by DCC.



**Image 4.1: Proposals Either Side of Eustace Bridge**

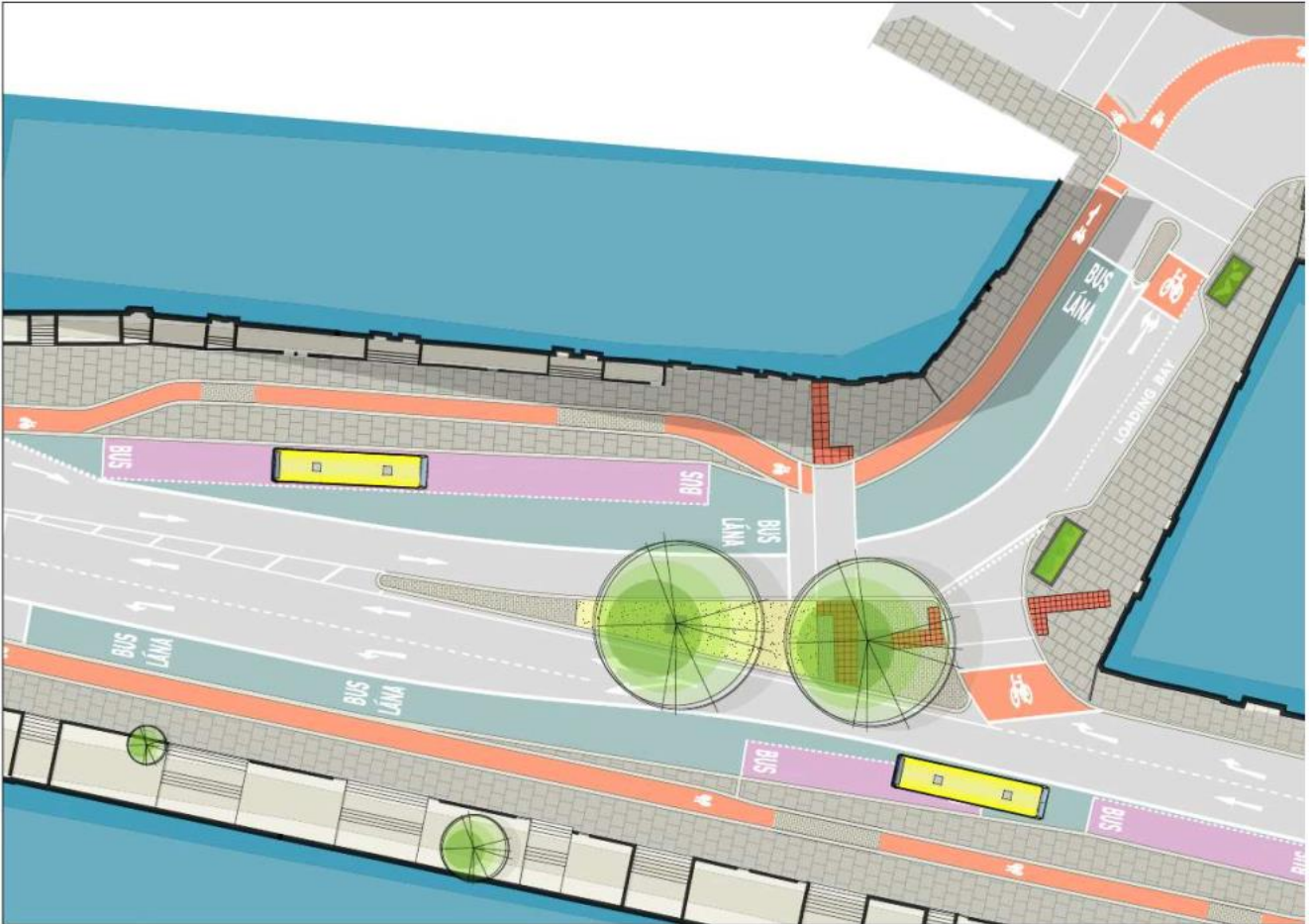
#### 4.5.1.8.2 Leeson Street Upper, Sussex Road

**Existing Character:** This section has an inner suburban residential character with a one-way gyratory. It includes a large central median on Leeson Street Upper with existing trees and a sculpture. Leeson Street Upper has significant pedestrian movements which reduce on the approach to Sussex Road. There are two and three-storey residential buildings along Leeson Street Upper and Sussex Road, with a small section of four-storey residential buildings along part of Leeson Street Upper. There are popular pubs, restaurants and a retail area at the junction with Sussex Terrace. Standard materials are applied to footpaths.

**Design Proposals:** The proposed design (see Image 4.2 and Image 4.3) is to enhance the footpaths where works to the kerb alignment are proposed with high quality concrete paving and wide granite kerbs to match. Much of the inner footway along the gyratory and Leeson Street Upper will remain unaffected with enhancements focussed on the retail / commercial areas. The existing loading bay on the north side of Sussex Road between the two pubs will be removed to eliminate any safety concerns regarding interactions with the cycle track / bus lane. Loading will be focussed on the bay around the corner on Sussex Terrace. The footpath here is proposed to be widened and resurfaced in concrete paving and granite kerbs to create additional space outside the pub and greater protection from passing vehicles. In addition, the existing parking / loading facility on the south side of Sussex Road will be lengthened along with the introduction of low-level planting beds with robust ornamental planting.



The eastern part of Sussex Road will be enhanced with concrete paving to facilitate the extension of the city centre materials into this area, while the consistent use of materials will unify this section. Good quality granite kerbs are proposed to be retained and re-used where possible. The central median island where Leeson Street Upper transitions to Leeson Street Lower, is to be resurfaced in concrete paving where pedestrian movements are, along with granite kerbs to enhance the setting of the existing sculpture and trees. The surfaces surrounding trees are to be improved by opening it up and surfacing with a self-binding gravel.



**Image 4.2: The Integration of Dedicated Cycle Lanes and Bus Stop Facilities at Leeson Street Upper**





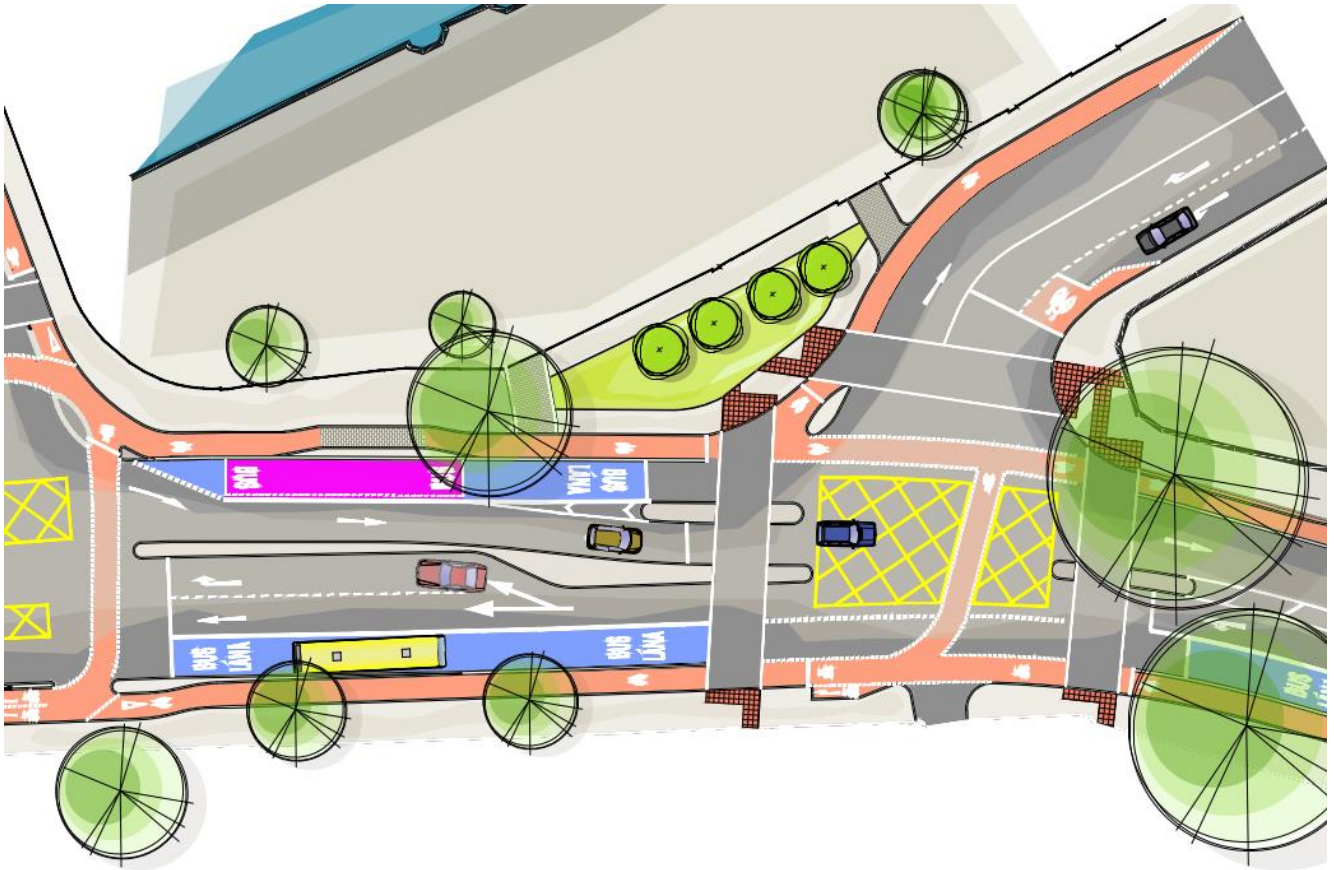
**Image 4.3: Widened and Enhanced Footway Near Sussex Terrace**

#### 4.5.1.8.3 Leeson Street Upper to Wellington Place

**Existing Character:** This section is predominantly inner suburban residential in character with front gardens, hedges and mature street trees. It is dominated by vehicular movements with limited active frontages. There is a listed building in this section. Standard concrete materials are applied along footways.

**Design Proposals:** Proposed footpaths are predominantly poured concrete with concrete kerbs to match with existing and to unify footpath materials. Pedestrians are given greater priority at side road crossings with raised sections in concrete setts to enhance pedestrian access. In places, driveway crossovers are also treated in concrete setts to differentiate the use of the space. Additionally, there will be a change in the surface material of the cycle track to concrete setts, where the location coincides with pedestrians boarding and alighting buses at the designated stop. This applies throughout the route.

A new local intervention is proposed at the junction of Wellington Place to enhance the local character and contribute to the wider ecological value of the area in relation to Morehampton Road Wildlife Sanctuary (see Image 4.4). This is also proposed as a Sustainable Drainage System (SuDS) area with large scale trees and species-rich grass. Poured concrete footways are proposed to match existing with a driveway crossover detail. Existing tree surrounds would be widened and surfaced with self-binding gravel.



**Image 4.4: Wellington Place Local Area Enhancement**

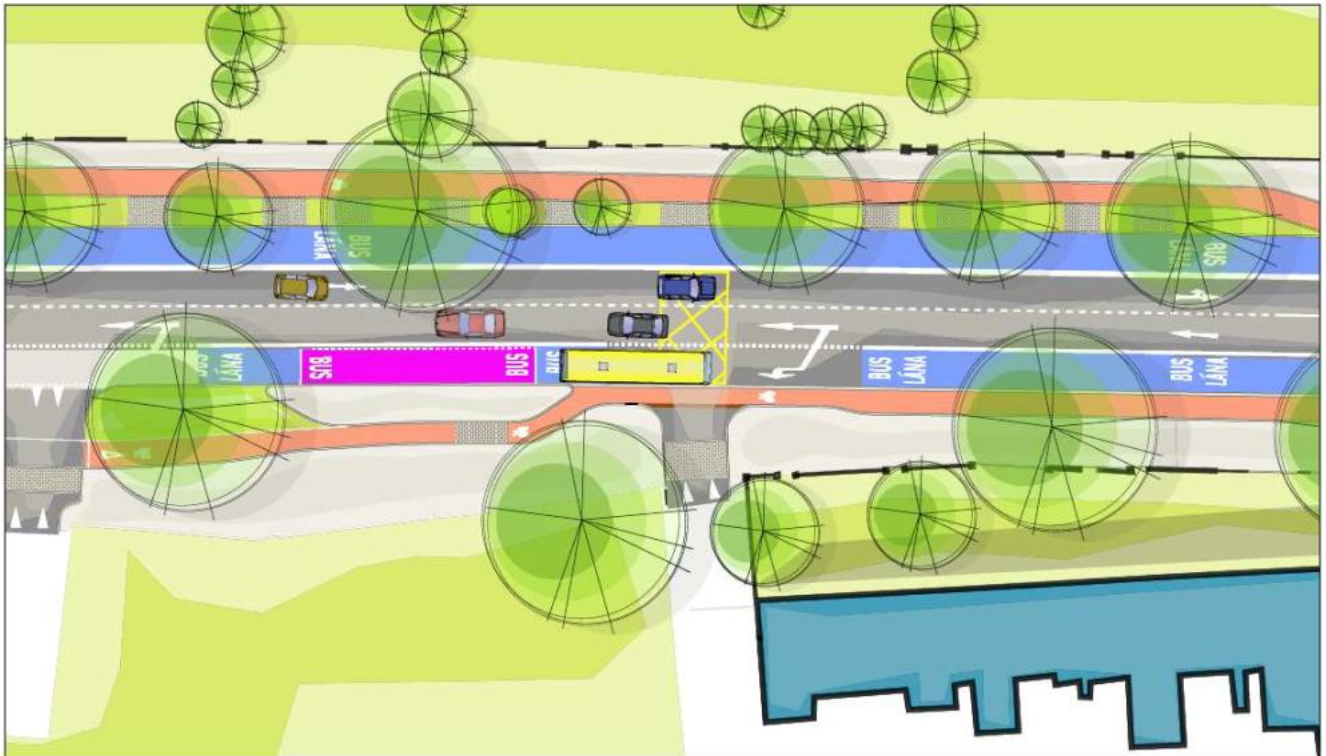
#### 4.5.1.8.4 Morehampton Road – Wellington Place to Victoria Avenue

**Existing Character:** This avenue is predominantly residential in character with two and three-storey buildings with front gardens and hedges. Significant mature trees line this section of road on either side. There is some on street parking and footpaths consisting of poured concrete and concrete kerbs. A local retail area is well used near Herbert Park Junction.

**Design Proposals:** In order to retain as many high-quality existing trees as possible, a narrower footpath / cycle track is proposed for short sections whilst passing the trunk of the tree in this section. There are some unavoidable tree losses on the north side of Morehampton Road but the existing tree cover within adjacent private properties is strong and contributes to the street scene.

Opportunity for new street tree planting have been incorporated where possible and the existing tree surrounds are proposed to be widened and surfaced with self-binding gravel. The proposals are for footways to be poured concrete / concrete paving slabs (depending on location), with concrete setts at driveway crossovers and raised pedestrian crossings with concrete kerbs and edges.

The coach parking arrangement close to the Hampton Hotel ensures the retention of existing high quality trees on the south side (see Image 4.5).



**Image 4.5: Morehampton Road Showing Retained Access to Driveways and Retention of High-Quality Tree on South Side**

The local retail area near Herbert Park junction (see Image 4.6) is proposed to be enhanced with high quality concrete paving and granite kerbs. Existing trees are retained where possible with enhancements to the tree surrounds by opening them up by removing the paved material laid right up to the trunk. Priority crossings are proposed over side streets in concrete blocks / setts.



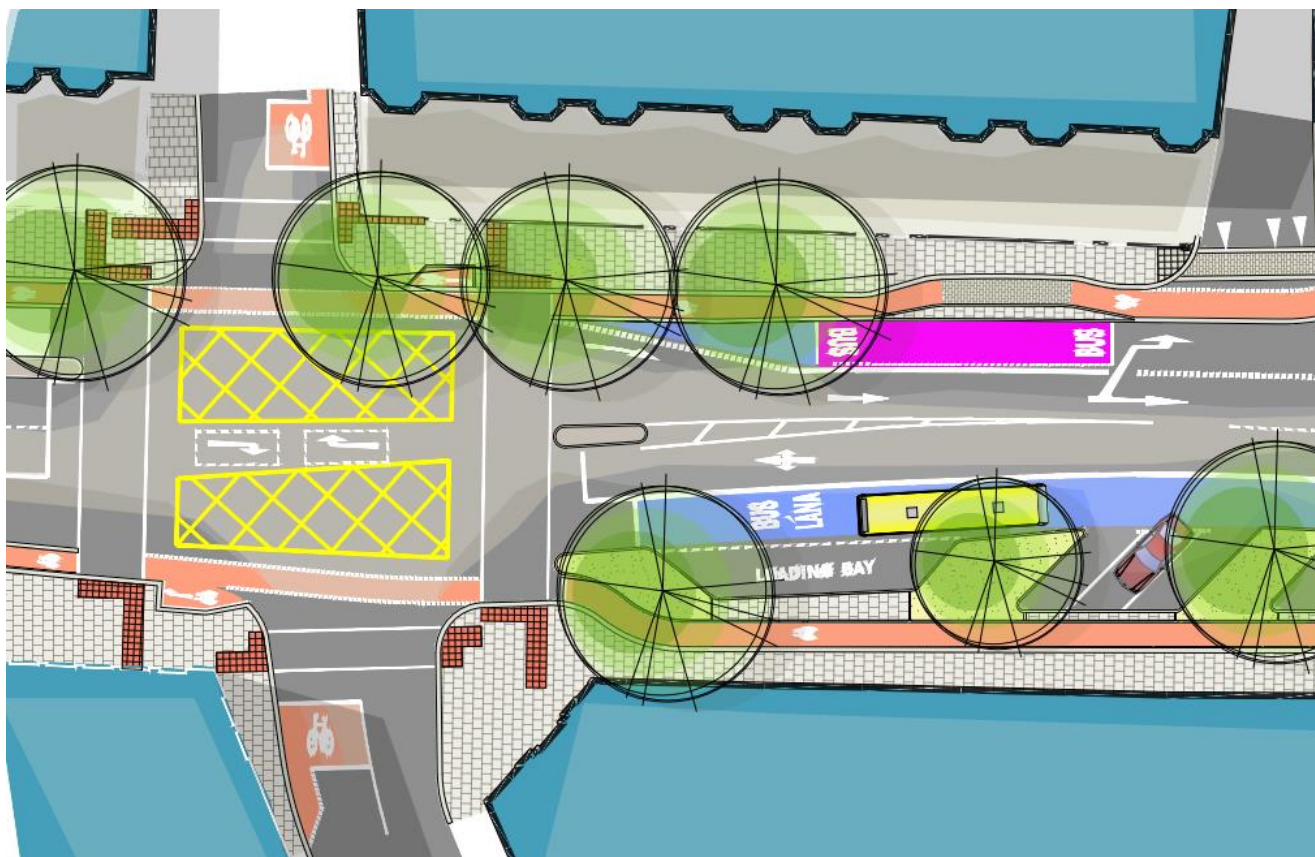


Image 4.6: Morehampton Road Near Herbert Park Junction

#### 4.5.1.8.5 Donnybrook Road – From Victoria Avenue to Eglinton Road

**Existing Character:** This section of Donnybrook Road is a local retail centre with other mixed-use buildings. There are predominantly two and three-storey buildings, many offering active edges to the street. The wide carriageway dominates the area with limited pedestrian crossing points. Significant parking is provided along retail frontages. High quality mature trees make a significant contribution to the character to this area.

**Design Proposals:** The retail centre is proposed to be enhanced with concrete paving slabs and granite kerbs (see Image 4.7). To ensure the existing important trees are retained and for safety to cyclists, the northbound cycle path is routed to the front of the trees where the existing footpath is wide. The tree surrounds are enhanced by opening out and surfacing with self-binding gravel.



**Image 4.7: Donnybrook Retail Area**

The retail area near Mulberry Lane (see Image 4.8) is proposed to be enhanced with an extended area of concrete paving slabs and blocks with granite kerbs. New street trees are proposed with raised seating surrounds. 'Driveway' style crossover in concrete sets increase the priority for pedestrians. Parking provision decreases and is switched from perpendicular to parallel to the carriageway, allowing the cycle path to be routed to the inside away from the opening of car doors.

The existing public area near The Crescent is retained and the existing paving tied-in to accommodate the new road alignment. The Crescent carriageway would be raised to create a shared surface from the car park. Granite kerbs are retained and re-used where possible.

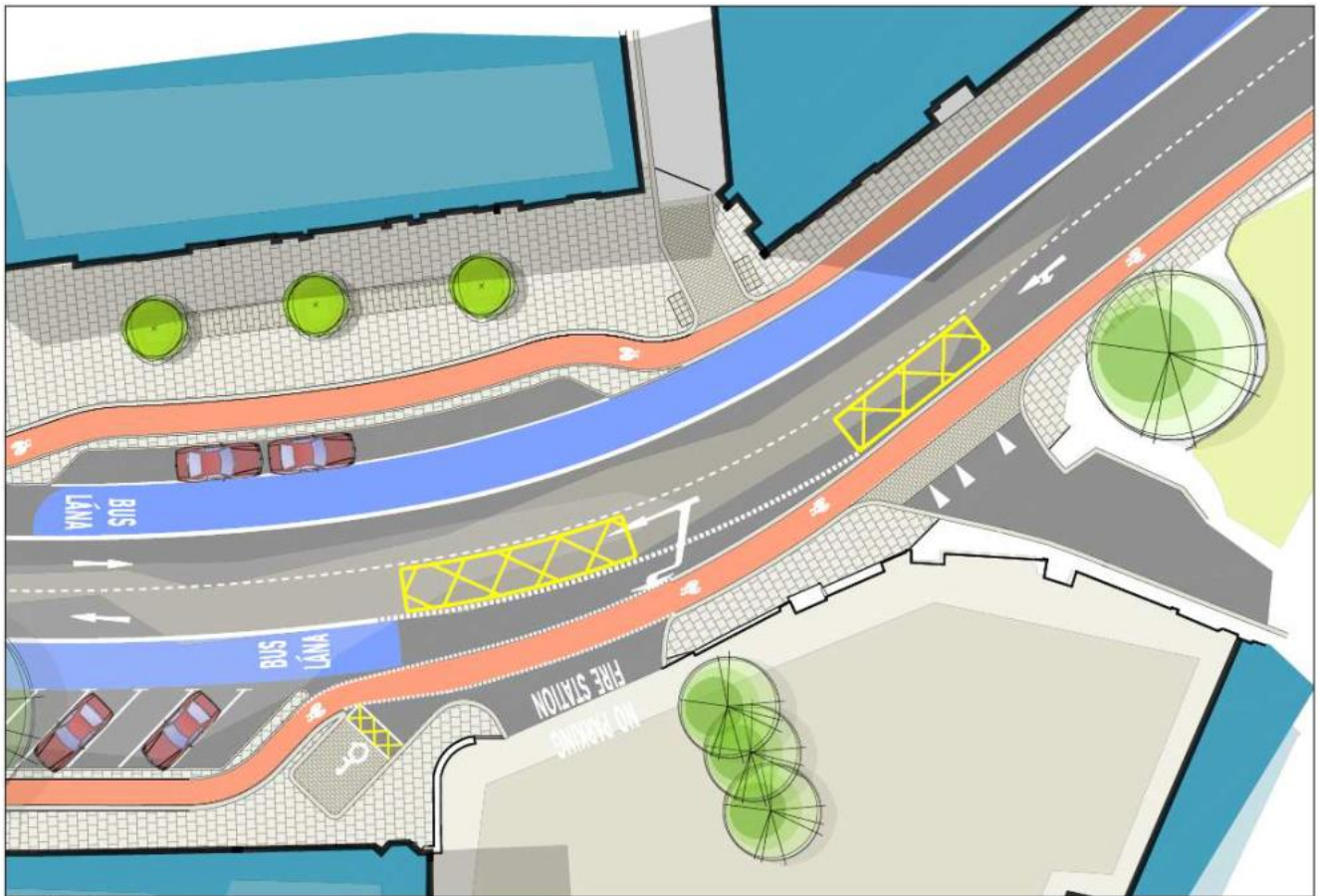


Image 4.8: Donnybrook Retail Area, Mulberry Lane

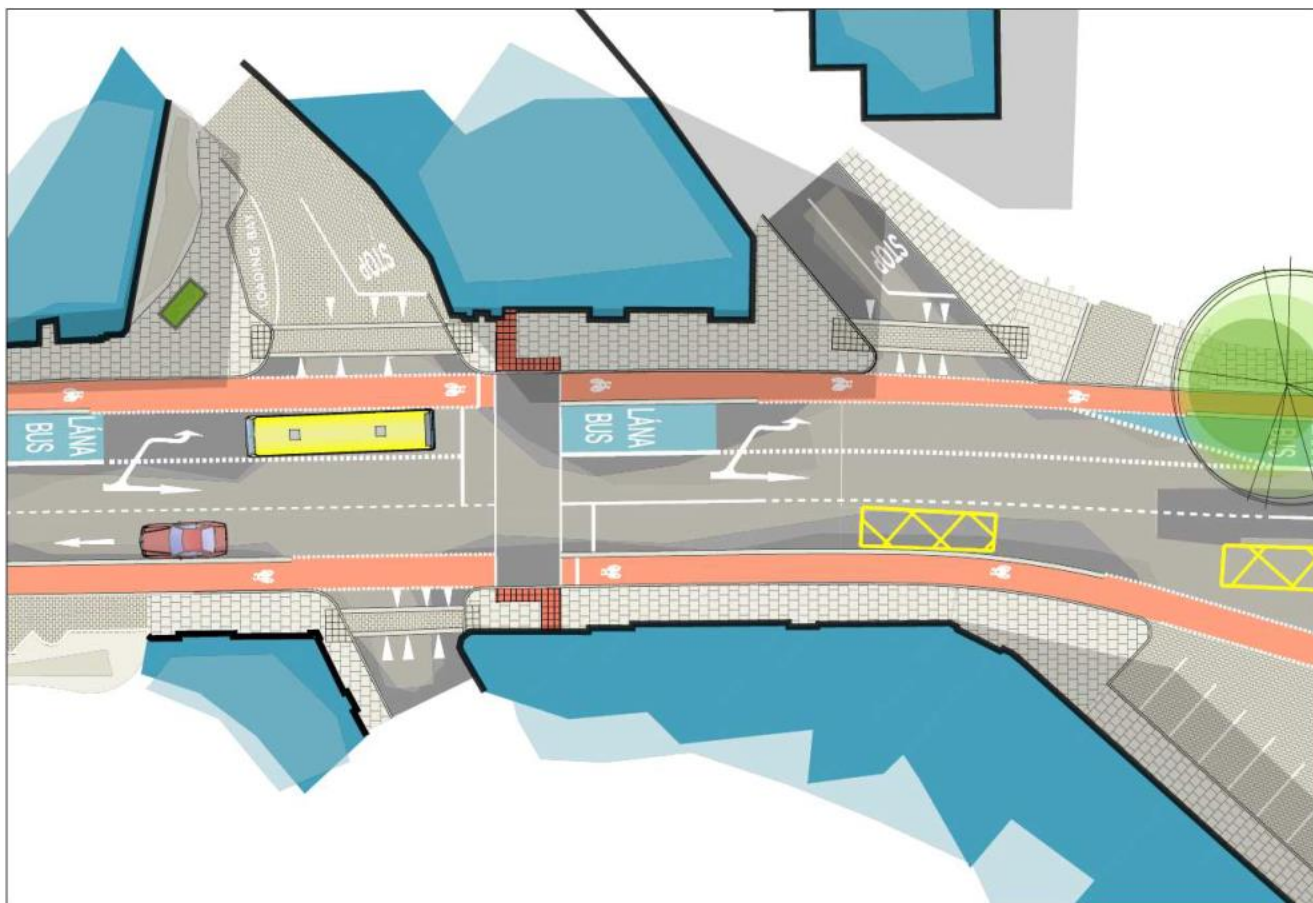
#### 4.5.1.8.6 Donnybrook Road – Eglinton Road to Stillorgan Road

**Existing Character:** An inner suburban mixed-use character area. Energia Park is a local landmark with a high boundary wall edge along Donnybrook Road. The road is relatively wide through this section with minimal urban realm amenity.

Further south, Donnybrook Parish Church is another notable landmark with mature trees along its boundary.

**Design Proposals:** The area is enhanced with the same concrete paving and granite kerb materials of Donnybrook retail centre extended as far as the Eglinton Terrace junction at the Energia Park entrance (see Image 4.9). Rampart Lane access is proposed to be resurfaced in concrete blocks to create a shared surface with a planting bed at the entrance with seating surrounds. Eglinton Terrace junction is narrowed to create more pedestrian footway space and features concrete paving with granite kerbs. Granite paving is applied to the footpath at the entrance to Donnybrook Cemetery. The parking area in front of a parade of cafes / shops opposite the entrance to Energia Park is realigned and resurfaced in concrete blocks. This reinforces the message that the space is used by both pedestrians and vehicles. Seven 'short stay' spaces are retained fronting the building line with an additional paved area created for outdoor seating. The footpaths to the periphery are surfaced with concrete paving and granite kerbs. Energia Park entrance is enhanced with concrete setts and granite kerbs.





**Image 4.9: Donnybrook Road, Rampart Lane and Eglinton Terrace Junction Enhancements**

The kerbs and footpath alignment along the Energia Park frontage are to be retained with the trees remaining unaffected. Poured concrete footways are proposed along the western section. Concrete paving and granite kerbs are proposed to enhance bus stop area near Eglinton Road. Concrete paving and concrete kerbs on Anglesey Bridge at the future interface with Dodder Greenway are to be considered in further design stages. Poured concrete footpaths by Donnybrook Parish Church will match the existing, with the 'Welcome' sign retained in the median.

#### **4.5.1.9 Land Acquisition and Use**

Temporary land acquisition is required to facilitate works within this section of the Proposed Scheme at various locations as outlined below:

- St Stephen's Green Park (heritage footpath);
- 4 Leeson Street Lower;
- At a number of locations along Morehampton Road (79, 81, , 87-91, 93A, 93, 95A, 95B, 97A, 97B, 97C, 99, 101, 103, 103/105, 105);
- Circle K Donnybrook;
- FirstStop Donnybrook; and
- FastFit Donnybrook.

All temporary land acquisition is to be reinstated once works are completed.

Permanent land acquisition is also required within this Section in a number of locations as follows:

- 75, 76 and 77 Morehampton Road;
- 2Donnybrook Road;

- Circle K Donnybrook;
- FirstStop Donnybrook; and
- FastFit Donnybrook.

The impacts on residential amenity arising from land acquisition in Section 1 of the Proposed Scheme are addressed in Chapter 10 (Population). Similarly, the impacts on landscape amenity arising from land acquisition in Section 1 of the Proposed Scheme are addressed in Chapter 17 (Landscape (Townscape) & Visual).

#### **4.5.1.10 Rights of Way**

There are no existing Rights of Way affected in Section 1 of the Proposed Scheme.

### **4.5.2 Section 2 – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout**

#### **4.5.2.1 General Overview of the Proposed Scheme**

The existing lane configuration is maintained on the Stillorgan Road between the Beaver Row / Anglesea Road junction and Foster's Avenue, apart from the southbound on-slip at Belfield, where a continuous bus lane is now provided from the slip road to the Stillorgan Road. To achieve this, the existing southbound bus lane on the Stillorgan Road has been truncated and will require coaches, buses, and taxis using it to merge with the adjacent general traffic lane as they pass under the Belfield flyover. New continuous bus lanes will be provided on the southbound off-slip, and across the Belfield flyover. It is intended to provide segregated cycle tracks on each slip road and a two-way segregated cycle track on the Belfield flyover. A separate cycle link will be provided to the adjacent sideroad to the east of the southbound slip roads.

On the Stillorgan Road between Seafield Road and Foster's Avenue it is intended to provide a bus lane, a one-way segregated cycle track, and two general traffic lanes in each direction. A short length of two-way segregated cycleway will be provided on each side in this area due to the proximity to UCD. This will run from Woodbine Road to Merrion Grove by the southbound carriageway, and from Foster's Avenue to the newly proposed cycle entrance into UCD opposite Seafield Road by the northbound carriageway. A short new two-way cycle track connection is provided southbound from Merrion Grove which will improve access from Coláiste Eoin / Coláiste Íosagáin to the N11 junction with Merrion Grove.

In addition, new junction layouts have been provided at RTÉ and Nutley Lane to improve road user throughput and safety. Bus stop locations and layouts have been reviewed, and in certain areas adjusted, to ensure optimum integration with interfacing services. Coach laybys have been proposed at certain locations to reduce instances of loading coaches blocking the bus lane.

The bus interchange proposals at UCD have been developed in collaboration with UCD and are coordinated with the UCD Future Campus masterplan. The UCD Bus Interchange General Arrangement drawings (BCIDB-JAC-ENV\_LA-0013\_IN\_00-DR-LL-9001) in Volume 3 of this EIAR can be referenced in conjunction with the main drawing series for the Proposed Scheme, to provide a more detailed overview of the UCD Interchange proposals. The proposed UCD interchange is located adjacent to the Belfield interchange on the R138 Stillorgan Road (at Chainage A4000 of the Proposed Scheme) and consists of two main operation zones. The main interchange plaza adjacent to the N11 northbound slip road will accommodate high frequency bus routes. The interchange bus islands located south of the UCD veterinary building, to the north-west of the main plaza and existing woodland, will be used for lower frequency and regional bus routes, as well as to provide overflow for the main plaza services. The interchange proposals also capture upgrade works for a shared pedestrian and cyclist commuter route along a naturally developed route through the existing woodland area. The overall site will provide 20 bus stop locations with 12 standard NTA / UCD bus shelters finished to match UCD street furniture. Two landmark bus shelters are proposed with passenger seating area. Each shelter will serve two stops on each side of the main plaza, positioned central to the stops they serve. The shelter's cantilevered canopies provide large, covered areas of waiting, supplementing the semi-enclosed waiting rooms. 87m of seating is provided, enough for 40% of the estimated 350 peak bus patrons. They have been designed to provide a cohesive solution adjacent to UCD's proposed Future Campus masterplan development, including the proposed Arrival Plaza.

The existing Lane configuration between Foster's Avenue and Wyattville Road has for the most part been retained. Junction designs along the route have been reviewed in an attempt to remove left turn filter lanes crossing cycle lanes where possible.

Between Merrion Grove and Lower Kilmacud Road it is proposed to provide a bus lane and two general traffic lanes plus a one-way segregated cycle track in each direction. A new dedicated footpath is to be provided between the Lower Kilmacud Road and the Old Dublin Road (Stillorgan), and the Old Dublin Road (Stillorgan) and Trees Road Lower junctions on both sides of the Stillorgan Road. The new southbound footpath at this location will require an extension to the existing St Laurence's Park subway, where a new toucan crossing will also be provided across the Stillorgan Road. The slip road from the Stillorgan Road on to The Hill at Stillorgan is proposed to be closed.

The northbound cycle track north of Brewery Road has been diverted on to St Brigid's Church Road, additional traffic calming and footway improvement measures are proposed along the St Brigid's Church Road to accommodate this. A section of southbound cycle track has also been diverted on to Belmont Terrace at Galloping Green. A new pedestrian link is proposed to South Park from Bray Road in Cornelscourt, and to Shanganagh Vale from the Bray Road.

It is proposed to maintain one bus lane and two general traffic lanes in each direction between Wyattville Road and Loughlinstown Roundabout. Widening of the carriageway and a setback of existing vehicle restraint systems in front of the pedestrian footbridge will be provided on the southbound carriageway to ensure a continuous southbound bus lane through the Loughlinstown Roundabout.

Footpaths are not proposed as per existing infrastructure between the Old Bray Road and Cornelscourt Shopping Centre pedestrian bridge, and between Clonkeen Road and Johnstown Road junctions and between Johnstown Road junction and the new junction at Druid's Glen Road, as alternative walking routes exist on adjacent quieter roads.

A new footpath is proposed on either side of the Stillorgan Road at the new junction on the N11 at Druid's Glen Road which tie-in with the existing footpath towards Wyattville Road. Improvements have been made to cycle track provisions at the Wyattville Road Junction. The existing adjacent northbound Bray Road slip towards Cherrywood Road will be retained in its current two-way layout.

At the Loughlinstown Roundabout it is proposed to signalise the existing roundabout on three arms and to provide a continuous bus lane southbound through the junction towards Shankill.

In addition, new junction layouts have been proposed at all major junctions along this section to remove existing left turn slips and to provide improved cycle movements. The northbound U-turn lane has been removed at the Westminster Road junction in order to facilitate a toucan crossing.

It is proposed that existing kerb lines will be retained and that the BusConnects Design Guide will be adhered to where possible along Section 2 of the Proposed Scheme.

#### **4.5.2.2 Deviations from Standard Cross Sections**

The width of the cross-sectional elements as outlined in Section 4.6 have been reduced at a number of constrained locations across the Proposed Scheme. The deviations within Section 2 – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout are detailed in Table 4.9.

**Table 4.9: Reduced Standard Cross Sections on Section 2 – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout**

Location	Design Element	DMURS	Design	Justification
A3220 – A3315	Footpath (southbound)	2.0m	Approx. 1.8m	Footpath locally narrowed to approximately 1.8m over a length of 1m at pinch point, at existing footbridge.
A3220 – A3315	Footpath (northbound)	2.0m	1.2m	Footpath narrows locally at pinch point to retain tree.
A3315 – A3365	Footpath (northbound)	2.0m	1.8m	Footpath narrows locally at pinch point.
A3315 – A3365	Cycle track (northbound)	2.0m	Approx. 1.65m	Cycle track narrows to 1.65m over a length of 30m behind bus stop.
A3480 – A3780	Footpath (southbound)	2.0m	Varies Approx. 1.5m – 3m	Footpath narrows to a pinch point of 1.5m as alignment matches existing kerb line and boundary wall to avoid land take in front of residential properties.
A3625 – A3715	Cycle track (both directions)	2.0m	Varies Approx. 1.5m – 2m	Cycle track narrows to 1.5m for a length of 100m northbound in front of residential properties and behind bus stops to tie into existing kerb.
A3625 – A3650	Footpath (northbound)	2.0m	Approx. 1.5m	Footpath narrows to a pinch point of 1.5m.
A4975 – A5025	Cycle track (northbound)	2.0m	1.8m	Cycle track narrows to 1.8m to restrict land take.
A5550 – A5595	Cycle track (southbound)	2.0m	Approx. 1.5m	Cycle track narrows over a length of 45m to 1.5m behind bus stop.
A5595 – A5695	Cycle track (southbound)	2.0m	Approx. 1.5m	Cycle track narrows over a length of 100m to 1.5m to provide for minimum footpath along length. Cross section is constrained by existing building and kerb lines.
A5695 – A5780	Footpath (northbound)	2.0m	Approx. 1.8m	Footpath narrows over a length of 45m to approximately 1.8m to tie into existing building and kerb lines.
A5720 – A5780	Footpath (northbound)	2.0m	Varies 1.5m – 2m	Footpath narrows to a pinch point of 1.5m.
A5720 – A5780	Cycle track (northbound)	2.0m	1.5m	Cycle Track narrows locally at pinch point.
A5900 – A6100	Cycle track (southbound)	2.0m	Varies 1.5m – 2m	Cycle track narrows over a length of 200m to approximately 1.5 – 1.8m to match existing. Widening will require land take and impact to properties.
A6360 – A6800	Cycle track (both directions)	2.0m	1.5m	Cycle track narrows over a length of 440m to approximately 1.5 m to match existing, with the intention to retain existing infrastructure and avoid excessive land take.
A6550 – A6710	Footpath (both directions)	2.0m	1.8m	Footpath narrows locally at pinch point at back of bus stop to 1.8m near to proposed Patrician Villas Subway.
A6830 – A6930	Cycle track (southbound)	2.0m	1.75m	Cycle Track narrows to 1.75m locally to match existing and retain footpath.
A6930 – A7050	Cycle track (southbound)	2.0m	Varies Approx. 1.5m – 1.65m	Cycle track locally narrowed over a length of 120m to approximately 1.5m – 1.65m.
A6930 – A7480	Cycle track (northbound)	2.0m	1.5m	Cycle Track narrows locally to match existing 1.5m to retain existing infrastructure over 400m length.
A7050 – A7600	Carriageway (northbound)	3.65m	3.0m	Traffic Lanes narrow to 3.0m to match existing lane widths along this stretch of the Proposed Scheme. This is an existing departure with limited space to develop due to constraints along the boundary with Glenalbyn Road. Designing out the existing departure would negatively impact the ability of BusConnects to provide adequate cycle and footpath facilities.
A7155 – A7172	Footpath (both directions)	2.0m	1.6m	Footpath narrows locally to tie into existing.
A7172 – A7192	Carriageway (side road)	3.0m	Approx. 4.0m total for full width	Carriageway narrows to 4.0m to match existing lane widths along this stretch of the scheme. This is an existing departure with limited space to develop due to constraints along the boundary with Glenalbyn Road. Designing out the existing departure would negatively impact the ability of BusConnects to provide adequate cycle and footpath facilities.
A7192 – A7320	Footpath (northbound)	2.0m	1.2m	Footpath narrows locally at pinch point to match existing.



Location	Design Element	DMURS	Design	Justification
A7500 – A7600	Cycle track (northbound)	2.0m	1.75m	Cycle Track narrows locally to match existing 1.75m at this pinch point at the bus stop. Widening will require major impact to the retaining wall and associated utilities.
A7650 – A7750	Cycle track (southbound)	2.0m	1.5m	Cycle Track narrows locally to 1.5m or impact to the retaining wall and associated utilities.
A7955 – A8145	Footpath (southbound)	2.0m	1.8m	Footpath narrows locally to 1.8m to avoid impacting properties.
A8225 – A8315	Cycle track (northbound)	2.0m	Varies Approx. 1.5m – 2m	Cycle track locally narrowed to approximately 1.5m at pinch point behind bus stops to reduce cyclist speed.
A8355 – A8455	Cycle track (southbound)	2.0m	Varies Approx. 1.5m – 2m	Cycle track locally narrowed to approximately 1.5m at pinch point behind bus stops to reduce cyclist speed.
A9150 – A9240	Cycle track (southbound)	2.0m	1.5m	Cycle Track narrows locally in between bus stops.
A9745 – A9840	Cycle track (southbound)	2.0m	1.5m	Cycle track narrows to 1.5m locally to tie into existing.
A9745 – A9840	Cycle track (both directions)	2.0m	Varies 1.45m – 2.25m	Cycle track locally narrowed to approximately 1.65m southbound and 1.45m northbound at pinch points.
A9745 – A9840	Footpath (northbound)	2.0m	1.5m	Footpath narrows locally at pinch point to 1.5m.
A10570 – A10570	Cycle track (southbound)	2.0m	1.5m	Cycle track narrows to 1.5m locally to tie into existing.
A13100 – A13330	Footpath (northbound)	2.0m	1.6m	Footpath narrows for approximately 50m along Wyattville West Slip Road to match existing.
A13485 – A13755	Footpath (northbound)	2.0m	1.6m	Footpath narrows to match existing on approach to Cherrywood Road.
A13755 – A13790	Cycle track (northbound)	2.0m	Varies Approx. 1.4m – 2m	Cycle track locally narrows over a length of 40m to 1.4m before joining combined road off-mainline along Bray Road.

#### 4.5.2.3 Bus Lane Provision

An overview of the bus lane provision as part of the Proposed Scheme is set out in Section 4.6. As outlined within that section, full bus priority through the use of dedicated bus lanes is not possible at all locations on the Proposed Scheme, and SCP is used where required. There are no SCP Junctions in Section 2 of the Proposed Scheme.

#### 4.5.2.4 Bus Stops

The different types of bus stop (island, shared landing area and inline) are described in Section 4.6. 34 of the 73 proposed bus stops within this section of the Proposed Scheme are Island Bus Stops. This section of the Proposed Scheme also includes the UCD Bus Interchange. The bus stop locations and types are outlined in Table 4.10 and shown in the General Arrangement series of drawings (BCIDB-JAC-GEO\_GA-0013\_XX\_00-DR-CR-9001) in Volume 3 of this EIAR. Further details of bus stop design are included in the PDGB (NTA 2021) in Appendix A4.1 in Volume 4 of this EIAR.

**Table 4.10: Proposed Bus Stop Locations in Section 2 of the Proposed Scheme**

Inbound / Outbound	Bus Stop Name	Bus Stop Number	Chainage	Bus Stop Type	Bus Shelter
Inbound	St Columcille's Hospital (Coach)	-	A13900	Layby	New bus shelter
Inbound	St Columcille's Road	3143	A13860	Island	New bus shelter
Inbound	Cherrywood Road	3144	A13440	Inline	New bus shelter
Inbound	Wyattville Slip Road (Coach)	-	A13120	Layby	New bus shelter
Inbound	Willow Court	3145	A13040	Island	New bus shelter
Inbound	St Laurence College	3146	A12720	Island	New bus shelter
Inbound	Kilbogget Grove	3147	A12195	Island	New bus shelter
Inbound	Shrewsbury Lawn	3148	A11790	Island	New bus shelter
Inbound	Johnstown Road	-	A11320	Layby	New bus shelter

Inbound / Outbound	Bus Stop Name	Bus Stop Number	Chainage	Bus Stop Type	Bus Shelter
Inbound	Cabinteely Bypass	5127	A11260	Island	New bus shelter
Inbound	Clonkeen Road	5128	A10685	Shared Landing	New bus shelter
Inbound	Clonkeen Road (Coach)	-	A10665	Layby	New bus shelter
Inbound	Old Bray Road	2996	A9815	Shared Landing	New bus shelter
Inbound	Westminster Grove	3258	A9450	Shared Landing	New bus shelter
Inbound	Westminster Grove (Coach)	-	A9230	Shared Landing	New bus shelter
Inbound	Foxrock Church	2060	A9265	Shared Landing	New bus shelter
Inbound	Knocksinna	2061	A8790	Shared Landing	New bus shelter
Inbound	Leopardstown Road	2062	A8280	Island	New bus shelter
Inbound	Leopardstown Road (Coach)	-	A8230	Layby	New bus shelter
Inbound	Galloping Green	2063	A7970	Island	New bus shelter
Inbound	Galloping Green (Coach)	-	A7930	Layby	New bus shelter
Inbound	Brewery Road	2064	A7590	Island	New bus shelter
Inbound	Merville Road	2065	A7330	Island	New bus shelter
Inbound	Laurence Park	4727	A6600	Island	New bus shelter
Inbound	Laurence Park (Coach)	-	A6600	Shared Landing	New bus shelter
Inbound	Oatlands College (Coach)	-	A6200	Layby	New bus shelter
Inbound	Oatlands College	4728	A6150	Island	New bus shelter
Inbound	Sycamore Crescent	2068	A5640	Island	New bus shelter
Inbound	St Thomas Road (Coach)	-	A5225	Layby	New bus shelter
Inbound	St Thomas Road	2070	A5180	Island	New bus shelter
Inbound	Seafield Road	2084	A4620	Island	New bus shelter
Inbound	UCD Interchange	768	A4000	Island (and Plaza)	New bus shelter
Inbound	Belfield Road	769	A3710	Island	New bus shelter
Inbound	Teresian School	771	A3050	Shared Landing	New bus shelter
Inbound	Teresian School (Coach)	-	A3010	Shared Landing	New bus shelter
Inbound	RTÉ	770	A3315	Island	New bus shelter
Outbound	Donnybrook Church	760	A2700	Shared Landing	New bus shelter
Outbound	Donnybrook Church (Coach)	-	A2860	Layby	New bus shelter
Outbound	Teresian School	761	A3075	Shared Landing	New bus shelter
Outbound	RTÉ (Coach)	-	A3285	Layby	New bus shelter
Outbound	RTÉ	762	A3350	Island	New bus shelter
Outbound	Belfield Road	763	A3660	Shared Landing	New bus shelter
Outbound	Stillorgan Slip Road (UCD)	764	A4020	Island	New bus shelter
Outbound	Stillorgan Slip Road (UCD) (Coach)	-	A4200	Island	New bus shelter
Outbound	Seafield Road	2008	A4685	Island	New bus shelter
Outbound	Fosterbrook (Coach)	-	A4870	Layby	New bus shelter
Outbound	Coláiste Eoin	2009	A5250	Island	New bus shelter
Outbound	Boosterstown Avenue	2010	A5575	Shared Landing	New bus shelter
Outbound	Priory Grove	7353	A6200	Island	New bus shelter
Outbound	Priory Grove (Coach)	-	A6300	Island	New bus shelter
Outbound	Patrician Villas	4571	A6740	Island	New bus shelter
Outbound	Stillorgan Park (Coach)	-	A6875	Layby	New bus shelter
Outbound	St John of Gods	2013	A7400	Shared Landing	New bus shelter
Outbound	Farmleigh Avenue	2014	A7670	Island	New bus shelter
Outbound	Galloping Green (Coach)	-	A7780	Layby	New bus shelter



Inbound / Outbound	Bus Stop Name	Bus Stop Number	Chainage	Bus Stop Type	Bus Shelter
Outbound	Beechwood Court	4636	A7880	Island	New bus shelter
Outbound	Newtownpark Avenue	2016	A8410	Island	New bus shelter
Outbound	Newtownpark Avenue (Coach)	-	A8475	Shared Landing	New bus shelter
Outbound	Knocksinna	2015	A8850	Shared Landing	New bus shelter
Outbound	Foxrock Church (Coach)	-	A9120	Shared Landing	New bus shelter
Outbound	Foxrock Church	2017	A9180	Shared Landing	New bus shelter
Outbound	Westminster Grove	3259	A9600	Shared Landing	New bus shelter
Outbound	Old Bray Road	7361	A9905	Shared Landing	New bus shelter
Outbound	Cabinteely Way	7362	A10650	Island	New bus shelter
Outbound	Cabinteely Way (Coach)	-	A10700	Layby	New bus shelter
Outbound	Johnstown Road (Coach)	-	A11285	Layby	New bus shelter
Outbound	Shrewsbury Lawn	3129	A11450	Island	New bus shelter
Outbound	Shrewsbury Lawn	3130	A11810	Shared Landing	New bus shelter
Outbound	Kilbogget Grove	3131	A12150	Island	New bus shelter
Outbound	St Laurence College	3133	A12810	Island	New bus shelter
Outbound	Cherrywood	3134	A13300	Shared Landing	New bus shelter
Outbound	Commons Road	3135	A13870	Island	New bus shelter
Outbound	St Columcille's Hospital (Coach)	-	A13900	Layby	New bus shelter

#### 4.5.2.5 Cycling Provision

The specific proposals for cycling facilities in Section 2 of the Proposed Scheme are described below. Provision for cyclists at the signal-controlled junctions are described in Section 4.6.

Cycling is to be provided from R138 at Donnybrook Church to Loughlinstown Roundabout on the N11 (approximately 11km) as follows:

- Segregated cycle track provided in each direction running adjacent to the direction of vehicle travel;
- A section of northbound cycle track between Brewery Road to The Hill is diverted to the adjacent side road, St Brigid's Church Road, due to space constraints on the N11. A similar approach is taken for the southbound cycle track at Belmont Terrace slightly further south at Galloping Green;
- To facilitate local access, this cycle route is supplemented in places with bi-directional cycle track sections on one or both sides of the N11 which includes two-way cycle track from UCD to Merrion Grove and from Wyattville junction to Loughlinstown Roundabout; and
- Signal-controlled crossings provided at all junctions through a combination of dedicated cycle crossings and shared toucan crossings.

These cycle tracks follow the 2013 GDACNP Primary Route number 12/12A (also a Primary Route under the new GDACNP 2022). There are existing cycle tracks in both directions along the majority of this section of the Proposed Scheme, however these will be reconfigured and upgraded to the arrangement set out in the PDGB (including 120mm upstand kerb between cycle track and traffic lane).

A tie-in is provided to Secondary Routes within the GDACNP at the Nutley Lane / Greenfield Park / R138 Stillorgan Road junction, at the Booterstown Avenue / R138 Stillorgan Road junction, at the N31 Mount Merrion / N11 Stillorgan Road junction, at the N31 Brewery Road / Farmleigh Avenue / N11 Stillorgan Road junction, at the Kill Lane / N11 Stillorgan Road junction, at the R842 Bray Road / N11 Stillorgan Road junction, at the Clonkeen Road / N11 Bray Road junction, at the Johnstown Road / N11 Bray Road junction, and at the Wyattville flyover junction. A tie-in is also provided to Primary Routes at the Foster's Avenue / R138 Stillorgan Road junction, at the Lower Kilmacud Road / Stillorgan Park Road / N11 Stillorgan Road junction, and at the Leopardstown Road / Newtownpark Avenue / N11 Stillorgan Road junction; and to Greenway Routes at UCD, at the Merrion Grove / R138 Stillorgan Road junction, at the Druids Glen Road / N11 Bray Road junction, and to the Carrickmines Greenway route at Wyattville Road junction.

#### 4.5.2.6 Junction Information

An overview of the approach to junction review and design is provided in Section 4.6.7. The major and moderate junctions within Section 2 – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout of the Proposed Scheme are outlined in Table 4.11.

**Table 4.11: Major and Moderate Junctions (Signalised) within Section 2 of the Proposed Scheme**

Junction Location	Description
<b>Major Junctions (Signalised)</b>	
Airfield Park RTÉ Stillorgan Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
Greenfield Park Nutley Lane Stillorgan Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
N11 UCD junction	Modified grade separated
Fosters Avenue Stillorgan Road	Modified three-arm signal-controlled junction with bus priority on dual carriageway
Belfield Park The Rise Stillorgan Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
Boosterstown Avenue Stillorgan Road	Modified three-arm signal-controlled junction with bus priority on dual carriageway
Mount Merrion Avenue Stillorgan Road	Modified three-arm signal-controlled junction with bus priority on dual carriageway
Treesdale Trees Road Lower Stillorgan Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
Priory Drive Old Dublin Road Stillorgan Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
Lower Kilmacud Road Stillorgan Grove Stillorgan Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
Farmleigh Avenue Brewster Road Stillorgan Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
Leopardstown Newtownpark Avenue Stillorgan Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
Springfield Park Stillorgan Road	Modified three-arm signal-controlled junction with bus priority on dual carriageway
Kill Lane Stillorgan Road	Modified three-arm signal-controlled junction with bus priority on dual carriageway
Westminster Road Stillorgan Road	Modified three-arm signal-controlled junction with bus priority on dual carriageway
Bray Road Stillorgan Road	Modified three-arm signal-controlled junction with bus priority on dual carriageway
Clonkeen Road Bray Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
Johnstown Road Bray Road	Modified four-arm signal-controlled junction with bus priority on dual carriageway
New Development (Cherrywood) Bray Road	Modified three-arm signal-controlled junction with bus priority on dual carriageway
Wyattville Road N11 northbound slip roads	Modified grade separated slip road junction, northbound only

Junction Location	Description
Wyattville Link Road slip road N11 Bray Road	Modified grade separated four-arm junction
N11 Silver Tassie	Modified three-arm signal-controlled junction with bus priority on dual carriageway (northbound only)
<b>Moderate Junctions (Signalised)</b>	
Stillorgan Road Belmont Terrace	Modified two-arm signal controlled junction

#### 4.5.2.7 Parking and Loading Bays

Changes to the parking and loading provisions along Section 2 – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout as a result of the Proposed Scheme are shown in Table 4.12 and Table 4.13 respectively.

**Table 4.12: Section 2 – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout: On-Street Parking Change Impact Summary**

Location	Type of Parking	Existing	Proposed	Change
UCD Interchange	Permit	82	0	-82
Belmont Terrace	Informal	23	21	-2
St Brigid's Church Road	Disabled Permit	2	2	0
	Informal	4	4	0
Airfield Park	Informal	13	13	0
Johnstown Road	Permit	3	3	0
Old Bray Road	Informal	12	12	0
Approximate adjacent informal parking within 200-250m		58	58	0
Total		182	113	-84

**Table 4.13: Section 2 – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout: Existing and Proposed Loading Bays**

Location	Type of Parking	Existing	Proposed	Change
Belmont Terrace	Loading Bay	1	1	0
Total		1	1	0

#### 4.5.2.8 Landscape and Urban Realm

For an overview of the landscape design principles and approach reference should be made to Section 4.6.12. The following sections provide a description of specific landscape and urban realm design in Section 2 of the Proposed Scheme.

##### 4.5.2.8.1 Stillorgan Road – Anglesea Road to UCD Campus

**Existing Character:** This section is a wide arterial road. It is composed of standard footpath materials which are mostly poured concrete. An existing cycle lane runs parallel to the footpath. In some areas guardrails and street clutter diminish the quality of the character. There is a continuous median along most of the section, with some trees often of low quality.

**Design Proposals:** Poured concrete or tarmac footways are proposed to match the existing materials where kerb realignments occur. There are considerable lengths of footpaths and cycle track that are not changed by kerb realignments, and are therefore retained as existing with minor repairs or resurfacing as needed. Land acquisition has been minimised through this wide corridor but in places where, for example a new bus stop is required, boundary wall reinstatement will match existing. It is proposed to transplant young trees and reinforce with new planting where the new coach stop requires land take opposite The Court. Stone boundary walls that are affected would be reinstated to match existing.

#### 4.5.2.8.2 Stillorgan Road – UCD Entrance to Lower Kilmacud Road

**Existing Character:** This section comprises connector access roads into UCD campus on either side of the main arterial road. There are wide roads separated by the arterial road, with significant planted verges. Footway materials are mostly poured concrete. UCD access arrangements are subject to change based on the UCD Masterplan.

The rest of the route is a wide arterial road with residential and mixed-use edges. Trees and green spaces are located along the route and median along the route.

**Design Proposals:** Pedestrian and cycle desire lines within the UCD campus area are enhanced through better crossings and surface materials of stone and concrete. The new UCD bus interchange has been designed to tie into the UCD masterplan proposals at this location (see Image 4.10). A large group of trees from the existing woodland block are to be removed to make space for a new access road and an enlarged bus interchange with bespoke canopy shelters to accommodate large numbers of pedestrians. New tree planting set within paved areas is proposed throughout the interchange to complement the new structures and continue design details of the proposed masterplan. The transition from the interchange area to the masterplan has been carefully considered to ensure a cohesive urban realm design.

Tree pits will include SuDS provision and tree species will be selected according to available space. Amenity lighting such as uplighters are proposed at certain locations where protected species (bats) will not be affected. Seating and cycle parking are included.

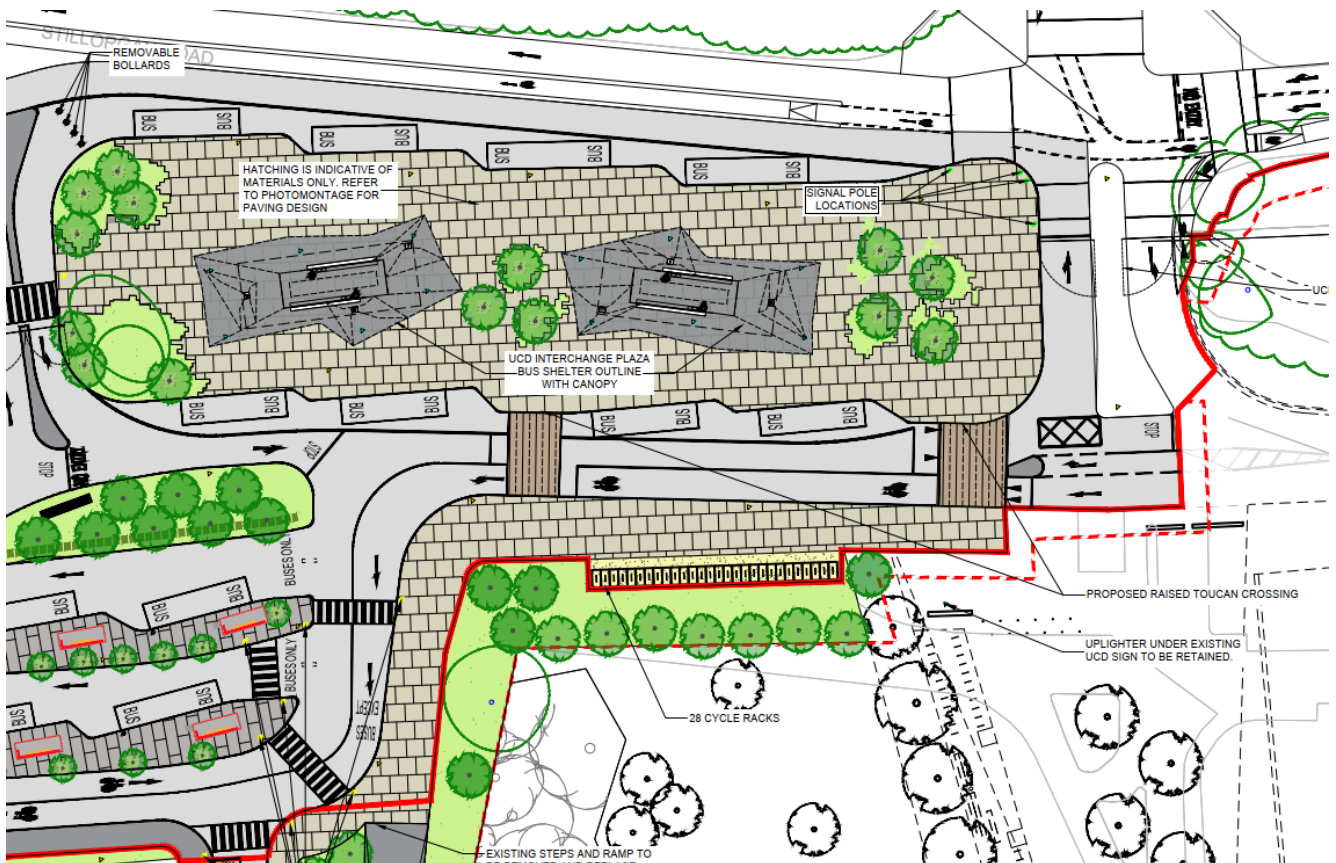


Image 4.10: UCD Bus Interchange Plaza

On the north side of the UCD / Stillorgan Road intersection a new set of steps on the embankment are proposed to improve pedestrian connections and these will be designed to minimise impact on tree roots. Pedestrians and cyclists are routed along the south and north side of the embankment respectively. Proposed surface materials are poured concrete for the footways and coloured asphalt for the cycle track. A small local intervention consisting of new concrete paving and concrete kerbs together with new trees is proposed to improve the bus stop area in the south-eastern corner which is well used by students.

In other areas along this section of the route, poured concrete or asphalt footways are proposed to match existing where kerb realignments occur. Footways and cycle tracks that are not adjusted by kerb realignments are retained as existing with minor repairs or resurfacing as needed. Boundary wall reinstatements are to match existing where land acquisition occurs and impacts on the existing boundaries. Amenity grass areas on verges and medians are retained and enhanced where needed along this section. New tree planting is proposed in suitable locations where space and underground utilities allow.

The grass verge between Ashfield Park and Seafield will be enhanced with new hedge planting for improved biodiversity and visual separation.

Two stones with a memorial plaque and 'Mount Merrion' wording are to be retained, and the paths positions rationalised to coordinate with pedestrian crossings and the realigned cycle track at the junction with The Rise. At Merrion Grove, a new cycle path connection will be established into Coláiste Eoin which will be an accessibility enhancement during the peak school flows. This will require the loss of some poor quality trees and the adjacent boundary wall will be lowered to open up visibility. The large ornate hotel plinth and signage will be re-positioned locally.

At Booterstown Avenue the grass verge is widened out along with new tree planting where below ground services allow.

The edge of the wooded area is to be repaired with native planting and trees at the Old Dublin Road (Stillorgan) junction.

Native shrub planting is proposed to make good the edge where land take and vegetation removal occurs near Patrician Villas. At the pedestrian subway near Patrician Villas, the existing underpass is to be lengthened to the east. A new ramped and stepped access is proposed within the green space which will be tied into the existing earth works and visually softened with new tree planting. Surface materials will be poured concrete paving and concrete kerbs to match the existing near to the subway. The existing ramped subway access on the western side is to be retained.

#### 4.5.2.8.3 Lower Kilmacud Road to Loughlinstown Roundabout

**Existing Character:** This section is a wide arterial road with residential and mixed-use edges. Much of the route is edged with trees and occasional green spaces along this section. Loughlinstown Roundabout is a threshold point that leads the route into the Shankill and Bray area.

**Design Proposals:** Footpath surface materials are to be poured concrete or asphalt to match the existing where kerb realignments occur. Footpaths and cycle tracks that are not changed by kerb realignments are retained as existing with minor surface repairs or resurfacing as needed. Boundary wall reinstatements would match existing materials where land acquisition occurs. Replacement planting is proposed to tie back any disruption to blocks of existing vegetation as required. Areas of amenity grass on verges and medians are to be retained and repaired where needed along this section.

Local intervention is proposed at Belmont Terrace. A new native hedge is planted to create separation between the N11 and the pub and housing, whilst encouraging pedestrians to cross over onto the existing footway fronting properties on Belmont Terrace. A raised table is also proposed to encourage pedestrians to use this route.

On the north side of the N11 just north-east of the Westminster Road junction, the footway is to be realigned. A new hedgerow and tree planting is proposed where space is sufficient to provide a partial reinstatement of removed vegetation along the service road.

New native tree and shrub planting is proposed in the grass verge at the Johnstown Road junction as a local intervention.

New trees are proposed in the grass verge at the service road north of Willow Avenue to offer increased separation and partial screening to the adjacent residential area.



Loughlinstown Roundabout is a threshold point that leads the route into the Shankill and Bray area. It is proposed to improve the access to the pedestrian bridge with new poured concrete footways to match the existing, with a two-way cycle lane link, reinstatement of affected areas of native planting and some verges enhanced with wildflower mixes. An enhancement to the roundabout is proposed by integrating a SuDS system linked to tree pits as well as wildflower grassed areas.

#### **4.5.2.9 Land Acquisition and Use**

Temporary land acquisition is required to facilitate works within this section of the Proposed Scheme at various locations as outlined below:

- A number of green areas and verges along this section of the Proposed Scheme;
- Cairn Homes Montrose Limited Plot ;
- RTÉ land;
- 118 Stillorgan Road;
- Belfield Court;
- Green area at Fosterbrook (Construction Compound BR2);
- Merrion Grove;
- Coláiste Eoin / Coláiste Íosagáin;
- James Hennessy Motors – to close existing access;
- The Grange Apartments and offices complex;
- Laurleen House, Stillorgan Road;
- Entrance to Rubric, Hermiston and another property, Stillorgan Road;
- 114 and 116A South Park;
- Car park at Interlock Hardware Limited, Monaloe House, Clonkeen Road;
- Entrance to Kylanure;
- Entrance to Shanganagh Vale, Bray Road;
- St Laurence College, Wyattville Road and
- Wheelans Wine, Cherrywood Road.

All temporary land acquisition is to be reinstated once works are completed.

Permanent land acquisition is also required within this Section in a number of locations as follows:

- A number of green areas and verges along this section of the Proposed Scheme;
- Cairn Homes Montrose Limited Plot;
- RTÉ land;
- Council land adjacent to UCD, Belfield;
- Merrion Grove;
- Cairn Homes Montrose Limited Plot at Stillorgan;
- The Grange Office and Apartment Plot;
- Belmont Terrace, Galloping Green North;
- Car park at Interlock Hardware Limited, Monaloe House, Clonkeen Road;
- St Laurence College, Wyattville Road; and
- Whelehens Wines, The Silver Tassie, Bray Road.

The impacts on residential amenity arising from land acquisition in Section 2 of the Proposed Scheme are addressed in Chapter 10 (Population). Similarly, the impacts on landscape amenity arising from land acquisition in Section 2 of the Proposed Scheme are addressed in Chapter 17 (Landscape (Townscape) & Visual).

#### 4.5.2.10 Rights of Way

Table 4.14 outlines the locations where existing rights of way will be affected by the Proposed Scheme.

**Table 4.14: Existing Rights of Way Affected**

Location	Chainage	Existing Situation	Proposed Change
Donnybrook Castle / The Court	A2900	Existing Private Right of Way for Utility cabinets	Private Right of Way to be acquired and access to be temporarily restricted during the works
Stillorgan Road – RTÉ	A3200	Existing Private Right of Way for Cairn Homes and ESB	Private Right of Way to be acquired and access to be temporarily restricted during the works
118 Stillorgan Road	A3475	Existing Private Right of Way for the owner of the 118 Stillorgan Road	Existing private vehicular access / egress to be retained for pedestrian and cyclists only as part of the works
James Hennessy Motors	A6100	Existing Private Right of Way for the owners of the James Hennessy Motors	All Private Rights to be restricted and boundary wall constructed as part of the works
Hill Road	A7050	Existing Public Right of Way from Stillorgan Road to the Hill Road	Existing vehicular access (excluding pedal cycle and other bicycles) to be restricted as part of the works
Monaloe House	A10600	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired
Shanganagh Vale	A12375	Existing Private Right of Way for The Marianists of Ireland CLG and ESB	Existing access to be temporarily restricted during the works
Shanganagh Vale	A12680	Existing Private Right of Way for The Marianists of Ireland CLG and ESB	Private Right of Way to be acquired and access to be temporarily restricted during the works

### 4.5.3 Section 3 – Loughlinstown Roundabout to Bray North (Wilford Roundabout)

#### 4.5.3.1 General Overview of the Proposed Scheme

Between Loughlinstown Roundabout and Stonebridge Road it is intended to provide a bus lane and general traffic lane in both directions. Where bus lanes are not continuous, Signal Controlled Bus Priority has been provided. South of Stonebridge Road up to Crinken Lane, where bus lanes are not continuous in both directions due to existing constraints, SCP has been proposed to ensure bus priority. Signal Controlled Bus Priority has been proposed between the St Anne's Church / Corbawn Lane Junction and Rathmichael Woods in the northbound direction.

Segregated cycle tracks have not been provided between Loughlinstown Roundabout and Stonebridge Road along the Proposed Scheme. It is intended to provide a two-way cycle track from Stonebridge Road on the Dublin Road as far as the Shanganagh Road junction, and on Stonebridge Road as far as Stonebridge Lane to provide a cycle link to the two schools on Stonebridge Road.

The roundabout between the Dublin Road, Corbawn Lane, and Shanganagh Road is proposed to be upgraded to a signalised junction with new pedestrian crossing facilities and SCP for buses. Corbawn Lane is to be an exit only junction on to Shanganagh Road. A dedicated right-turn lane is proposed from Shanganagh Road on to Beechfield Manor. A dedicated left turn lane from Shanganagh Road into Beechfield Manor is also to be provided.

The proposed design between the Shanganagh Road junction and Crinken Lane retains the existing general traffic lanes with no bus or cycle lanes, apart from a section of the northbound carriageway where a bus lane is provided from Crinken Lane to a new junction at the entrance to Olcovar. Signal-controlled bus priority will be provided along this section. The Quinn's Road roundabout is to be upgraded to a signalised junction, and an upgraded signalised junction is proposed at the entrance to the Olcovar development. Footpaths along the Dublin Road at Cherrington Drive and Beech Road are to be retained at their roadside location.

From Crinken Lane to the Wilford Roundabout it is proposed to provide northbound and southbound bus lanes, segregated cycle tracks and general traffic lanes. Signal-controlled bus priority will be used northbound from Wilford Junction for a short distance as far as Woodbrook College. Where appropriate, roadside trees shall be retained by locating the proposed footpaths and cycle tracks behind the tree line. Improved lighting and crowning of trees will be provided to enhance visibility.

New pedestrian crossings are proposed at the new junction outside Olcovar, south of Crinken Lane, south of Allies River Road, and by Crinken Church. The existing pedestrian crossing at Woodbrook College is to be moved southwards to provide a crossing point close to the relocated southbound bus stop.

At Shanganagh Park and Shanganagh Cemetery, the northbound and southbound cycle track are proposed to be diverted into the park, alongside the southbound footpath, and behind green space and existing trees to the eastern side of the carriageway between two Toucan Crossings, with a newly proposed cemetery boundary wall set back to enable the retention of the roadside tree line. New lighting and crowned trees will be provided to ensure through visibility. Playground areas will be retained in their current existing location as part of BusConnects proposals. Their final future location will be confirmed as part of the Shanganagh Park and Cemetery Masterplan (Dún Laoghaire-Rathdown County Council).

Two new residential developments are under construction, at Shanganagh Castle and the Woodbrook Estate. The proposed signalised junctions for these developments and bus stops have been coordinated with the development proposals and incorporated within the design.

It is proposed that existing kerb lines will be retained and that the BusConnects Design Guide will be adhered to where possible along Section 3 of the Proposed Scheme. Bus stop locations and layouts have been reviewed, and in certain areas adjusted, to ensure optimum spacings. Coach laybys have been proposed at certain locations along the route to reduce instances of loading coaches blocking the bus lane.

#### **4.5.3.2 Deviations from Standard Cross Sections**

The width of the cross-sectional elements as outlined in Section 4.6.1 have been reduced at a number of constrained locations across the Proposed Scheme. The deviations within Section 3 – Loughlinstown Roundabout to Bray North (Wilford Roundabout) are detailed in Table 4.15.

**Table 4.15: Reduced Standard Cross Sections on Section 3 – Loughlinstown Roundabout to Bray North (Wilford Roundabout)**

Location	Design Element	DMURS	Design	Justification
A14180 – A14640	Footpath (southbound)	2.0m	Varies Approx. 1.6m – 2m	Footpath narrows to a pinch point of 1.6m to match existing.
E20 – E80	Footpath (northbound)	2.0m	Varies Approx. 1.2m – 2m	Footpath narrows to a pinch point of 1.2m as alignment matches existing kerb line and boundary wall to avoid land take.
E205 – E260	Footpath (northbound)	2.0m	Varies Approx. 1.6m – 2m	Footpath narrows to a pinch point of 1.6m as alignment matches existing kerb line and boundary wall to avoid land take.
A14810 – A15075	Footpath (northbound)	2.0m	Varies Approx. 1.6m – 2m	Footpath narrows to a pinch point of 1.6m in front of Applegreen petrol station to match existing.
G145 – G175	Footpath (northbound)	2.0m	Varies Approx. 1.8m	Footpath locally narrows over a length of 30m to approximately 1.8m to tie into existing boundary.
H45 – H80	Cycle track (2-way)	3.5m	3m	3.0m 2-way cycle track is provided over a length of 45m to avoid land take.
H45 – H80	Cycle track (northbound)	2.0m	Varies Approx. 1.2m	Cycle track narrows to 1.2m to tie-in to combined traffic lane.
A15115 – A15160	Traffic Lane (southbound)	3.0m	Varies 2.2m – 3.0m	Traffic lane width narrows at pinch point to accommodate the cycle track and avoid impact to the bridge.
A15160 – A15800	Footpath (northbound)	2.0m	1.6m	Footpath narrows locally at pinch point.
A15175 – A15205	Footpath (southbound)	2.0m	Varies Approx. 1.8m	Footpath locally narrows over a length of 30m to approximately 1.8m to tie into existing boundary.
A15495 – A15510	Footpath (northbound)	2.0m	Varies Approx. 1.5m – 1.8m	Footpath locally narrows to approximately 1.8m over 15m in length with a 1.5m pinch point to tie into existing boundary.
A15605 – A15630	Footpath (southbound)	2.0m	Varies Approx. 1.8m	Footpath locally narrows over a length of 30m to approximately 1.8m to tie into existing boundary.
A15800 – A15865	Footpath (northbound)	2.0m	Varies Approx. 1.5m – 3.5m	Footpath narrows to a pinch point of 1.6m due to alignment of existing boundary wall at Sherrington Lodge.
A15925 – A16035	Footpath (southbound)	2.0m	Varies Approx. 1.5m – 2m	Footpath narrows to a pinch point of 1.5m due to alignment of existing boundary wall at Crinken College.
A16020 – A16040	Footpath (southbound)	2.0m	Varies Approx. 1.8m	Footpath locally narrows over a length of 20m to approximately 1.8m to tie into existing boundary.
A16120 – A16140	Footpath (northbound)	2.0m	Varies Approx. 1.8m	Footpath locally narrowed to 1.8m pinch point to tie into existing boundary wall.
A16220 – A16230	Footpath (northbound)	2.0m	Varies Approx. 1.8m	Footpath locally narrowed to 1.9m pinch point to tie into existing boundary wall.
A16645 – A16710	Footpath (southbound)	2.0m	Varies Approx. 1.65m – 2m	Footpath narrows to a pinch point of 1.65m matching existing kerb line to minimise land take and tree loss at Saint James' Lodge. Ties in to existing.
A16975 – A16990	Footpath (northbound)	2.0m	Approx. 1.8m	Footpath locally narrows over a length of 15m to 1.8m to tie into existing boundary wall.

#### 4.5.3.3 Bus Lane Provision

An overview of the bus lane provision as part of the Proposed Scheme is set out in Section 4.6. As outlined within that section, full bus priority through the use of dedicated bus lanes is not possible at all locations, and SCP is used in a number of junctions in Section 3 of the Proposed Scheme as listed in Table 4.16.

**Table 4.16: Proposed SCP Junctions in Section 3 of the Proposed Scheme**

Junction Location	Priority Type
Dublin Road / Shanganagh Road Junction to Shanganagh Park	Bus priority by provision of SCP has been adopted over this section of the corridor to minimise impacts to existing property, mature tree and other topography constraints. Approx. Chainage A15075 to A16130 Southbound.
Dublin Road / Olcovar Junction to Woodbank	Bus priority by provision of SCP has been adopted over this section of the corridor to minimise impacts to existing property, mature tree and other topography constraints. Approx. Chainage A14630 to A15900 Northbound.



#### 4.5.3.4 Bus Stops

The different types of bus stop (island, shared landing area and inline) are described in Section 4.6. Three of the 17 proposed bus stops within this section of the Proposed Scheme are Island Bus Stops. The bus stop locations and types are outlined in Table 4.17 and shown in the General Arrangement series of drawings (BCIDB-JAC-GEO\_GA-0013\_XX\_00-DR-CR-9001) in Volume 3 of this EIAR. Further details of bus stop design are included in the PDGB (NTA 2021) in Appendix A4.1 in Volume 4 of this EIAR.

**Table 4.17: Proposed Bus Stop Locations in Section 3 of the Proposed Scheme**

Inbound / Outbound	Bus Stop Name	Bus Stop Number	Chainage	Bus Stop Type	Bus Shelter
Inbound	Woodbrook College	4202	A17080	Island	New bus shelter
Inbound	St James Church	4203	A16800	Shared Landing	New bus shelter
Inbound	Shanganagh Cemetery	5090	A16460	Inline	New bus shelter
Inbound	Allies River Road (Coach)	-	A16335	Layby	New bus shelter
Inbound	Shanganagh Castle	4204	A16170	Shared Landing	New bus shelter
Inbound	Claremount	4206	A15780	Inline	New bus shelter
Inbound	Stonebridge Close	3140	A15480	Inline	New bus shelter
Inbound	Station Road	3141	A14930	Inline	New bus shelter
Inbound	Kentfield	3142	A14505	Inline	New bus shelter
Outbound	Kentfield	3136	A14545	Inline	New bus shelter
Outbound	St Anne's Church	3138	A15010	Shared Landing	New bus shelter
Outbound	Stonebridge Close	3139	A15445	Inline	New bus shelter
Outbound	Claremount	4124	A15920	Inline	New bus shelter
Outbound	Shanganagh Park	4125	A16310	Inline	New bus shelter
Outbound	Shanganagh Cemetery (Coach)	-	A16515	Layby	New bus shelter
Outbound	Woodbrook Strategic Housing Development	4127	A16890	Island	New bus shelter
Outbound	Woodbrook College	4128	A17225	Island	New bus shelter

#### 4.5.3.5 Cycling Provision

The specific proposals for cycling facilities in Section 3 of the Proposed Scheme are described below. Provision for cyclists at the signal-controlled junctions are described in Section 4.6.

Cycling is to be provided from Dublin Road – Stonebridge Road to Corbawn Lane (approximately 0.5km) as follows:

- Bi-directional cycle track on the eastern side of Dublin Road and northern side of Stonebridge Road, offset from the carriageway; and
- Signal-controlled crossings provided at all junctions through a combination of parallel pedestrian / cycle crossing and shared toucan crossings.

Cycling is to be provided from Dublin Road – Shanganagh Park to Wilford junction (approximately 2.5km) as follows:

- Segregated cycle track provided in each direction running immediately adjacent to the direction of vehicle travel, offset from the carriageway where possible;
- A two-way cycle track has been provided through Shanganagh Park and past the adjacent Shanganagh Cemetery, with northbound cyclists accessing this side of the Dublin Road at two toucan crossing points;
- Signal-controlled crossings provided at all junctions through a combination of dedicated cycle crossings and shared toucan crossings; and
- Toucan crossings are not provided at the M11 Wilford junction as there is no cycle provision on the N11 approach road.

At the following locations in this section of the Proposed Scheme, segregated cycling facilities have not been provided as a result of specific site constraints:

- Dublin Road – Loughlinstown Roundabout to Stonebridge Road (approximately 700m):
  - Impacts including land take to residential properties were not considered appropriate. The proposed bus lanes along this section will be shared with cyclists.
- Dublin Road – St Anne’s junction to Crinken Lane (approximately 930m):
  - Local resident group engagement and the potential impacts on the Shankill village area were considered when determining cycle and bus infrastructure in this area. In addition, existing advisory lanes that exist in places are considered too narrow to be retained alongside the new cross section proposals. Cyclists will use the general traffic lanes alongside general traffic and buses, with a speed limit reduction proposed over this section.

These cycle tracks follow a 2022 GDACNP Secondary Route from Loughlinstown Roundabout to the junction at St Anne’s Church (including Stonebridge Road), and a Primary Route from Shanganagh Road to the Wilford Junction. There are existing cycle lanes in both directions along the majority of this section of the Proposed Scheme except for through Shankill Village and along Stonebridge Road. In the locations listed above, cycle provision will be reconfigured and upgraded to the arrangement set out in the PDGB (including 120mm upstand kerb between cycle track and traffic lane).

#### 4.5.3.6 Junction Information

An overview of the approach to junction review and design is provided in Section 4.6.7. The major and moderate junctions within Section 3 – Loughlinstown Roundabout to Bray North (Wilford Roundabout) of the Proposed Scheme are outlined in Table 4.18.

**Table 4.18: Major and Moderate Junctions (Signalised) within Section 3 of the Proposed Scheme**

Junction Location	Description
<b>Major Junctions (Signalised)</b>	
M11 slips (Wilford Roundabout) Dublin Road	New three-arm signal-controlled junction
<b>Moderate Junctions (Signalised)</b>	
Stonebridge Road Dublin Road	Modified three-arm signal-controlled junction with bus priority
Corbawn Lane Shanganagh Road Dublin Road	New three-arm signal-controlled junction with bus priority
Shanganagh Road Beechfield Manor	Modified three-arm signal-controlled junction
Quinn’s Road Cherrington Road Dublin Road	New four-arm signal-controlled junction
Dublin Road Olcover	New three-arm signal-controlled junction with bus priority
Dublin Road Shanganagh Castle	New three-arm signal-controlled junction with bus priority
Dublin Road Woodbrook Downs	New four-arm signal-controlled junction with bus priority

#### 4.5.3.7 Parking and Loading Bays

There are no changes to the parking and loading provisions proposed along Section 3 – Loughlinstown Roundabout to Bray North (Wilford Roundabout) as a result of the Proposed Scheme. The existing car park at St Anne’s Church, which is impacted by the Proposed Scheme, will be reconfigured to accommodate the equivalent number of parking as existing, subject to agreement with the landowner.

#### 4.5.3.8 Landscape and Urban Realm

##### 4.5.3.8.1 Loughlinstown Roundabout to St Anne's Shankill, Including Stonebridge Road

**Existing Character:** This area has an outer suburban character. The route typically bounds residential properties with a mix of boundary types including timber fences, hedges, railings and walls, as well as mature trees behind. The built form is generally two-storey houses, some with high boundaries. In places the existing road widths are narrow. Two schools are located on Stonebridge Road. St Anne's Church is a significant local landmark in the area. This section also links with the Shankill Dublin Area Rapid Transit (DART) station area.

**Design Proposals:** It is proposed to replant native planting to repair edges of woodland where tree loss occurs due to kerb realignment along Dublin Road. Footways are to be reinstated with asphalt and concrete kerbs to match the existing. Where stone wall boundaries are proposed to be reinstated and set back, the materials are to match existing utilising any existing stone where possible.

At the Stonebridge Road junction, reinstating boundary treatments in a consistent manner and providing replacement trees and ornamental planting within private properties will be the focus for landscape proposals. Engagement has taken place with landowners and further discussions will be held at detailed design to agree final proposals. Footways will be surfaced in asphalt and concrete kerbs to match the existing.

The cycle path and footpath along the north side of Stonebridge Road is routed through the proposed residential development site. Although some tree removal is required, the overall impact on the group is minimised. 'No-dig' construction methods are to be utilised where the paths run through root protection areas.

Reconfiguration works outside of the Proposed Scheme land take boundary are proposed to be undertaken as accommodation works subject to further liaison and agreement with the property owner. Image 4.11 shows an example of how the urban realm improvements could be undertaken in the accommodation works area associated with St Anne's Church. The church forecourt and grounds can be redesigned to adjust the parking layout to ensure no net loss of spaces as well as including a tree avenue towards the southern elevation. A new stone boundary wall and associated ornamental planting and concrete paving can be created as a focal point at the pedestrian entrance to accommodate the re-positioned statue. The surrounding footways that form part of the Proposed Scheme are to be reinstated with concrete paving and kerbs will match existing.



Image 4.11: St Anne's Church Grounds

#### 4.5.3.8.2 St Anne's Shankill to Cherrington Road, Including Shankill Village

**Existing Character:** This section comprises a narrow road leading into the Shankill Village Centre with retail on the western side and residential properties on the eastern side. The retail area comprises two-storey, fine grain retail frontages in a Village setting. Small trees are present within planters along retail side and mature trees line the residential edge. 'Heritage' style lighting in black is laid through the village centre.

**Design Proposals:** Through Shankill Village, four pedestrian crossings on Dublin Road will be enhanced by introducing concrete set paving. This will be applied at a pedestrian crossing at the Quinn's Road junction and one just south of Corbawn Lane which will define the start / end to the village core. Two further pedestrian crossings within the village will be treated in the same manner. Other proposed interventions through the village centre are minimal. A local enhancement is to plant two new street trees within new low level planting beds rather than in existing containers. Footways will be locally widened at identified pinch points. Raised tables will be provided to enhance pedestrian crossings at local side roads within the village.

#### 4.5.3.8.3 Quinn's Road to M11 Diverge (Wilford Roundabout)

**Existing Character:** This section has a suburban character with narrow carriageway widths in some sections. The main residential areas are set apart from the roadway by areas of green space. Significant lengths of this section of road are tree lined. A small retail area is located at the Barbeque Centre. High fences and hedges are present along parts of the route. Shanganagh Park and Cemetery are local landmarks. There are numerous property entrances and listed structures along the route.

**Design Proposals:** All trees along Cherrington Drive are to be retained along this section of Dublin Road. Asphalt footpaths with concrete kerbs are proposed to match the existing. Concrete setts are proposed at the driveway crossover into the Barbeque Centre.



South of Castle Farm entrance, the footpath is to be routed to the rear of existing mature trees to minimise vegetation loss. The wall is to be rebuilt to a reduced level and set to the back of the footpath utilising the existing stone material where possible. A 'no-dig' construction method is to be utilised where the path runs through root protection areas.

Where property boundaries are impacted by kerb realignments, walls will be reinstated to match existing along with replacement planting behind.

The landscape proposals have been coordinated with the Shanganagh Castle housing development proposals, just north of Shanganagh Park. Cycle path and pedestrian connections have been aligned and the footway has been positioned to maximise the space for new tree planting along the frontage.

The interface with the Shanganagh Park masterplan has been considered in consultation with the local authority. It is proposed to route the two-way cycle path through the park, utilising in part the existing footpaths. Paths will tie into proposals for the wider park masterplan, while a footpath will also be retained along the roadside to provide a more direct route. Some tree losses are required to accommodate bus and coach stops. Mitigation tree planting opportunities along the boundary are possible that accord with the masterplan proposals.

Land take into the western boundary of the cemetery is required to help retain some of the mature trees in the grass verge adjacent to the carriageway. An over mature row of conifers within the cemetery is to be replaced in consultation with the local authority. A more suitable native hedge is proposed following engagement with the local authority.

The stone piers and railings forming the boundary of Crinken Church remain untouched. The proposed alignment along the west side results in tree loss to the front face of the woodland block which will be repaired with a band of native planting set behind the reinstated stone wall. The alignment south of Woodbrook Downs widens to the east only, therefore protecting all trees and stone walls on the west side. New tree planting and rebuilt stone walls is focussed on the east side providing a consistent landscape approach through this section. The new proposals on the east side will tie into the Woodbrook Strategic housing development site and the associated new junction opposite Woodbrook Downs (see Image 4.12). Liaison has taken place with the development organisation and the local authority regarding boundary treatments and tie-in proposals.

The historic gated entrance into the Woodbrook Estate remains unaffected by any carriageway widening. The surface treatment of the wide footway in front of the gates is enhanced with stone setts and wide granite kerbs. South of the gated entrance the proposed southbound bus stop and carriageway widening in close proximity to Woodbrook College results in the loss of some mature trees, with set-back of the wall also required. The alignment through this section has been considered carefully to minimise tree loss and retain a row of mature trees set further back. Replacement native planting is proposed to re-establish the vegetation belt along this side. The proposed wall reinstatement north of the M11 diverge junction will be detailed to match the stone material seen elsewhere along this section.

Immediately south of Wilford roundabout the Woodbrook Estate is impacted with the demolition of Woodbrook Side Lodge. A new lodge is to be rebuilt in a more central position within the plot and designed to meet current building regulations in a style similar to the existing. The boundary wall, and pedestrian and vehicle gated access points will also be rebuilt utilising existing materials where possible.



**Image 4.12: New Woodbrook Estate Junction with New Landscape Treatment Along the East Side of the Carriageway**

#### **4.5.3.9 Land Acquisition and Use**

Temporary land acquisition is required to facilitate works within this section of the Proposed Scheme at various locations as outlined below:

- A number of green areas along this section of the Proposed Scheme;
- The Paddocks, St Rita's, Dublin Road;
- Clonmore, Dublin Road;
- Thingwall, Dublin Road;
- Fairymount, Dublin Road;
- Kendor, Dublin Road;
- Coltsfoot, Dublin Road;
- Woodbank Housing Estate, Dublin Road;
- Bari, 4 Rathmichael Lawns, Dublin Road;
- 3 Rathmichael Lawns, Dublin Road;
- Cailma, Dublin Road;
- Rathmichael National School, Stonebridge Road;
- Rathbeg Residential Development Site, Stonebridge Lane;
- Northlands, Rathmichael Park, Dublin Road;
- Kiltuc, Dublin Road;
- Narrow Meadow, Dublin Road;
- Carezza, Dublin Road;
- St Anne's, Dublin Road;

- St Anne's Church and St Anne's Resource Centre;
- 1,2 and 3 Sherrington Lodge;
- Olcovar Housing Estate;
- Paved area at the Lidle/ Costa Coffee;;
- Access to Barbeque Centre, Dublin Road;
- Crinken Lodge, Dublin Road;
- Crinken Lane, Dublin Road;
- Plot between Aughmore Lane Estate and Allies River Road;
- Plot between Allies River Road and The Orchard Lodge, Dublin Road;
- Shanganagh Park;
- Shanganagh Cemetery;
- The Orchard, Dublin Road;
- Shanganagh Marble and Stone Centre, Dublin Road;
- Askefield House, Dublin Road;
- Askefield Lodge, Dublin Road;
- Beauchamp House, Dublin Road;
- Crinken Church, Dublin Road;
- Beauchamp Lodge, Dublin Road;
- Proposed Woodbrook Housing Estate, Dublin Road;
- Woodbrook Estate, Dublin Road;
- Woodbrook College, Dublin Road;
- Wilford Cottage, Dublin Road; and
- Wilford House, Dublin Road.

All temporary land acquisition is to be reinstated once works are completed.

Permanent land acquisition is also required within this Section in a number of locations as follows:

- A number of green areas along this section of the Proposed Scheme;
- Clonmore, Dublin Road;
- Thingwall, Dublin Road;
- Fairymount, Dublin Road;
- Kendor, Dublin Road;
- Coltsfoot, Dublin Road;
- Woodbank Housing Estate, Dublin Road;
- Rathmichael National School, Stonebridge Road;
- Rathbeg Residentail Development, Stonebridge Lane;
- Northlands, Rathmichael Park, Dublin Road;
- Kiltuc, Dublin Road;
- Narrow Meadow, Dublin Road;
- Carezza, Dublin Road;
- St Anne's, Dublin Road;
- St Anne's Church and St Anne's Resource Centre;
- Olcovar Housing Estate;
- Crinken Lodge, Dublin Road;
- Crinken Lane, Dublin Road;
- Plot between Aughmore Lane Estate and Allies River Road;
- Plot between Allies River Road and The Orchard Lodge, Dublin Road;

- Shanganagh Park;
- Shanganagh Cemetery
- Shanganagh Marble and Stone Centre, Dublin Road;
- Askefield House, Dublin Road;
- Beauchamp House, Dublin Road;
- Crinken Church, Dublin Road;
- Beauchamp Lodge, Dublin Road;
- Proposed Woodbrook Housing Estate, Dublin Road;
- Woodbrook Estate, Dublin Road; and
- Woodbrook College, Dublin Road.

The impacts on residential amenity arising from land acquisition in Section 3 of the Proposed Scheme are addressed in Chapter 10 (Population). Similarly, the impacts on landscape amenity arising from land acquisition in Section 3 of the Proposed Scheme are addressed in Chapter 17 (Landscape (Townscape) & Visual).

#### 4.5.3.10 Rights of Way

Table 4.19 outlines the locations where existing rights of way will be affected by the Proposed Scheme.

**Table 4.19: Existing Rights of Way Affected**

Location	Chainage	Existing Situation	Proposed Change
Woodbank Estate	A14700	Existing Private Right of Way for ESB substation	Private Right of Way to be acquired and access to be temporarily restricted during the works
Rathmichael Park	A14800	Existing Private Right of Way for ESB substation	Substation to be set back as part of the works and Private Right of Way to be acquired
Eastbourne	A14930	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired
Linden	A14950	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired
Ashdown	A14970	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired
St Anne's	A14950	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired
St Anne's Resource Centre / St Anne's Church	A15000	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired
Olcovar Apartments and Housing Estate	A15850	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired
Crinken Lane	A16050	Existing Private Right of Way in favour of Crinken Lodge	Existing access to be set-back as part of the works and Private Right of Way to be acquired. Access to be temporarily restricted during the works
Shanganagh Castle Housing Development	A16270	Existing Private Right of Way in favour of Department of Justice	Existing access to be set-back as part of the works and Private Right of Way to be acquired. Access to be temporarily restricted during the works
Shanganagh Park	A16275	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired

### 4.5.4 Section 4 – Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge)

#### 4.5.4.1 General Overview of the Proposed Scheme

From the M11 junction (Wilford Roundabout) to the Lower Dargle Road, it is proposed to continue with a bus lane, general traffic lane and a segregated cycle track in each direction. All junctions have been developed further to provide improved cycle movements. It is proposed to replace the Wilford Roundabout with a new signalised junction. The Corke Abbey Avenue / Old Connaught Avenue junction with the Dublin Road has been designed to cater for the proposed bus and cycle lanes, and to remove the left turn slips in and out of Corke Abbey Avenue. The design for the Upper Dargle Road junction with the Dublin Road has removed the northbound left turn slip

from the Dublin Road. The junction with the new road at Chapel Lane has also been upgraded to a signalised junction, including improved cycle and pedestrian movements.

The proposed works will impact the existing Woodbrook Side Lodge, which is a heritage structure located at the southern end of the Woodbrook Estate in Bray. It is proposed to demolish the existing lodge and build a new lodge building further east of its present location in order to allow for road widening in that area. In order to reduce the heritage impact associated with the demolition, it is proposed to reuse some of the materials from the existing lodge within the new lodge, where it is fit for reuse. Refer to the Woodbrook Side Lodge Plans and Elevations drawings (BCIDB-JAC-BLD\_ZZ-0013\_XX\_01-DR-AA-0001, BCIDB-JAC-BLD\_ZZ-0013\_XX\_02-DR-AA-0001) in Volume 3 of this EIAR for detail on the proposals to rebuild the Woodbrook Side Lodge residential property. This EIAR has assessed the impacts associated with the demolition and subsequent construction of a replacement lodge building. However, in order to ensure a worst-case scenario has been assessed, where relevant an assessment has also been done of a scenario in which the building is not replaced.

The proposed works will impact the existing Circle K Petrol Station on the eastern side of the Dublin Road. In order to make space for the wider cross-section at this location, the outer four pumps will be removed, and the canopy size will be reduced. The remainder of the petrol station will be reinstated. Refer to Chapter 5 (Construction) and the Circle K General Arrangement drawing (BCIDB\_JAC\_SPW\_AW-0013\_XX\_00\_DR\_0001) in Volume 3 of this EIAR for detail on the proposals at this location.

At the end of the Proposed Scheme at the tie-in to the Fran O'Toole Bridge, the northbound bus lane starts just after the Lower Dargle Road junction so the tie-in at the Proposed Scheme termination consists of a southbound bus lane and two general traffic lanes and cycle track in both direction, on the immediate Castle street approach to the Fran O'Toole Bridge, where the Proposed Scheme will end. This layout has been developed to coordinate with the proposed Bray Bridge Improvement Scheme.

It is proposed to retain the existing kerb lines wherever possible and adhere to the design standards from the PDGB along Section 4 of the Proposed Scheme. Bus stop locations have been reviewed, and in certain areas adjusted, to ensure optimum spacings. Coach laybys have been proposed at certain locations along the route to reduce instances of loading coaches blocking the bus lane.

#### 4.5.4.2 Deviations from Standard Cross Sections

The width of the cross-sectional elements as outlined in Section 4.6 have been reduced (from published guidance, e.g. DMURS (Government of Ireland 2013)) at a number of constrained locations across the Proposed Scheme. The deviations within Section 4 – Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge) are detailed in Table 4.20.

**Table 4.20: Reduced Standard Cross Sections on Section 4 – Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge)**

Location	Design Element	DMURS	Design	Justification
A18165 – A18290	Cycle track (both directions)	2.0m	Varies Approx. 1.75m	Cycle track locally narrows over a length of 125m to 1.75m to accommodate the bus stop and minimising impact to the adjacent proposed development site.
A18355 – A18480	Cycle track (both directions)	2.0m	Varies Approx. 1.5m	Cycle track locally narrows over a length of 125m to 1.5m to tie into existing.
A18460 – A18512	Cycle track (northbound)	2.0m	Varies Approx. 1.2m – 1.8m	Cycle track narrows locally to 1.2m over a 10m length on road at Castle Street Shopping Centre due to boundary constraints at entrance off Lower Dargle Road. This is to avoid land take at Belton Terrace.

#### 4.5.4.3 Bus Lane Provision

An overview of the bus lane provision as part of the Proposed Scheme is set out in Section 4.6. As outlined within that section, full bus priority through the use of dedicated bus lanes is not possible at all locations, and SCP is used in a number of junctions in Section 4 of the Proposed Scheme as listed in Table 4.21.



**Table 4.21: Proposed SCP Junctions in Section 4 of the Proposed Scheme**

Junction Location	Priority Type
Dublin Road / M11 Junction	Two dedicated right turn lanes have been identified as required for southbound traffic from the Dublin Road onto the M11. Impacts to the existing building line on the northbound side of the road and to the Woodbrook Estate retaining wall and adjacent mature trees running along the southbound side of the road also need to be minimised. To facilitate this, SCP is provided instead of a dedicated northbound bus lane at this location. Approx. Chainage A17140 to A17380 Northbound.
Dublin Road / Upper Dargle Road Junction	There are local pinch points at Raven Hall shopping centre and other nearby properties. In addition, a two-way cycle track tie-in must be accommodated on the southbound side at this location. Bus priority takes place over a small distance of approximately 30m in the northbound direction and 20m in the southbound direction to avoid further land take and associated impacts. Approx. Chainage A18100 to A18130 Northbound Approx. Chainage A18150 to A18170 Southbound

#### 4.5.4.4 Bus Stops

The different types of bus stop (island, shared landing area and inline) are described in Section 4.6. None of the six proposed bus stops within this section of the Proposed Scheme are Island Bus Stops. The bus stop locations and types are outlined in Table 4.22 and shown in the General Arrangement series of drawings (BCIDB-JAC-GEO\_GA-0013\_XX\_00-DR-CR-9001) in Volume 3 of this EIAR. Further details of bus stop design are included in the PDGB (NTA 2021) in Appendix A4.1 in Volume 4 of this EIAR.

**Table 4.22: Proposed Bus Stop Locations in Section 4 of the Proposed Scheme**

Inbound / Outbound	Bus Stop Name	Bus Stop Number	Chainage	Bus Stop Type	Bus Shelter
Inbound	St Cronan's Road	4154	A18410	Shared Landing	New bus shelter
Inbound	Castle Street Shopping Centre	-	A18290	Layby	New bus shelter
Inbound	Roseville Court	4416	A17960	Shared Landing	New bus shelter
Inbound	Old Connaught	4201	A17675	Shared Landing	New bus shelter
Outbound	Old Connaught Avenue	4129	A17790	Shared Landing	New bus shelter
Outbound	Castle Street	4130	A18210	Shared Landing	New bus shelter
Outbound	Dwyer Park	4131	A18390	Shared Landing	New bus shelter

#### 4.5.4.5 Cycling Provision

The specific proposals for cycling facilities in Section 3 of the Proposed Scheme are described below. Provision for cyclists at the signal-controlled junctions are described in Section 4.6.

Segregated cycle facilities will be provided in both directions from the M11 Wilford junction to the end of the Proposed Scheme at Fran O'Toole Bridge.

These cycle tracks follow a 2022 GDACNP Primary Route. Cycle facilities are currently only intermittently provided, and are composed of a mix of advisory cycle lanes and shared bus lanes along this section of the Proposed Scheme, however these will be reconfigured and upgraded to the arrangement set out in the PDGB (including 120mm upstand kerb between cycle track and traffic lane).

A tie-in is provided to a Secondary Route within the 2022 GDACNP at the Old Connaught Avenue / Dublin Road junction, and at the Upper Dargle Road / Dublin Road Junction.

#### 4.5.4.6 Junction Information

An overview of the approach to junction review and design is provided in Section 4.6.7. The major and moderate junctions within Section 4 – Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge) of the Proposed Scheme are outlined in Table 4.23.

**Table 4.23: Major and Moderate Junctions (Signalised) Within Section 4 of the Proposed Scheme**

Junction Location	Description
<b>Major Junctions (Signalised)</b>	
N/A	N/A
<b>Moderate Junctions (Signalised)</b>	
Dublin Road Corke Abbey Avenue	Modified four-arm signal-controlled junction with bus priority
Chapel Lane Dublin Road	New four-arm signal-controlled junction with bus priority
Upper Dargle Road Dublin Road	Modified four-arm signal-controlled junction with bus priority

#### 4.5.4.7 Parking and Loading Bays

Changes to the parking and loading provisions along Section 4 – Bray North (Wilford Roundabout) to Bray South (Fran O’Toole Bridge) as a result of the Proposed Scheme are shown in Table 4.24 and Table 4.25 respectively.

**Table 4.24: Section 4 – Bray North (Wilford Roundabout) to Bray South (Fran O’Toole Bridge): On-Street Parking Change Impact Summary**

Location	Type of Parking	Existing	Proposed	Change
Dublin Road	Commercial (car sales)	76	62	-14
	Commercial (impacted business)	19	9	-10
	Disabled Permit	0	1	+1
Castle Street	Designated Paid	132	119	-13
	Disabled Permit	5	5	0
	Commercial (car sales)	16	13	-3
	Commercial (businesses)	15	4	-11
Approximate adjacent informal parking within 200-250m		352	352	0
Total		615	565	-50

**Table 4.25: Section 4 – Bray North (Wilford Roundabout) to Bray South (Fran O’Toole Bridge): Existing and Proposed Loading Bays**

Location	Type of Parking	Existing	Proposed	Change
Castle Street	Loading bays (Designated)	2	6	+4
Total		2	6	+4

#### 4.5.4.8 Landscape and Urban Realm

##### 4.5.4.8.1 M11 Diverge (Wilford Roundabout) to Old Connaught Avenue

**Existing Character:** The M11 Diverge is a wide roundabout with existing grassed area, planting and stone boundary walls. South of the roundabout is of outer suburban character with one and two-storey residential edges, with large front gardens in front of houses with some high fences and edges. Out of town commercial lots feature in this section. Residential properties set back from the road edge.

**Design Proposals:** The M11 Diverge roundabout has been redesigned as a T-junction with proposed surrounding landscape areas including new native trees and species-rich grassland to enhance biodiversity. Any changes to stone wall will be reinstated to match existing where required.

Properties are impacted on the east side of Dublin Road as the Proposed Scheme enters the edge of Bray. Woodbrook Side Lodge and the boundary wall will be demolished and rebuilt. The Windsor Bray Nissan dealership protruding forecourt display area will be reduced in size and any railings / bollards reinstated appropriately to ensure the existing security function is retained. A number of residential gardens will be impacted which will result in replacement garden hedges, boundary walls and garden restoration proposed on a like for like

basis and will be agreed in detail with landowners at the next design stage. Footway surface treatment is asphalt through this section.

Along Dublin Road, north of Old Connaught Avenue where the houses are set back from the road, new street trees are proposed to be planted on the reinstated grass verge to mitigate for loss of trees elsewhere.

#### 4.5.4.8.2 Old Connaught Avenue to Castle Street (End of Route)

**Existing Character:** There are retail areas in several parts of this section, including the Industrial Yarns Complex. One to three-storey residential properties are present approaching the Village Centre. There is a significant change in topography towards the Village Centre. Castle Street has a local Village Centre character with retail and mixed uses. The street is relatively wide with narrow footpaths and car parking along Castle Street. A recently upgraded small area of urban realm exists close to Fran O'Toole Bridge.

**Design Proposals:** A local enhancement of urban realm is proposed at Upper Dargle Road junction with low planters and integrated seats, and enhanced pedestrian crossings. Footpaths are to be resurfaced in concrete paving with granite or conservation kerbs at the junction continuing south to the end of the section. North of Upper Dargle Road footways will be asphalt with concrete kerbs. New roadside tree planting is proposed within the green space fronting Lidl with linked tree pits designed to utilise surface water as part of a SuDS system.

Bray retail area footways will be enhanced with high quality concrete paving with wide granite or conservation kerbs. A new boundary railing is proposed between the setback footpath and shopping centre car park. The existing public space near the bridge is to be retained with adjustment to paving as required.

As part of the accommodation works required to adjacent impacted businesses at locations such as the Dargle Centre, urban realm improvements will be introduced where appropriate and where space allows. Typically, this could be new shrub planting, replacement paving and realigned boundary railings or walls.

#### 4.5.4.9 Land Acquisition and Use

Temporary land acquisition is required to facilitate works within this Section of the Proposed Scheme at various locations as outlined below:

- A number of green areas along this section of the Proposed Scheme;
- Woodbrook Side Lodge, Dublin Road;
- Plot of land adjacent to Cois Cairn, Dublin Road (Construction Compound BR1);
- Windsor Motors Bray, Dublin Road;
- Green areas adjacent to 1-4 and 8-14 Dublin Road;
- Front gardens at Meentogues (5 Dublin Road), Brookvale (6 Dublin Road) and St Anthony's (7 Dublin Road);
- Paved area in front of shops at St Peter's Road / Dublin Road junction;
- AXA Insurance, Dublin Road;
- Ford Motors and Circle K, Dublin Road;
- Area in front of Lidl, Industrial Yarns Complex, Dublin Road;
- Thin strip of land (cycle track) at Dublin-Wicklow Border, Dublin Road;
- North Wicklow Educate Together Secondary School, Dublin Road;
- Old Everest Centre Site, Castle Street;
- Dargle Shopping Centre, Castle Street;
- Development Site, Castle Street – to facilitate reinstatement works;
- 79 Castle Street;
- Castle Street Shopping Centre, Castle Street; and
- Plot at Ravenswell Road.

All temporary land acquisition is to be reinstated once works are completed.

Permanent land acquisition is also required within this Section in a number of locations as follows:

- A number of green areas along this section of the Proposed Scheme;
- Woodbrook Side Lodge, Dublin Road;
- Windsor Motors Bray, Dublin Road;
- Green areas adjacent to 1-4 and 8-14 Dublin Road;
- Front gardens at Meentogues (5 Dublin Road), Brookvale (6 Dublin Road) and St Anthony's (7 Dublin Road);
- AXA Insurance, Dublin Road;
- Ford Motors and Circle K, Dublin Road;
- Area in front of Lidl, Industrial Yarns Complex, Dublin Road;
- Thin strip of land (cycle track) at Dublin-Wicklow Border, Dublin Road;
- North Wicklow Educate Together Secondary School, Dublin Road;
- Old Everest Centre Site, Castle Street;
- Dargle Shopping Centre, Castle Street;
- Development Site, Castle Street – to facilitate reinstatement works;
- Castle Street Shopping Centre, Castle Street; and
- Plot at Ravenswell Road.

The impacts on residential amenity arising from land acquisition in Section 4 of the Proposed Scheme are addressed in Chapter 10 (Population). Similarly, the impacts on landscape amenity arising from land acquisition in Section 4 of the Proposed Scheme are addressed in Chapter 17 (Landscape (Townscape) & Visual).

#### 4.5.4.10 Rights of Way

Table 4.26 outlines the locations where existing rights of way will be affected by the Proposed Scheme.

**Table 4.26: Existing Rights of Way Affected**

Location	Chainage	Existing Situation	Proposed Change
Windsor Bray Renault	A17500	Existing Private Right of Way for ESB Sub Station	ESB Substation located within the lands of Windsor Bray to be removed and relocated as part of the works and Private Right of Way to be acquired
Fitzpatrick Motors	A17825	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired
Dargle Shopping Centre	A18240	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired
Dargle Shopping Centre	A18250	Existing Private Right of Way for Utility cabinets	Utility cabinets to be setback as part of the works and Private Right of Way to be acquired

## 4.6 Key Infrastructure Elements

The following sections provide a description of the main infrastructure elements of the Proposed Scheme. The following have been designed following guidance relating to the design principles for urban streets, bus facilities, cycle facilities and urban realm encapsulated in the PDGB as outlined in Section 4.4.

### 4.6.1 Mainline Cross-Section

Traffic lane widths will follow the guidance outlined in DMURS (Government of Ireland 2013), with the preferred width of traffic lanes on the Proposed Scheme being:

- 3.0m in areas with a posted speed limit  $\leq 60$ km/h; and
- 3.5m in areas with a posted speed limit  $> 60$ km/h.

Along a section of the N11 National Road where the Proposed Scheme makes use of the existing bus and general traffic infrastructure, and the posted speed limit of 60km/h for general traffic and 60km/h for bus lane traffic, under the TII Publications, the preferred width of the traffic lane increases:

- 3.5m in areas with a posted speed limit of 60km/h or as per existing lane width.

Along a section of the N11 National Road where the Proposed Scheme makes use of existing bus and general traffic infrastructure, the posted speed limit increases to 80km/h for general traffic and 60km/h for bus lane traffic, under the TII Publications; the preferred width of traffic lanes increases:

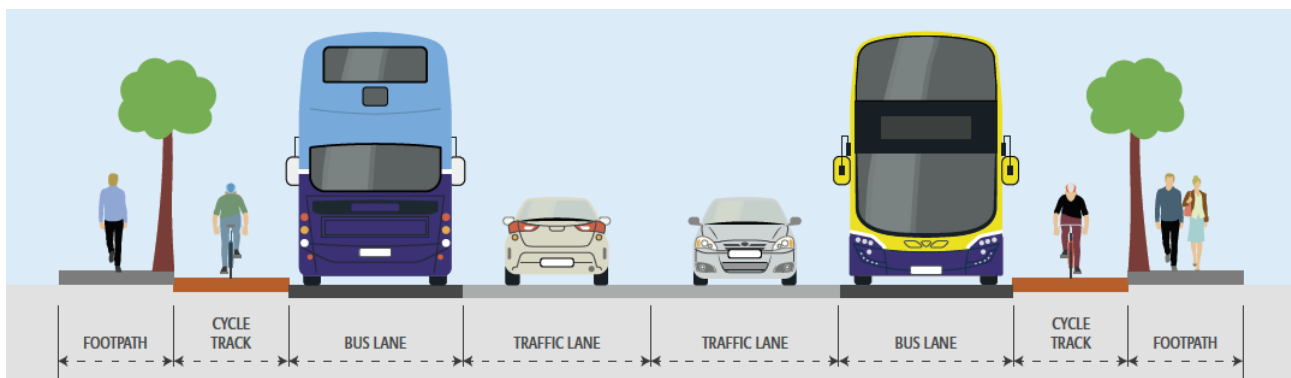
- 3.5m in areas with a posted speed limit =80km/h or as per existing lane width.

Along the N11 National Road section, at approaches to junctions, minimum entry lane width considered is 3.0m.

Traffic lane widths of 2.75m are permissible but not desirable and should only be allowed on roads with a very low HGV percentage. In some locations these lane widths have been considered for auxiliary turning lanes where appropriate.

The desirable minimum width for a single direction, with flow, raised adjacent cycle track is 2.0m. Based on NCM this allows for overtaking within the cycle track. The minimum nominal width is 1.5m. The desirable width for a two-way cycle track is 3.25m with a 0.5m buffer between the cycle track and the carriageway. The minimal nominal width of cycle track along the N11 National Road 80km/h section is 1.75m as per TII Publications.

2.0m is a desirable minimum width for footpaths, with 1.2m being a minimum width at pinch points over a 2m length of the path. The minimum nominal width is 1.8m. The minimum nominal width along the N11 National Road 80km/h section is 1.3m as per TII Publications. An example of the typical BusConnects road layout (without multiple traffic lanes in each direction or median) is shown in Image 4.13.



**Image 4.13: Typical BusConnects Road Layout (PDGB)**

The cross-sectional design of the mainline has been developed to achieve the desirable width criteria contained within the PDGB wherever reasonably practicable. Where these criteria are not achievable, for instance due to physical constraints at pinch points, the widths have been reduced as shown in Table 4.27.



**Table 4.27: Cross-Sectional Design Parameters (PDGB)**

Design Element	Desirable Minimum Standard	Minimum Width	Permitted Reductions at Constraints
Footpath	2.0m	1.8m	1.2m (over distances <2m as per PDGB in Appendix A4.1 in Volume 4 of this EIAR)
Cycle Track (one-way)	2.0m	1.5m	1.2m (over distances <2m as per PDGB in Appendix A4.1 in Volume 4 of this EIAR)
Cycle Track (two-way)	3.25m + 0.5m (buffer)	Refer to NCM Width Calculator 0.3m (buffer)	Reduced at bus stops.
Bus Lane	3.0m	3.0m	N/A
Traffic Lane	3.0m (≤60kph) 3.25m (>60kph)	3.0m	2.75m (low heavy goods vehicle flow)

For the Proposed Scheme the width of the bus lanes and traffic lanes have not been reduced below 3.0m. The width of the cross-sectional elements detailed in Table 4.27 have been reduced at a number of constrained locations across the Proposed Scheme. These deviations from the standards are outlined for each section of the Proposed Scheme in Section 4.5.

Along the N11 section of the Proposed Scheme with the proposed speed limit equal to 60km/h between Mount Merrion Avenue/N11 junction and Kill Lane/ N11 Junction in particular, the design seeks to minimise largescale changes to the existing infrastructure where it is deemed to be suitable for use in its existing case:

- Along this section of the N11 National Road the Proposed Scheme makes use of the existing pedestrian and cyclists infrastructure, and the footpath and cycle tracks have been improved where practical. The Proposed Scheme provides for new footpath link along the section of the N11 between the junction with Priority Drive and Hill Road.
- Along this section of the N11 National Road where the Proposed Scheme makes use of the existing bus and general traffic infrastructure, the preferred width of traffic lanes adopted is 3.5m or as per existing lane width.

For the N11 section of the Proposed Scheme, with the proposed speed limit greater than 60km/h (80km/hr) between the N11 between Kill Lane/ N11 Junction and Loughlinstown Roundabout, the design seeks to minimise largescale changes to the existing infrastructure where it is deemed to be suitable for use in its existing case:

- Along this section N11 National Road where the Proposed Scheme makes use of the existing pedestrian and cyclists infrastructure to minimise large scale changes to the existing infrastructure, the footpath and cycle tracks have been improved at Bus stop locations considering safety or as per existing;
- The Proposed Scheme between N11 between Cornelscourt (junction with old Bray Road) to Kilbogget Junction (ch 9+800 to ch: 12+050) retains the existing pedestrian arrangement and new footpath is not proposed, as it was considered a non-desired pedestrian link based on the pedestrian movement along this stretch and is aligned with the local development plans. Alternative walking routes exist on adjacent quieter roads.
- Along this section N11 National Road where the Proposed Scheme makes use of the existing bus and general traffic infrastructure, the preferred width of traffic lanes adopted is 3.5m.

Where the existing road geometry does not meet the design standards, this has been highlighted each section of the Proposed Scheme in Section 4.5.

The existing junctions along the N11 section have been designed to provide safety for pedestrian and cyclists, while giving priority to buses and coaches. The existing left turn slip lanes have been removed and junctions have been design as Protected Junctions layout.

## **4.6.2 Pedestrian Provision**

### **4.6.2.1 Footpath Widths**

The desirable minimum width for a footpath is 2.0m. This width should be increased in areas catering for significant pedestrian volumes where space permits. DMURS (Government of Ireland 2013) defines the absolute minimum footpath width for road sections as 1.8m based on the width required for two wheelchairs to pass each other. Building for Everyone: A Universal Design Approach (NDA 2020), defines acceptable minimum footpath widths at specific pinch points as being 1.2m wide over a two-metre length of path.

In line with the Road User Hierarchy designated within DMURS, at pinch points the width of the general traffic lane should be reduced first, then the width of the cycle track should be reduced before the width of the footpath is reduced where practicable.

Throughout the Proposed Scheme, footpath widths of two metres or wider have been proposed, however where this has not been achieved, deviations from standard have been required as outlined in Section 4.5.

### **4.6.2.2 Pedestrian Crossings**

Where possible, DMURS (Government of Ireland 2013) recommends that designers provide pedestrian crossings that allow pedestrians to cross the street in a single, direct movement. To facilitate road users who cannot cross in a reasonable time, the desirable maximum crossing length without providing a refuge island applied across the Proposed Scheme is 19m. This is applicable at stand-alone pedestrian crossings as well as at junctions.

Refuge islands should be a minimum width of two metres. Larger refuge islands should be considered by designers in locations where the balance of place and movement is weighted towards vehicle movements, such as areas where the speed limit is 60kph or greater, in suburban areas or where there is an increased pedestrian safety risk due to particular traffic movements. Where a refuge island is provided, straight crossings are desirable, and the refuge island has been designed to be 4m wide or more. At a staggered crossing, islands of less than 4m in width may be provided, and these have been designed to have a minimum effective width of 2m between obstacles such as signal poles.

Along the Proposed Scheme pedestrian crossings varying from 2.4m and 4m in width have been incorporated. Larger pedestrian crossing widths have been allocated in areas that are expected to accommodate a high number of pedestrians crossing or at locations where both pedestrians and cyclists share a crossing such as at a Toucan crossing.

At signalised junctions and standalone pedestrian crossings, the footpath is to be ramped down to carriageway level to facilitate pedestrians who require an unobstructed crossing. At minor junctions, raised tables are provided to raise the road level up to footpath level and facilitate unimpeded crossing. Tactile paving is provided at the mouth of each pedestrian crossing and audio units will be provided on each traffic signal push button to assist mobility impaired users. Pedestrian crossings are indicated in the Landscaping General Arrangement drawings (BCIDB-JAC-GEO\_GA-0013\_XX\_00-DR-CR-9001) in Volume 3 of this EIAR.

## **4.6.3 Cycling Provision**

One of the objectives for the Proposed Scheme is to enhance the potential for cycling by providing safe infrastructure, segregated from general traffic wherever practicable. Physical segregation ensures that cyclists are protected from motorised traffic and can bypass vehicular congestion, thus improving cyclist safety and reliability of journey times. Physical segregation can be provided in the form of vertical segregation, (e.g. raised kerbs), horizontal segregation (e.g. parking / verge protected cycle tracks), or both. Bike racks will generally be provided, where practicable, at Island Bus Stops and key additional locations as noted in the Landscaping General Arrangement drawings (BCIDB-JAC-ENV\_LA-0013\_XX\_00-DR-LL-9001) in Volume 3 of this EIAR.

The 'preferred cross-section template' developed for the Proposed Scheme includes protected cycle tracks, providing vertical segregation from the carriageway to the cycle track and vertical segregation from the cycle track to the footpath.

The principal source for guidance on the design of cycle facilities is the NCM (NTA 2011) and the PDGB.

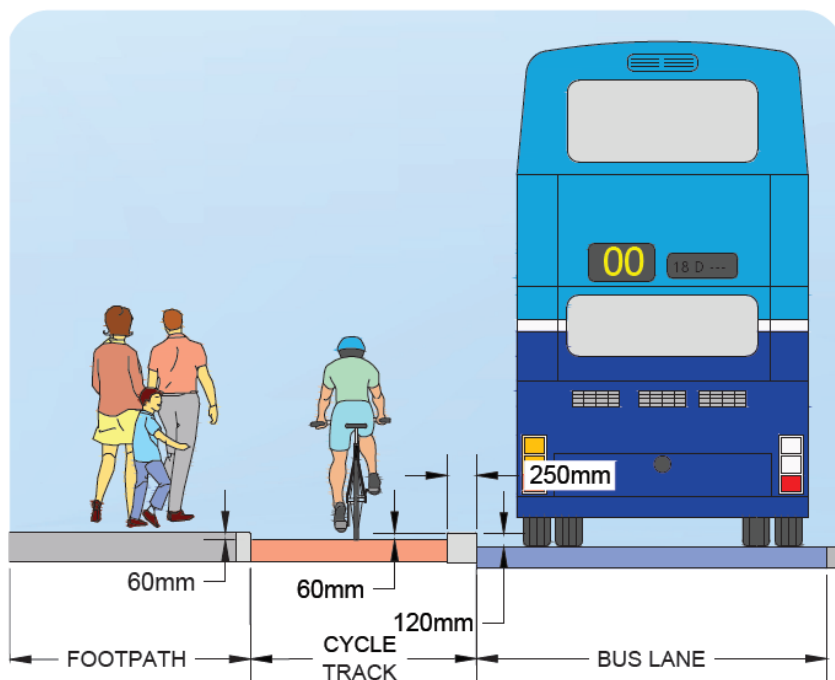
The desirable minimum width for a single-direction, with-flow, raised-adjacent cycle track is 2m. This arrangement allows for two-abreast cycling, and based on the NCM Width Calculator, this also allows for overtaking within the cycle track. The minimum width is 1.5m, which based on the NCM Width Calculator, allows for single file cycling. Localised narrowing of the cycle track below 1.5m is also necessary over very short distances to cater for local constraints (e.g. exceptional mature trees).

The desirable minimum width for a two-way cycle track is 3.25m. In addition to this, a buffer of 0.5m should be provided between the two-way cycle track and the carriageway. Using the NCM width calculator, reduction of these desirable minimum widths can be considered on a case-by-case basis, with due cognisance of the volume of cyclists anticipated to use the route as well as the level of service required.

The Proposed Scheme is approximately 18.5km long and includes 33.8km of segregated cycle tracks compared with an existing provision of just 17.4km of cycle track, and 14.9km unsegregated cycle lane in both directions. Details of the proposed cycle provision throughout the extent of the Proposed Scheme are provided in the following sections.

#### 4.6.3.1 Cycle Tracks

A cycle track is a segregated lane dedicated to cycling which is physically segregated from the adjacent traffic lane and/or bus lane horizontally and/or vertically, as shown in Image 4.14, taken from the PDGB.



**Image 4.14: Fully Segregated Cycle Track**

Segregated cycle tracks have been provided in each direction at the following locations:

- From the start of the Proposed Scheme at St Stephen's Green to the Loughlinstown Roundabout;
- From Stonebridge Road to St Anne's Church in Shankill; and
- From Shanganagh Castle in Shankill to the end of the Proposed Scheme at Fran O'Toole Bridge in Bray.

#### 4.6.3.2 Cycle Lanes

Cycle lanes are designated lanes on the carriageway that are reserved either exclusively or primarily for the passage of cyclists. Standard cycle lanes include Mandatory Cycle Lanes and Advisory Cycle Lanes. Mandatory

Cycle Lanes are marked by a continuous white line which prohibits motorized traffic from entering the lane, except for access. Parking is not permitted on mandatory cycle lanes. Mandatory Cycle Lanes are 24-hour unless time plated in which case they are no longer cycle lanes. Advisory Cycle Lanes are marked by a broken white line which allows motorized traffic to enter or cross the lane. They are used where a Mandatory Cycle Lane leaves insufficient residual road space for traffic, and at junctions where traffic needs to turn across the cycle lane. Parking is not permitted on Advisory Cycle Lanes other than for set down and loading. Advisory Cycle Lanes are 24-hour unless time plated.

Cycle tracks are the preferred cycling infrastructure proposed along the length of the Proposed Scheme. Where necessary the use of cycle lanes have been limited to the following locations typically along the route:

- Transitions to existing cycle lanes, typically on side roads of the main corridor alignment; and
- For side road crossings where the cycle track is locally reduced to road level.

#### **4.6.3.3 Offline Cycle Track**

Offline cycle tracks are fully offset from the road carriageway by a grass verge, providing a greater level of protection and comfort to cycle users. Offline sections of cycle track are provided at the following locations:

- Along Belmont Terrace for a short section to improve cycle track widths and interactions with general traffic outbound;
- Along St Brigid's Church Road for a short section where insufficient space was available along the R138 inbound;
- Two-way cycle track along Stonebridge Road connecting to Shanganagh Road;
- Alongside the R138/N11 as it approaches UCD in both directions, as existing;
- Inbound between St Columille's Hospital and Loughlinstown Roundabout as existing; and
- Two-way cycle track to the east of Dublin Road as it passes Shanganagh Park and Cemetery.

Local connections are also provided to offline cycle routes in the vicinity of Grand Canal, at Coláiste Eoin, the proposed Dodder Greenway and adjacent to the Dublin Road / Upper Dargle Road junction.

The UCD Interchange proposals also include offline cycle routes, which become shared spaces with pedestrians once within the campus and interchange area. This is in keeping with the cycling strategy for the campus and recognises that the campus is a different environment to that of the main Proposed Scheme.

#### **4.6.3.4 Quiet Street Treatment**

Where the Proposed Scheme cannot facilitate cyclists without significant impact on bus priority, alternative cycle routes are explored where appropriate and feasible away from the Proposed Scheme bus route. Such offline options may include directing cyclists along streets with minimal general traffic other than car users who live on the street. Guidance in this regard has been provided within the PDGB which states:

*'Diversions of proposed cycle facilities on to quieter parallel routes, to avoid localised narrowing of cycle tracks on the main CBC route, is to be considered in the context of the CBC route being listed as a primary cycle route as per the Greater Dublin Area Cycle Network Plan. These diversions, however, may also be considered where appropriate cycle facilities cannot be provided along the CBC route without significant impact.'*

These are called Quiet Streets due to the low volume of only local general traffic users travelling at low speed and are deemed suitable and safe for cyclists sharing the roadway with the general traffic without the need to construct segregated cycle tracks or painted cycle lanes. The Quiet Street Treatment would involve appropriate advisory signage and lane marking for both the general road users and cyclists.

On the Proposed Scheme a Quiet Street cycle route is proposed on the west side of the N11, commencing north of Loughlinstown Roundabout, the route passes residential and commercial premises along a local road with low traffic and low vehicle speeds before joining up with a dedicated section of cycle path approximately 100m south of the Wyattville Road Bridge. In addition to this, local connections are provided from the Proposed Scheme's main cycle track to existing quiet streets at certain locations, where appropriate.

#### **4.6.3.5 Treatment of Constrained Areas**

At some locations along the Proposed Scheme, standard width of cycleways cannot be achieved, and localised narrowing will be required. All locations where substandard widths are required have been recorded and presented in each of the sections of the Proposed Scheme as described in Section 4.5.

#### **4.6.3.6 Cycle Provision Through Junctions**

Junctions have been designed to facilitate a high level of safety, comfort, and priority for sustainable modes of travel (i.e. walking and cycling) and for public transport by prioritising the space and time allocated to these modes within the operation of a junction. This will also accommodate the forecast future year traffic volumes as safely and efficiently as possible within the remaining space and time. This has allowed the BusConnects Infrastructure team to maximise the number of people moving through each junction and to prioritise these sustainable modes of travel. These locations are shown on the General Arrangement drawings (BCIDB-JAC-GEO\_GA-0013\_XX\_00-DR-CR-9001) included in Volume 3 of this EIAR.

### **4.6.4 Bus Priority Provision**

One of the objectives of the Proposed Scheme is to enhance the capacity and potential of the public transport system by improving bus speeds, reliability, and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements. Several measures can be used to achieve this. This is described further in this section.

#### **4.6.4.1 Bus Lanes**

Bus priority can be achieved by means of providing a dedicated lane within the carriageway for the bus to travel independently from the general traffic. This includes priority through junctions by bringing the bus lane to the junction stop line as per general traffic lanes. This means in some circumstances that left-turning traffic cannot use the bus lane at junctions and instead will be provided with a dedicated left-turn traffic signal phase for the turn movement off the general traffic lane or will be provided with a separate left-turning lane. In general, bus lanes will be a minimum of 3m wide. This is as per the guidance for traffic lane widths outlined in DMURS (Government of Ireland 2013). Larger lane widths are needed in some instances to enable buses to navigate corners, etc. ('swept path'). Bus lanes are shown on the General Arrangement drawings (BCIDB-JAC-GEO\_GA-0013\_XX\_00-DR-CR-9001) included in Volume 3 of this EIAR.

#### **4.6.4.2 Signal Controlled Priority (SCP)**

An alternative measure for achieving bus priority at locations where the provision of bus lanes is not possible, is the use of SCP, which facilitates bus priority by using traffic signals to give buses priority ahead of general traffic on sections of a route with significant physical constraints or pinch-points impacting on the provision of a bus lane. Typical pinch-points arise where the existing carriageway is narrow (no bus lane or segregated cycle track) due to existing buildings or structures that cannot be demolished or modified to widen the road to make space for a bus lane. While SCP is a good alternative to a physical bus lane it is only effective for short distances. It works through the use of traffic signal controls (typically at junctions) where the bus lane and general traffic lane must merge ahead and share the road space for a short distance until the bus lane recommences downstream. The general traffic will be stopped at the signal to allow the bus pass through the narrow section first. SCP will fail if downstream congestion blocks access to the downstream bus lane. Image 4.15 illustrates a schematic operation of SCP.





Image 4.15: Signal Controlled Priority (SCP) Schematic Operation (Source: PDGB)

Locations within the Proposed Scheme where SCP provisions will result in buses and general traffic sharing a lane are described below:

- Buses travelling in either direction across the canal bridge;
- Buses travelling southbound through Leeson Street Upper / Wellington Place junction;
- Buses travelling northbound through Donnybrook Road / Belmont Avenue junction;
- Buses travelling northbound on Donnybrook Road from Eglinton Terrace to The Crescent;
- Buses travelling southbound on the Dublin Road in Shankill from Shanganagh Road junction to Shanganagh Park;
- Buses travelling northbound on the Dublin Road in Shankill from Olcovar junction to Woodbank;
- Buses travelling northbound on the Dublin Road from the M11 Wilford junction to Woodbrook College; and
- Buses travelling in either direction on the Dublin Road in Bray through the Upper Dargle Road junction.

Sections of the Proposed Scheme where SCP at multiple traffic signal junctions are proposed are described further in Section 4.5.

#### **4.6.4.3 Bus Gates**

A Bus Gate is a sign-posted short length of stand-alone bus lane. This short length of road is restricted exclusively to buses, taxis, cyclists and emergency vehicles. It facilitates bus priority by removing general through traffic along the overall road where the bus gate is located. General traffic is directed by signage to divert towards other roads before it arrives at the Bus Gate.

One bus gate is provided at the northern end of the Proposed Scheme on Leeson Street Lower, between the junction with Earlsfort Terrace (St Stephen's Green) and Leeson Lane. Between these points, only bus, taxi, cycle, and emergency vehicle access will be permitted on the Leeson Street Lower carriageway for the duration of the bus gate operational hours. Traffic approaching Leeson Street Lower from the Hatch Street Lower junction will be restricted to buses and local access only at all times of day.

The purpose of the bus gate at this location is to limit the carriageway traffic between St Stephen's Green and Hatch Street Lower to buses and local access only. Southbound general traffic is already not presently permitted on this section of Leeson Street Lower. The diversion of northbound general traffic allows a reduction in carriageway cross section to accommodate suitable footway and cycle track widths while maintaining bus priority.

Northbound general traffic will be diverted via Hatch Street Lower and Earlsfort Terrace. This requires the conversion of the northbound bus lane on Earlsfort Terrace to a general traffic lane. Earlsfort Terrace is on an orbital route and carries up to six bus services per hour in each direction, whereas Leeson Street Lower is on a spine route and carries up to 16 buses per hour in each direction. The existing left turning ban at Earlsfort Terrace towards St Stephen's Green North has been removed to facilitate the general traffic movement.

General traffic will be restricted from proceeding north at the Leeson Street Lower / Hatch Street junction by traffic restrictions, supporting traffic signs and (if deemed necessary) by bus lane enforcement cameras. Local access from the south will be maintained at this junction for those vehicles wishing to access Leeson Lane and other accesses off Leeson Street Lower, which may be controlled by permit if necessary.

The hours of operation of the bus gate will be subject to on-going review based on prevailing traffic conditions and the goal of achieving the project objectives. The NTA and local authorities will co-operate in good faith to address any issues with the hours of operation that may arise during the lifetime of the Proposed Scheme.

#### **4.6.4.4 Treatment at Pinch Points**

In line with the Road User Hierarchy designated within DMURS (Government of Ireland 2013), at pinch points, the width of the general traffic lanes should reduce first, then the width of the cycle track should be reduced before the width of the pedestrian footpath is reduced. The Proposed Scheme design reflects this approach, where practicable.

#### **4.6.4.5 Bus Stops**

To improve the efficiency of the bus service along the Proposed Scheme the position and amount of bus stops have been reviewed as part of a bus stop assessment.

The basic criteria that are considered when locating a bus stop are as follows:

- Driver and waiting passengers are clearly visible to each other;
- Location close to key facilities;
- Location close to main junctions without affecting road safety or junction operation;
- Location to minimise walking distance between interchange stops;
- Where ideally there is space for a bus shelter;
- Location in pairs, 'Tail to Tail' on opposite sides of the road;
- Close to (and on exit side of) pedestrian crossings;
- Away from sites likely to be obstructed; and
- Adequate footway width.

For the Core Bus Corridor Infrastructure Works it is proposed that bus stops should be preferably spaced approximately 400m apart on typical suburban sections of the route, dropping to approximately 250m in urban centres.

It is important that bus stops are located close to pedestrian crossings where practicable as pedestrians will tend to take the quickest route, which may be hazardous. Locations with no or indirect pedestrian crossing will be avoided.

The following bus stop designs were considered for use on the Proposed Scheme: the Island Bus Stop, the Shared Landing Area Bus Stop, the Inline Bus Stop, and the Layby Bus Stop.

Further detail on the design and locations of bus stops along the Proposed Scheme are described in Section 4.5.

#### 4.6.4.5.1 Island Bus Stops

Where sufficient space allows Island Bus Stops are the preferred bus stop option for the Proposed Scheme.

This option will reduce conflict between cyclists and stopping buses by deflecting cyclists behind the bus stop. To address the pedestrian / cyclist conflict, a pedestrian priority crossing point is provided for pedestrians accessing the bus stop area. Part-time signals will enable controlled crossing. Visually impaired pedestrians may call for a fixed green signal when necessary and the cycle signal will change to red. The cycle track will narrow from 2.0m to 1.5m for single file cycling through the bus stop, as overtaking is not required in this area.

An example of an island bus stop is shown in Image 4.16.

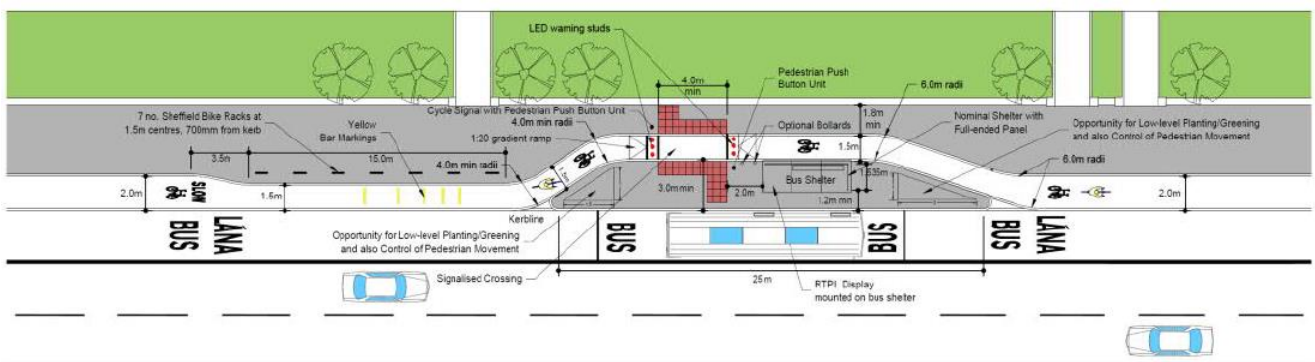
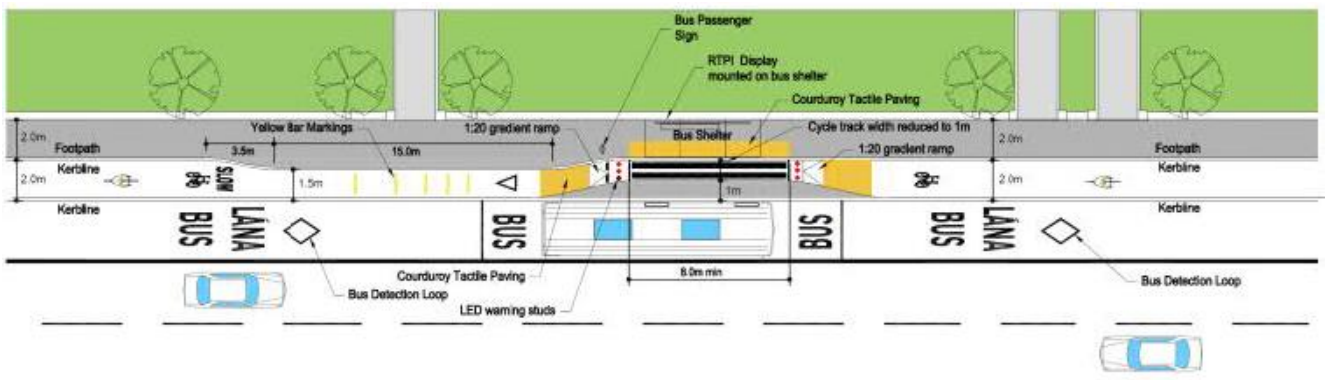


Image 4.16: Island Bus Stop

Island bus stops are proposed at a number of locations along the Proposed Scheme. These locations are outlined per Proposed Scheme section in Section 4.5.

#### 4.6.4.5.2 Shared Bus Stop Landing Area Bus Stops

Where space constraints do not allow for an Island Bus Stop, an option consisting of a Shared Landing Area Bus Stop is proposed. It is designed to reduce conflict between cyclists and stopping buses by ramping cyclists up to footpath level where they continue through the stop. The cycle track will also be narrowed when level to the footpath and tactile paving provided to prevent pedestrian / cyclist conflict. An example of a Shared Landing Area Bus Stop is shown in Image 4.17.



**Image 4.17: Shared Bus Stop Landing Zone Arrangement**

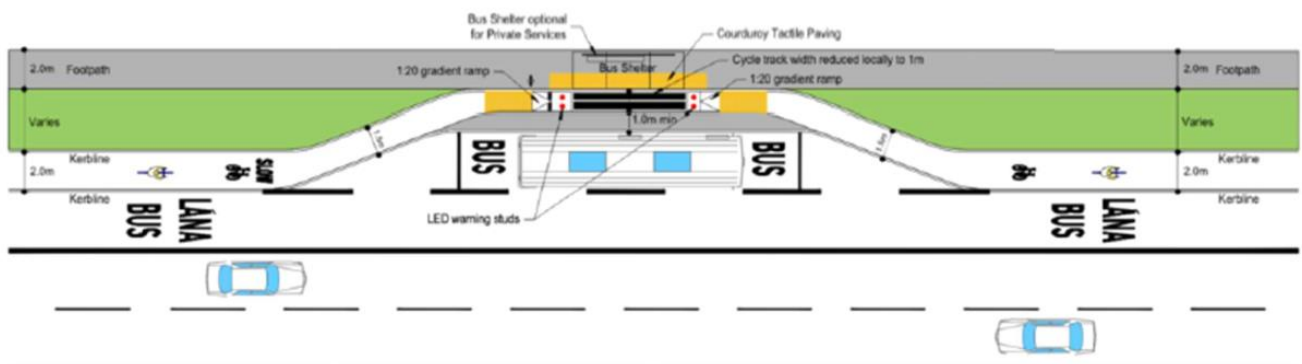
The location of Shared Landing Bus Stops, which are used in a number of locations on the Proposed Scheme, are described in Section 4.5.

#### 4.6.4.5.3 Inline Bus Stop

Where there are no cycle tracks provided, Inline Bus Stops are used, where the users departing the bus exit straight on to the footpath. Inline Bus Stops are used on the Proposed Scheme due to the presence of offline cycle facilities. These locations are outlined in Section 4.5.

#### 4.6.4.5.4 Layby Bus Stop

Layby bus stops can provide an effective solution for coaches with long dwell times at bus stops, allowing other buses to pass the stopped bus. In these cases, and where space has permitted, a separate layby bus stop has been proposed. An example of a Layby Bus Stops is shown Image 4.18.



**Image 4.18: Layby Bus Stop Landing Arrangement**

#### 4.6.4.5.5 Bus Stop Shelters

As a general policy, shelters will be provided at all bus stops on the Proposed Scheme. This will improve the comfort of passengers waiting for a bus during poor weather, as well as providing shade on sunny days. In some locations, such as those designated as Architectural Conservation Areas, it may however not be appropriate to provide a bus shelter in front of a building of heritage value to minimise visual impact.

### 4.6.5 Accessibility for Mobility Impaired Users

The aim of the Proposed Scheme is to provide enhanced walking, cycling and bus infrastructure along the corridor. In achieving this aim, the Proposed Scheme has been developed using the PDGB and in accordance with the principles of DMURS (Government of Ireland 2013) and Building for Everyone: A Universal Design Approach (NDA 2020).



The following non-exhaustive list of relevant standards and guidelines have informed the approach to Universal Design in developing the Proposed Scheme:

- Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors (NTA 2021);
- Building for Everyone: A Universal Design Approach (NDA 2020);
- How Walkable is Your Town? (NDA 2015);
- Shared Space, Shared Surfaces and Home Zones from a Universal Design Approach for the Urban Environment in Ireland (NDA 2012);
- Best Practice Guidelines, Designing Accessible Environments (Irish Wheelchair Association 2020);
- UK DfT Inclusive Mobility (UK DfT 2005);
- UK DfT Guidance on the Use of Tactile Paving Surfaces (UK DfT 2007); and
- BS 8300-1:2018 Design of an accessible and inclusive built environment. External Environment – Code of practice (BSI 2018).

The Disability Act 2005 (as amended) places a statutory obligation on public service providers to consider the needs of mobility impaired users. An Accessibility Audit of the existing environment and the proposed draft preliminary design for the corridor was undertaken. The Audit provided a description of the key accessibility features and potential barriers to persons with disabilities based on the Universal Design standards of good practice. The Audit was undertaken in the early design stages with the view to implementing any key measures identified as part of the design development process.

In achieving the enhanced pedestrian facilities there has been a concerted effort made to provide clear segregation of modes at key interaction points along the Proposed Scheme which was highlighted as a potential mobility constraint in the Audit. In addressing one of the key aspects to segregation, the use of the 60mm set down kerb between the footpath and the cycle track is of particular importance for guide dogs, whereby the use of white line segregation is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions.

One of the other key areas that was focused on was the interaction between pedestrians, cyclists, and buses at bus stops. The Proposed Scheme has prioritised, where possible, the use of island bus stops, including signal call button for crossing of cycle tracks, to manage the interaction between the various modes with the view to providing a balanced safe solution for all modes.

## **4.6.6 Integration**

### **4.6.6.1 Interchange with Existing and Proposed Public Transport Network**

One of the objectives of the Proposed Scheme is to enhance interchange between the various modes of public transport operating in the city and wider metropolitan area. The Proposed Scheme facilitates improved existing and new interchange opportunities with other transport services including:

- Existing Dublin Bus services at numerous locations along the route;
- Services accessing the proposed UCD Interchange facility;
- Greater Dublin Area Cycle Network Plan (GDACNP);
- Proposed Woodbrook DART station;
- Luas Green Line Extension;
- Dublin Metrolink;
- Interface with New Proposed Dublin Area Bus Network Re-Design;
- Interface with Park and Ride Facilities; and
- Interface with adjacent BusConnects CBC Schemes.

### **4.6.6.2 Integration with Other Road Users**

General traffic flow and local access will be maintained along the Proposed Scheme corridor although there will be impacts on vehicle capacity along the route due to the reallocation of road space to bus priority and cycle



tracks and the introduction of turning movement restrictions. The provision of bus priority and segregated cycling facilities will result in more efficient movement of increased numbers of people along the route, without removing the option for general traffic to use the route. It is recognised that there is dependence by some on cars or business vehicles. Through the provision of bus priority and improved cycling and pedestrian facilities all road users get better equitable choices and associated more efficient use of the road space for people movement. The improvement provided to more reliable sustainable travel options is being balanced against the general traffic flow impacts.

#### 4.6.6.3 Integration with Other Infrastructure Projects

A number of infrastructure projects are planned within the vicinity of the Proposed Scheme which will interface with the proposals. These are outlined below:

- **Fitzwilliam Cycle Route scheme:** The cycle scheme is being delivered by DCC and will interface with the Proposed Scheme at the junction between Fitzwilliam Place and Leeson Street Lower. The design of the Proposed Scheme at this interface has been coordinated to include for the cycle track along Fitzwilliam Place and Adelaide Road. In the potential interim scenario whereby the proposed cycle scheme infrastructure is not in place ahead of the Proposed Scheme, minor adjustments to kerb line and line marking for cycle track tie-in shall be implemented on Fitzwilliam Place and Adelaide Road;
- **Dodder Greenway:** Plans are being developed by DCC for the Dodder Greenway, which will interface with the Proposed Scheme in the Donnybrook area. Coordination has taken place with DCC on the potential integration opportunities, which includes a toucan crossing at the tie-in with the proposed greenway at the Eglinton Road junction;
- **Urban Realm Regeneration at Fitzwilliam Place:** The proposed urban realm regeneration at the Fitzwilliam Place square designed by others, has been coordinated and incorporated into the Proposed Scheme;
- **Appian Way and Leeson Street Upper (adjacent to Leeson Village):** The development proposals included for the construction of a 10-storey over lower ground floor building to include 44 studio and one-bed apartments. A substation was proposed with access from Leeson Street Upper. All other access was to be for pedestrians, cyclists and emergency access only. The Planning Application has been refused;
- **75a Leeson Street Upper and Swan Place (North Morehampton Square):** The development will consist of the demolition of the existing single-storey commercial building, change of use to residential, and the construction of a terrace of three, three-storey, two-bedroom dwelling houses (at around chainage A1330 of the Proposed Scheme). The Planning Application has been granted;
- **Development at Kiely's Pub, Donnybrook:** The proposed development will consist of the demolition of all existing buildings on site (comprising the former Kiely's public house and outbuildings) and the construction of a mixed-use building of three to seven storeys in height, above basement level. The Planning Application has been granted;
- **Development at Circle K site, Donnybrook Road and Brookvale Road:** Planning proposals have been submitted for the development of a twelve-storey over basement building (with retail and café / restaurant use at ground floor level and 'Build to Rent' residential use at 1st to 11th floor levels. The proposals include a building overhang detail which would extend over the proposed BusConnects public footway. Following DCC's refusal of the planning application, an application has been made to An Bord Pleanála;
- **1, 3, 5, 7, 9 and 11 Eglinton Road:** Planning permission for a residential development of 94 no. apartments and a ground floor café (at around chainage A2500 of the Proposed Scheme). Vehicular access will be provided from Brookvale Road into basement levels. The Planning Application has been granted;
- **RTÉ Campus Montrose:** A planning application was submitted for the construction of 611 apartments, three town houses, a childcare facility, two cafés, a change of use for the existing Mount Errol building for residents' facilities and a gym (at around chainage A2900 of the Proposed Scheme). The development also proposed 2.5 acres of landscaped publicly open space. This planning application was granted by An Bord Pleanála subject to various conditions. However, in March 2021, a High Court order overturned An Bord Pleanála's permission. The proposed development has been revisited and is currently at pre-planning stage. The proposed development is a mixed development and will consist of 675 housing dwellings, 200 bed hotel, 370sqm crèche,

450 sqm restaurant, 150sqm farm shop and ancillary residential amenity. Liaison has taken place with DCC and the developer ahead of their planning application for the proposed development. The Proposed Scheme design has been coordinated with the proposed development at Montrose, the bus top has been moved slightly north and impact on the trees has been minimised. A planning application has not been lodged at the time of writing this report;

- **UCD Future Campus Masterplan:** The UCD campus at Belfield is located at around chainage A4075 of the Proposed Scheme. The UCD Future Campus masterplan development consists of significant works within the campus including modifications to the existing entrance arrangement to incorporate a new junction and internal road layout, Arrival Plaza, Centre for Creativity building and Centre for Future Learning. The UCD Interchange layout has been coordinated with the UCD masterplan proposals. The planning application for UCD's masterplan proposals has been granted;
- **UCD Nova Cycle Scheme:** The UCD Nova Cycle scheme was under construction during the design development of the Proposed Scheme and the scheme is now built. The Proposed Scheme design has been coordinated with the recently built UCD Nova Cycle scheme keeping BusConnects objectives, between the UCD Nova Entrance near the footbridge and Fosters Avenue;
- **N11 Pavement Renewal Scheme:** The Proposed Scheme has been coordinated with TII N11 Pavement renewal scheme. N11 Pavement renewal scheme is due for completion in 2023 with three years construction 2021-2023 split under three Lots. The scheme will upgrade the entire N11 section to bring it to standard, fixing repairs and defects;
- **Fortwilliam Cottage:** The development will include four semi-detached houses and an increase in width of the existing vehicular entrance to 5.0m, at around chainage A5800 of Proposed Scheme. The planning application has been granted;
- **Talbot Hotel:** Permission for the erection of an extension (3,555sqm in total floor area) consisting of a proposed four storeys over a semi-basement extension to the rear of the existing Hotel, comprising 61 bedrooms over the proposed ground floor, first floor, second floor and part set-back third floor. The development at around chainage A6000 of the Proposed Scheme includes internal alterations at the rear of the existing building, alterations to the layout of the existing car park, hard and soft landscaping together with all ancillary services and associated site works. The planning application has been granted;
- **St Laurence's Park:** The proposed works include the demolition of 16 no. Maisonettes, two no. semi-detached houses and removal of prefabricated Library building. Dún Laoghaire-Rathdown County Council gives notice of in this proposal to construct a two-storey library building with gross area of 1,010sqm and 88 apartments. The development is at around chainage A6750 of the Proposed Scheme. The planning application has been granted;
- **Stillorgan Leisureplex:** The development at around chainage A6750 of the Proposed Scheme will have a total of 232 Build-To-Rent apartment units. The development will provide for two retail units, four restaurant / café units, provision of a public plaza onto the corner of the Lower Kilmacud Road and the Old Dublin Road, public realm improvements, resident lounge area, communal kitchen and dining, co-working space, cinema, gym and concierge service. Vehicular access to the basements is from the Lower Kilmacud Road and St Laur'nce's Park. The planning application has been granted;
- **Former Blakes and Esmonde Motors Site:** The development will consist of the demolition of existing vacant buildings and the construction of a mixed use development comprising 179 student accommodation units, 103 residential apartment units, a sports hall and retail, restaurant, and other facilities. The proposed development will comprise four buildings ranging in height from three to nine storeys. The proposed development is located around chainage A6900 of the Proposed Scheme. The development also includes the provision of public, communal and private open space and includes improvements to the public realm along the Lower Kilmacud Road and The Hill. The planning application has been granted. Since then the site has been taken over by a new developer and Cairn Homes Properties Ltd., have issued notice to An Bord Pleanála of their intent to apply for planning permission for a strategic housing development at this site. The development will consist of the construction of a mixed use scheme of 377 Built-to-Rent apartments, Community Sports Hall (c. 933 sqm), along with five restaurants / cafés (c. 841sqm), creche (c. 215sqm), office (c. 195sqm) and ancillary residents' support facilities / services (c. 1,016sqm) laid out in six blocks ranging in height from three to nine storeys (over basement) comprising 21 studio apartments, 189 one-bedroom apartments, 159 two-bedroom apartments and eight three-bedroom apartments, and public realm upgrades. Liaison has taken place with Dún Laoghaire-Rathdown County Council and the developer ahead of their planning application for the proposed development. The Proposed

Scheme design is being coordinated with the proposed development at the former Blakes site. A planning application has not been lodged at the time of writing this report;

- **Brewery Road / Stillorgan Road:** Planning permission for a Build-to-Rent strategic housing development consisting of a new residential scheme of 287 residential units. Provision is also made for pedestrian connections to the adjoining park to the south-west, the N11 Stillorgan Road to the north-east and the existing The Grange development to the south-east. The development is at chainage A7650 of the Proposed Scheme. It shall be accessed from Brewery Road. The application has been granted. The Proposed Scheme has also been coordinated with the proposed Brewery Road Safety Improvement Scheme at the same location;
- **Roselawn and Aberdour:** A strategic housing development consisting of the demolition of the existing structures on site and the provision of a Build-to-Rent residential development comprising 142 apartments at around chainage A8750 of the Proposed Scheme. The development also proposes a pedestrian link from the N11 to Granville Road via Knocksinna Court; permanent vehicular access off Knocksinna Court via Granville Road and temporary construction access off the N11; and provision of a gate for emergency access towards the south-western corner of the site onto the N11. The planning application has been granted;
- **Springfield House:** Permission granted for the demolition of the existing dwelling and the construction of 24 dwelling units at around chainage A9300 of the Proposed Scheme;
- **51 (Clara House) & 52 (Montrose):** Permission granted for demolition of the two existing dwellings, along with associated outbuildings. Construction of two apartment blocks providing 45 apartment units with associated balconies, comprising 17 one-bed units, 25 two-bed units and three three-bed units (at around chainage A9340 of the Proposed Scheme). The permission includes vehicular access and basement entrance / egress at Kill Lane;
- **Killart:** Permission granted for the construction of 19 residential dwellings and a new access road off Clonkeen Road (at around chainage A10700 of the Proposed Scheme);
- **Development at the New Junction at Druid's Glen Road:** The Proposed Scheme design has been coordinated with the recently constructed new development along the N11 at the new junction at Druid's Glen Road. The development and the new junction were at construction completion stage during the design development of the Proposed Scheme and is now built as this report is written;
- **Loughlinstown – Proposed Sign and Railing:** Permission is sought for the replacement of the existing north-facing Premiere internally illuminated advertising display with a digital advertising display and minor alterations to landscape plan. The proposed replacement sign and railing site is at around chainage A13950 of the Proposed Scheme;
- **Coltsfoot:** A planning application has been submitted for the demolition of the existing Coltsfoot single residence and the construction of 53 apartments over basement with associated external works and a relocated access point from the Dublin Road. The development location is immediately north of the existing Woodbank development along the R837 Dublin Road, Shankill. Planning permission has been refused;
- **Rathbeg Residential Development along Stonebridge Road:** Permission has been granted for the demolition of an existing two-storey dwelling house known as 'Rat'beg' and ancillary outbuildings and sheds, and the construction of a residential development of 54 units and main vehicle access off Stonebridge Lane. The proposed site layout is at around chainage E200 of the Proposed Scheme. Liaison has taken place with Dún Laoghaire-Rathdown County Council and the developer ahead of their planning application for a residential development on the site along Stonebridge Road. The Proposed Scheme design has been coordinated with proposed development, which includes routing the two-way cycle track through the proposed development site, which tie-in with the St Anne's School entrance;
- **Shanganagh Castle Housing Development:** Residential development of 597 residential units comprising housing, apartment and Build-to-Rent apartment units at around chainage A16200 of the Proposed Scheme. The planning application has been granted and construction commenced. The Proposed Scheme design has been coordinated with the development;
- **Shanganagh Park and Cemetery Masterplan:** Shanganagh Park and Cemetery is a suburban park surrounded by extensive greenbelt lands at around chainage A16475 of the Proposed Scheme. The planning application has recently been submitted. The masterplan includes:
  - Upgrading the park from local to regional status;
  - Improving functionality in the form of additional recreational use and natural habitat;
  - Consolidating the park, the castle and cemetery;

- Improved pedestrian connection between the coastline and the park;
  - A sculptural mound, topped by a viewing terrace offering views of Dublin and Wicklow Mountains, Dalkey Island and Bray Head;
  - Increased tree cover;
  - Three DART crossing points including a green bridge for wildlife;
  - Sports pavilion and facilities;
  - Provision for the East Coast Greenway cycling route to traverse;
  - An upgraded access to Shanganagh Cemetery;
  - An additional carpark on the castle grounds;
  - Reopening an entrance to the rear of the castle;
  - Relocating the piers from the south-west corner of the park;
  - An attenuation pond;
  - Relocation of the children's playground at Old Dublin Road;
  - Shared use pedestrian link from Woodbrook DART Station;
  - Potential location for renewable energy generation;
  - Community gardens and orchards;
  - Improved access to Shankill Beach; and
  - Other ancillary works.
- **Townland of Corke Little, Woodbrook:** The Woodbrook Strategic Housing Development is located at around chainage A16850 of the Proposed Scheme. It consists of a residential-led development comprising 685 no. residential units and one childcare facility. Included in the planning application is the provision of Woodbrook Distributor Road / Woodbrook Avenue from the Old Dublin Road (R119) to the future Woodbrook DART Station. Also included in the application is a new vehicular access provided from the Old Dublin Road (R119) opposite Woodbrook Downs entrance including new junction arrangements. Planning permission has been granted and the junction works are under construction at the time of writing this report;
  - **Aske House:** Permission has been granted for the development of a Specialist Hospital for 56 in-patients (at around chainage A16975 of the Proposed Scheme). The works include modification/widening of the existing site entrance at the Dublin Road by setting back and reinstating the old gate piers and railing;
  - **28 Dublin Road Apartment Development:** Submitted planning application includes construction of a single-storey apartment development consisting of four one-bedroom apartment dwellings including partial site excavation (at around chainage A17960 of the Proposed Scheme). Planning permission has been refused;
  - **St John of God Complex:** Permission has been granted for revisions to and extension of the existing internal road to provide connection to an associated road proposal on the adjoining Industrial Yarns Complex and removal of existing vehicular access from the Dublin Road. The proposed realignment of the site access is at around chainage A18100 of the Proposed Scheme;
  - **Bray Golf Club Lands off Ravenswell Road, Bray:** Consultation is underway regarding the development of the Bray Golf Club Lands as a Strategic Housing Development. The proposals include for residential units a childcare facility and other associated facilities. The development access is proposed from Ravenswell Road. The proposed works within these lands is subject to further development at the time of writing this report;
  - **Ravenhall Building (former Everest Centre Site), Castle Street, Bray:** Planning application consists of change of use from retail / commercial to 10 apartment units. Included in the application is the reconfiguration of existing internal and external car parking, alterations to existing services, and a new boundary wall to the north-east of the building (at around chainage A18200 of the Proposed Scheme). The Planning Permission has been refused but currently under appeal (March 2021). Recently the site has been sold to another developer and the new developer proposal is a 58 apartment complex with underground car park at this site. Discussions are ongoing with Wicklow County Council (WCC) and the current developer to coordinate the design with the Proposed Scheme. A planning application has not been lodged at the time of writing this report;
  - **Development of Site on Castle Street Adjacent to Dwyer Park, Bray:** Liaison has taken place with Wicklow County Council and the developer ahead of their planning application for a residential



development and creche on this site. A planning application has not been lodged at the time of writing this report. The Proposed Scheme design has been coordinated with development; and

#### 4.6.6.3.1 Bray Bridge Improvement Scheme

The Proposed Scheme design terminates at the northern end of the Fran O'Toole Bridge and the design has been coordinated to tie in with Wicklow County Council's Bray Bridge Improvement Scheme proposals, which takes into account bus priority and cyclists and pedestrian infrastructure. The junction design at the tie-in with the proposed Bray Bridge Improvement Scheme designed by WCC has been included as an alternative layout.

Image 4.19 shows the junction layout as part of the Proposed Scheme where the scheme ties into the existing road cross-section North of the Bray Bridge. Image 4.20 shows a coordinated design solution of the overall arrangement in a scenario in which both schemes have been implemented.



**Image 4.19: BusConnects Design tie-in to the Existing**



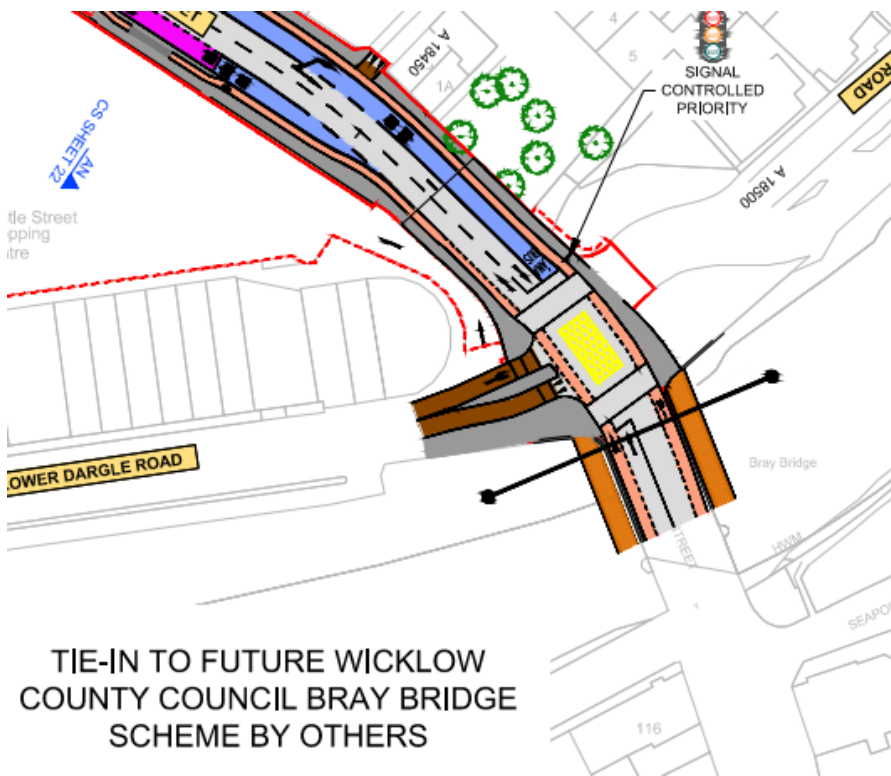


Image 4.20: BusConnects Design Co-ordinated with the Proposed WCC Bray Bridge Improvement Scheme

#### 4.6.6.4 Integration with Other Adjacent BusConnects Core Bus Corridor Schemes

As part of the design of the Proposed Scheme, consideration has been given to the potential coordination required in relation to other schemes within the BusConnects CBC Infrastructure Works. This section outlines potential interactions of the Proposed Scheme with adjacent schemes and identifies any procedures within the construction strategies that may be required in order to account for various sequencing scenarios in the construction of the schemes.

The Proposed Scheme includes the signalised junction of the R138 Stillorgan Road and Nutley Lane, which is also part of the Belfield / Blackrock to City Centre Scheme.

The BusConnects Infrastructure design team for each scheme have coordinated the design at the junction to ensure the design considers:

- Tie-in with the existing; and
- Tie-in with the Belfield / Blackrock to City Centre CBC Scheme.

Works proposed to the Nutley Lane junction include carriageway realignment, cycle track and pedestrian crossing works. The design teams of both schemes have coordinated the respective scheme designs to provide flexibility in the proposals such that construction sequencing and physical works can be coordinated or delivered in sequence should both schemes be implemented. Image 4.21 shows the proposed junction layout as part of the Proposed Scheme where the scheme ties into the existing Nutley Lane layout. Image 4.22 shows the proposed junction layout where the Belfield / Blackrock Scheme ties into the existing R138 Stillorgan Road layout. Image 4.23 shows an indicative coordinated design solution of the overall arrangement in a scenario in which both schemes have been implemented.

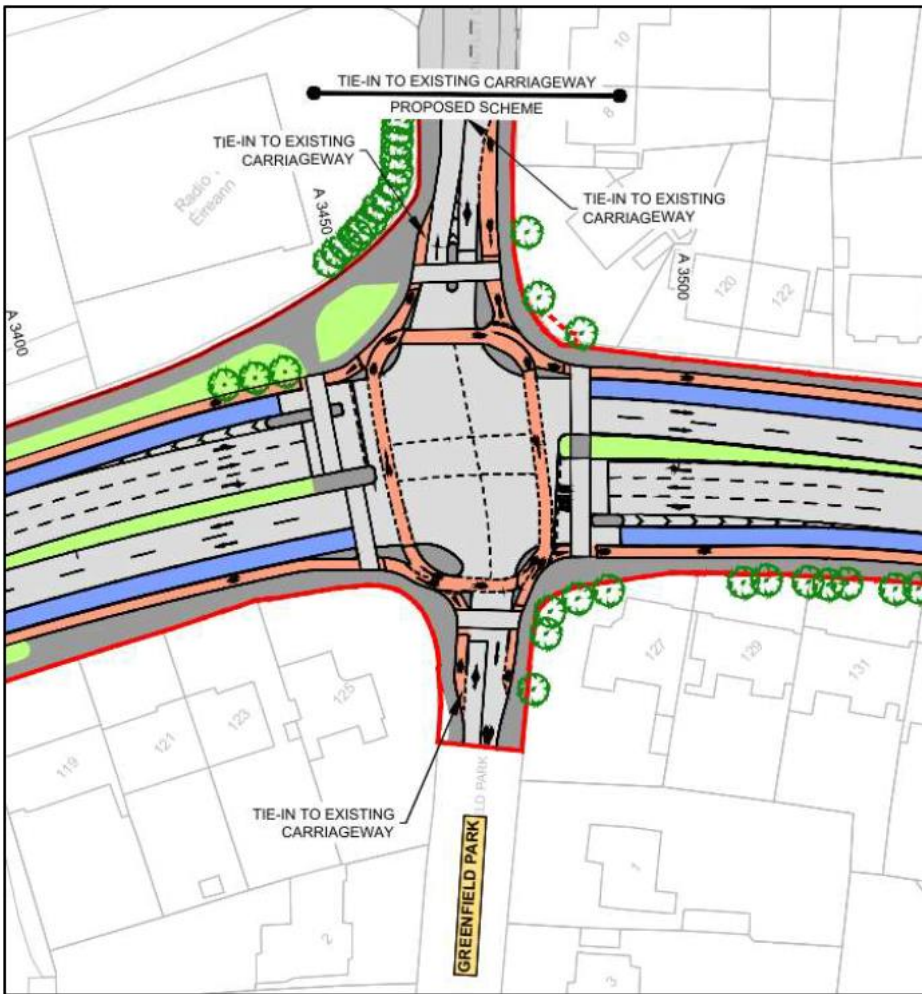


Image 4.21: Proposed Scheme Preliminary Design Layout at R138 Stillorgan Road / Nutley Lane Junction, Tying into the Existing Nutley Lane Layout



Image 4.22: Preliminary Design of the Belfield / Blackrock to City Centre Core Bus Corridor Scheme at Nutley Lane, Tying into the Existing R138 Stillorgan Road / Nutley Lane Junction Layout

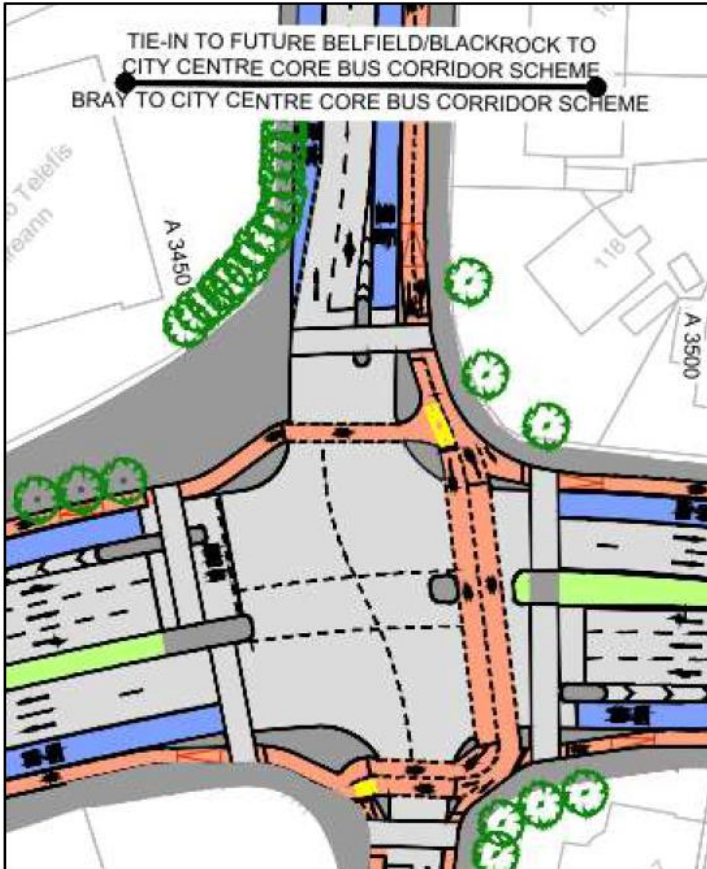


Image 4.23: Preliminary Design at R138 Stillorgan Road / Nutley Lane Junction of the Expected Overall Arrangement of the Proposed Scheme and Belfield / Blackrock to City Centre Scheme

The Belfield / Blackrock to City Centre Scheme is subject to a separate planning process, the timing of which is largely independent of that of the Proposed Scheme, and as such no exact sequencing of construction works can be determined at this stage. Table 4.28 represents a matrix of potential interactions and impacts associated with the various potential sequencing scenarios in relation to construction and operation of both schemes.

It is considered that vehicular access to and egress from the southern of the two existing driveways of the property 118 Stillorgan Road will be retained for pedestrians and cyclists only as part of both the Proposed Scheme and the Belfield / Blackrock to City Centre CBC Scheme works, and as such shall be included in the Compulsory Purchase Order process for both.

**Table 4.28: Matrix of Potential Interactions and Impacts Associated with Different Sequencing Scenarios**

	<b>Belfield / Blackrock Scheme: Not Yet Commenced</b>	<b>Belfield / Blackrock Scheme: Under Construction</b>	<b>Belfield / Blackrock Scheme: Completed</b>
<b>Proposed Scheme: Not Yet Commenced</b>	N/A	<p>Construction of the Belfield / Blackrock to City Centre CBC Scheme shall be carried out in accordance with the Construction Strategy within that scheme's planning application, without any potential interaction with the works associated with the Proposed Scheme.</p> <p>The works shall take place within the Red Line Boundary of the same and tie-in with the existing environment on Nutley Lane.</p> <p>Works to the subject junction will be as per the design in Image 4.22.</p>	<p>The Belfield / Blackrock to City Centre CBC Scheme shall be in full operation, designed in accordance with its planning application which will allow for the Proposed Scheme to tie in at a future date.</p> <p>Two-way cycle track will be constructed at Nutley Lane as part of the Belfield / Blackrock to City Centre CBC Scheme, along with two-way cycle track crossing at the N11 south eastern arm of the junction.</p> <p>Rest of the physical infrastructure at the R138 Stillorgan Road / Nutley Lane junction shall remain unchanged, outside of the Belfield / Blackrock to City Centre CBC Scheme's Red Line Boundary.</p>
<b>Proposed Scheme: Under Construction</b>	<p>Construction of the Proposed Scheme will be carried out in accordance with the Construction Strategy within that scheme's planning application, without any potential interaction with works associated with the Belfield / Blackrock to City Centre CBC Scheme.</p> <p>The works shall take place within the Red Line Boundary of the same and tie-in with the existing environment on Nutley Lane. Works to the subject junction will be as per the design in Image 4.21.</p>	<p>It is not envisaged that both schemes will be under construction at the same time at this location.</p> <p>It is considered there is sufficient flexibility in the construction programme to either align (tie-in) construction works here or keep activities staggered to occur at different stages of the programme. The approach taken will need to be determined based on detailed traffic management proposals, which will be coordinated between the schemes once the start dates and detailed construction programmes are confirmed.</p>	<p>The Belfield / Blackrock to City Centre CBC Scheme will be completed, and the Proposed Scheme will make the necessary works at the R138 Stillorgan Road / Nutley Lane junction for cycle track connectivity to Nutley lane two-way cycle track. The arrangement will reflect the coordinated design as per Image 4.23.</p>
<b>Proposed Scheme: Completed</b>	<p>The Proposed Scheme shall be in full operation, designed in accordance with its planning application.</p> <p>A common point has been determined approximately 40m from the stop line on Nutley Lane arm, up to which the Proposed Scheme will be constructed as per the design shown in Image 4.21.</p> <p>The subject junction shall remain unchanged in terms of physical infrastructure, outside of the Red Line Boundary.</p>	<p>The Proposed Scheme will have been completed and the Belfield / Blackrock to City Centre CBC Scheme will tie into the revised existing layout as per the Proposed Scheme shown in Image 4.21.</p> <p>The Belfield / Blackrock to City Centre CBC Scheme will construct the two-way cycle track along Nutley Lane as per the coordinated design arrangement.</p>	<p>Both schemes will be fully operational in accordance with their planning application and the arrangement will reflect the coordinated design as per Image 4.23.</p>



## **4.6.7 Junctions**

The design and modelling of junctions has been an iterative process to optimise the number of people (rather than vehicles) that can pass through each junction, with priority given to pedestrian, cycle, and bus movements. The design for each junction within the Proposed Scheme was developed to meet the underlying objectives of the Proposed Scheme.

Junctions have been designed to ensure a high level of comfort and priority for sustainable modes of travel e.g. walking, cycling and public transport, by prioritising the space and time allocated to these modes within the operation of a junction, and subsequently to accommodate the forecasted future year traffic volumes as safely and efficiently as possible within the remaining space and time. This has allowed the design to maximise the number of people moving through each junction and to prioritise these sustainable modes of travel.

Junction design on the Proposed Scheme falls into four categories, namely:

- Major Junctions (Signalised);
- Moderate Junctions (Signalised); and
- Minor and Priority Junctions.

The categorisations are based on:

- Size;
- The extent of physical work required to establish them; or
- The degree of change compared to the existing layout.

The junction locations along the Proposed Scheme route and the layouts that will be implemented at these locations are presented in Section 4.5.

## **4.6.8 Structures**

Where the route interfaces with an existing structure, a visual inspection has been carried out to identify the current condition of the structure and any repair / maintenance works required. Where alterations to the existing carriageway lines, kerbs lines and verge widths are proposed to the superstructure of an existing structure a structural assessment has been carried out to ensure the structural capacity is fit-for-purpose for the revised arrangement.

### **4.6.8.1 Retaining Walls**

Retaining walls with a retained height greater than 1.5m are classified as principal structures. Those retaining walls that have a retained height less than 1.5m are classified as minor retaining walls. Table 4.29 provides a summary of all the proposed retaining structures on the Proposed Scheme.



**Table 4.29: Summary of Retaining Structures**

Wall Reference	Structure Type	Retained Height (m)			Chainage Start	Chainage End	Length (m)
R13-RW034	Cast In-Situ Reinforced Concrete Wall	Varies	0.5	Max	A2420	A2440	20
R13-RW039	Earth Embankment	Varies	1.5	Max	A6195	A6240	45
R13-RW031	Earth Embankment	Varies	1.0	Max	A6305	A6380	75
R13-RW044a	Precast Reinforced Concrete Wall	Varies	1.0	Max	A8805	A8825	20
R13-RW044b	Precast Reinforced Concrete Wall	Varies	1.0	Max	A8805	A8825	20
R13-RW043	Existing Wall at Loughlinstown Roundabout	Varies	3.6	Max	A14050	A14140	110
R13-RW022	Precast Reinforced Concrete Wall	Varies	1.0	Max	A14560	A14660	100
R13-RW041	Earth Embankment	Varies	2.0	Max	A14700	A14750	50
R13-RW023	Cast In-Situ Reinforced Concrete Wall	Varies	2.5	Max	E10	A14770	40
R13-RW024	Precast Reinforced Concrete Wall	N/A	1.5	Max	A14770	A14800	30
R13-RW036	Precast Reinforced Concrete Wall	N/A	0.5	Max	A14800	A14980	Maximum 180
R13-RW045	Existing Masonry Wall at St Anne's Roundabout	Varies	1.5	Max	A15175	A15025	135
R13-RW046	Existing Masonry Wall at St Anne's Roundabout	Varies	3.2	Max	A15175	A15025	120
R13-RW027	Cast In-Situ Reinforced Concrete Wall	Varies	1.2	Max	A15880	A16010	130
R13-RW027	Cast In-Situ Reinforced Concrete Wall	Varies	0.5	Max	A16310	A16350	40
R13-RW029	Earth Embankment	Varies	1.3	Max	A16785	A16840	55
R13-RW038	Precast Reinforced Concrete Wall	Varies	1.8	Max	A17040	A17080	40
R13-RW013	Precast Reinforced Concrete Wall	Varies	1.5	Max	A17190	A17290	100
R13-RW014	Cast In-Situ Reinforced Concrete Wall	Varies	1.0	Max	A17755	A17800	45
R13-RW016	Cast In-Situ Reinforced Concrete Wall	Varies	2.5	Max	A18085	A18130	45
R13-RW017	Cast In-Situ Reinforced Concrete Wall	N/A	2.0	Max	A18150	A18190	40

## 4.6.9 Other Street Infrastructure

There are a number of other elements of street infrastructure included as part of the design of the Proposed Scheme. These elements include signage, road markings and communications infrastructure. Signage and road markings will be provided along the extents of the Proposed Scheme to clearly communicate information, both regulatory and safety messages, to the road user. In addition, the existing communication equipment along the Proposed Scheme has been reviewed and proposals developed to upgrade where necessary.

### 4.6.9.1 Traffic Signs and Road Markings

#### 4.6.9.1.1 Traffic Sign Strategy

A preliminary Traffic Sign design has been undertaken to identify the requirements of the Proposed Scheme, whilst allowing for further design optimisation at the detailed design phase. A combination of Information, Regulatory, and Warning signs, have been assessed taking consideration of key destinations / centres; intersections / decision points; built and natural environment; other modes of traffic; visibility of signs and viewing angles; space available for signs; existing street furniture infrastructure; and existing signs. In line with DMURS

(Government of Ireland 2013), the signage proposals have been '*kept to the minimum requirements of the TSM, particularly where place values are very high*'.

A review of the existing regulatory and warning signs in the vicinity of the route was carried out to identify unnecessary repetitive and redundant signage to be removed. This includes rationalising signage structures by better utilising individual sign poles and clustering signage together on a single pole.

As stated in TSM Chapter 1 (Department of Transport, Tourism and Sport 2019), in urban areas the obstruction caused by posts located in narrow pedestrian footpaths should be minimised. Therefore, where practicable, signs are to be placed on single poles, or larger signs will be cantilevered from a post at the back of the footpath using H-frames where necessary. Passively safe posts will be introduced where possible to eliminate the need for vehicle restraint systems.

Prior to assessing the requirements for individual signs, a review was carried out on the impact that proposed traffic restrictions and changes to the road layout will have on the key traffic routes in the vicinity of Proposed Scheme. The following sections of the route were identified as undergoing significant design changes and these changes will be applied to the road layouts and imposed road restrictions, creating an impact on the traffic routes:

- The bus gate introduction on Leeson Street Lower and associated northbound general traffic diversion along Hatch Street Lower and Earlsfort Terrace, and Left Turn only movement out of Leeson Lane for general traffic;
- The banned right turn from Morehampton Road onto Wellington Place (this movement is not currently possible to make but the new junction layout requires the introduction of a new restriction on this turn);
- The banned right turn from Morehampton Road onto Auburn Avenue;
- The closure of the N11 offslip at The Hill;
- The banned U-turn movement on N11 Stillorgan Road at Westminster Road; and
- The removal of the roundabout at Dublin Road / Shanganagh Road / Corbawn Lane and its associated works (i.e. exit only from Corbawn Road onto Shanganagh Road and a dedicated right-turn lane from Shanganagh Road onto Beechfield Manor).

#### 4.6.9.1.2 Gantry Signage

No gantry signage exists along the route, and the Proposed Scheme has no requirement for any new gantry signage.

#### 4.6.9.1.3 Road Markings

A preliminary design of road markings has been undertaken in accordance with TSM Chapter 7 (Department of Transport, Tourism and Sport 2019). This exercise also included the preliminary road marking design of the following items:

- Bus lanes;
- Cycle tracks: the pavement will be marked according to best practice guidelines such as DMURS (Government of Ireland 2013) and the NCM with particular attention given to junctions. Advance Stacking Locations have been designed where practicable to provide a safer passage for cyclists at signal-controlled junctions for straight ahead or right turn movements; and
- Pedestrian crossings have been incorporated throughout the design to connect the network of proposed and existing footpaths. Wider pedestrian crossings have been provided in locations expected to accommodate a high number of pedestrians. DMURS classifies pedestrian crossing widths in areas of low to moderate pedestrian activity as 2.5m and in areas of moderate to high pedestrian activity as 3m.

### 4.6.10 Pavement

Pavement assets along the Proposed Scheme comprise bus-lanes, general traffic lanes, cycle lanes and specific trafficked areas (e.g. off-line bus stops, bus terminals, off-line parking and loading bays).

Kerbs, Footways and Paved Areas assets along the Proposed Scheme comprise kerbs, footpaths and cycle tracks.

For the purpose of design, the pavement assets are categorised into two networks. The primary network refers to the bus corridor under consideration, while the secondary network refers to the roads impacted by the re-routing of existing traffic from the Proposed Scheme to the nearby road network.

As part of the Proposed Scheme, varying pavement works will be undertaken. These works will comprise the following:

- Widening of the existing carriageways;
- Carriageway realignment;
- Rehabilitation and strengthening of the existing carriageways;
- Other specific trafficked areas (e.g. off-line parking and loading bays);
- New pedestrian areas including footpaths; and
- New cycle ways.

Pavements are designed and constructed in accordance with TII's publications, international standards and relevant local authority standards.

#### **4.6.10.1 Design Requirements**

The Proposed Scheme pavement design will include new pavement, pavement strengthening or rehabilitation works where the existing pavement will be disturbed by construction works, as indicated in the Pavement Treatment Plans (BCIDB-JAC-PAV\_PV-0013\_XX\_00-DR-CR-9001) included in Volume 3 of this EIAR. Special attention to addressing problems associated with wheel-track rutting and ensuring that ponding will not arise at bus-stops and pedestrian / cycle crossings will be a key focus.

The prevailing principle being followed by the Proposed Scheme pavement design is the provision of a high-quality pavement construction. Therefore, the Proposed Scheme pavement must provide sufficient durability, longevity, and strength, to be able to withstand repetitive wheel track loading on a frequent basis. The pavement design strategy includes for minimising ongoing maintenance requirements along the route to minimise impact on continuity of bus service operations.

#### **4.6.10.2 Design Standards**

The preliminary design of pavement assets is based on the following standards:

- DN-PAV-03021 – Pavement and Foundation Design (TII 2010a);
- DN-PAV-03023 – Surfacing Materials for New and Maintenance Construction for use in Ireland (TII 2020a);
- AM-PAV-06050 – Pavement Assessment, Repair and Renewal Principles (TII 2020b);
- PE-SMG-02002 – Traffic Assessment (TII 2010b);
- CC-SPW-00600 – Specification for Road Works Series 600 – Earthworks (TII 2013a);
- CC-SPW-00700 – Specification for Road Works Series 700 – Road Pavements – General (TII 2016);
- CC-SPW-00800 – Specification for Road Works Series 800 – Road Pavements – Unbound and Cement Bound Mixtures (TII 2013b); and
- CC-SPW-00900 – Specification for Road Works Series 900 – Road Pavements – Bituminous Materials (TII 2017).

The preliminary design of kerbs, footways and paved area assets is based on the following standards:

- DN-PAV-03021– Pavement and Foundation Design (TII 2010a);
- DN-PAV-03026 – Footway Design (TII 2005);
- Construction Standards for Road and Street Works in Dublin City Council (May 2016) – Revision 1;
- PE-SMG-02002 – Traffic Assessment (TII 2010b);
- CC-SPW-00600 – Specification for Road Works Series 600 – Earthworks (TII 2013a);
- CC-SPW-00700 – Specification for Road Works Series 700 – Road Pavements – General (TII 2016);
- CC-SPW-00800 – Specification for Road Works Series 800 – Road Pavements – Unbound and Cement Bound Mixtures (TII 2013b);
- CC-SPW-00900 – Specification for Road Works Series 900 – Road Pavements – Bituminous Materials (TII 2017);
- CC-SPW-01000 – Specification for Road Works Series 1000 – Road Pavements – Concrete Materials (TII 2013c);
- CC-SPW-01100 – Specification for Road Works Series 1100 – Kerbs, Footways and Paved Areas (TII 2012); and
- BS 7533 series of standards (1999–2021) – Pavement Constructed with Clay, Natural Stone or Concrete Pavers.

#### **4.6.10.3 Pavement Rehabilitation Strategy**

At Specimen Design stage, different pavement strategies will be developed for:

- Areas to be widened or fully reconstructed; and
- Areas to be rehabilitated (do minimum, intermediary strategies, fully reconstruct).

Additional testing requirements in line with AM-PAV-06050 will be specified for the appointed contractor to complete the Detailed Pavement Design.

The risk of tar contaminated material presence in the existing pavement is expected to be mitigated at Specimen Design stage with the delivery of the Ground Penetrating Radar survey through the testing of the calibrating cores for tar.

In order to estimate the waste quantities and the carbon emissions from the Proposed Scheme pavement works, the following assumptions were made:

- Where full depth reconstruction is anticipated (e.g. widening, traffic island relocation), a conservative fully flexible pavement design is assumed: 350mm of bituminous mixtures on top of 150mm of subbase material and 400mm of capping material;
- Where the existing pavement is anticipated to only require rehabilitation, the assumed materials and associated depths depend on the Pavement Surface Condition Index (PSCI) for the pavement design:
  - Fully flexible carriageway;
  - PSCI  $\geq 7$ : no works;
  - PSCI = 5 or 6: 50mm bituminous inlay;
  - PSCI = 3 or 4: 200mm bituminous inlay;
  - PSCI = 1 or 2: 350mm bituminous inlay + 150mm subbase inlay + 400mm capping inlay;
  - Rigid carriageway;
  - PSCI  $\geq 5$ : no works; and
  - PSCI  $\leq 4$ : 200mm concrete inlay.

The appropriate pavement structures for footways and cycle tracks will be defined at Specimen Design stage.

#### **4.6.11 Parking and Loading**

As part of the design of the Proposed Scheme, an assessment has been carried out into the impact on existing parking.

The number and type of parking spaces and loading bays were counted along the Proposed Scheme, and the proposed losses of these parking spaces and loading bays has been quantified. Mitigation measures have been identified to reduce the impact of the Proposed Scheme in so far as is reasonably practicable, by incorporating some parking provision, and providing enhanced cycle parking facilities.

Changes to the parking and loading provisions along each section of the Proposed Scheme are described further in Section 4.5. Reference should be made to Chapter 6 (Traffic & Transport) for further information on the impacts on parking as a result of the Proposed Scheme.

#### **4.6.12 Landscape and Urban Realm**

Urban realm refers to the everyday street spaces that are used by people to shop, socialise, play, and use for activities such as walking, exercise, or commute to / from work. The urban realm encompasses all streets, squares, junctions, and other rights-of-way, whether in residential, commercial, or civic use. When well designed and laid out with care in a community setting, it enhances the everyday lives of residents and those passing through. It typically relates to all open-air parts of the built environment where the public has free access. It would include seating, trees, planting, and other aspects to enhance the experience for all.

Successful urban realms or public open space tend to have certain characteristics. These include:

- They have a distinct identity;
- They are safe and pleasant;
- They are easy to move through; and
- They are welcoming.

##### **4.6.12.1 Landscape and Character Analysis**

The landscape and urban realm proposals are derived from analysis of the existing urban realm, including existing character, any heritage features, existing boundaries, existing vegetation and tree planting, and existing materials. For each section of the route, the design took a broad overview of typical dwelling age and style, extents of vegetation and tree cover. The predominant mixes of paving types, appearance of lighting features, fencing, walls, and street furniture was considered. The purpose of this analysis was to assess the existing character of the area and how the Proposed Scheme may alter this. The outcome of the analysis allowed the designers to consider appropriate enhancement opportunities along the route. The enhancement opportunities include key nodal locations which focus on locally upgrading the quality of the paving materials, extending planting, decluttering of streetscape and general placemaking along the route. Where possible, a SuDS approach has been taken to assist with drainage along the route.

##### **4.6.12.2 Hardscape**

###### **4.6.12.2.1 Typical Material Typologies**

Through the process of developing the Proposed Scheme, a typology and palette of proposed materials was developed to create a consistent design response for various sections of the route. The proposed materials were based on the existing landscape character, existing materials, historical materials while also identifying areas for betterment through the use of higher quality surface materials. The Landscaping General Arrangement drawings (BCIDB-JAC-ENV\_LA-0013\_XX\_00-DR-LL-9001) in Volume 3 of this EIAR illustrate these elements.

The material typologies employed in the preliminary design are:

- **Poured in situ concrete footpath** - Used extensively on existing footpaths. Concrete pavements can be laid without a kerb, can have neatly trowelled edges and textured surface for a clean, durable, slip resistant surface;



- **Asphalt footpath** - Widely used on existing footpaths and will tie in with other sections of urban realm. Laid with a road kerb, can have a smooth finish or textured aggregate surface, provides a strong flexible slip resistant surface. Opportunities to retain good quality kerbs have been explored and tie-in points considered;
- **Precast concrete unit paving** - Either concrete paving slabs or concrete blocks, there is a very wide variety of sizes and colours available to provide an enhanced urban realm. The use / reuse of granite kerbs where appropriate will further enhance the urban realm. This type of material use is mostly employed in non-inner-city urban realm enhancements;
- **Natural stone paving** - Employed for high quality urban realm areas, mostly in city centre locations. This typology represents natural stone surface treatments such as granite and are used to create enhanced public spaces for major urban realm interventions;
- **Stone or concrete setts** - Proposed for distinguishing pedestrian crossing points either on raised table or at road level;
- **Self-binding gravel** - Proposed for pedestrian paths set away from the road expected to see less traffic. Used for natural areas, for example, paths through wildflower meadows. They provide a defined informal route as an alternative to asphalt or concrete; and
- **No change** - In addition to areas with proposed material changes, there were also areas identified where no change in materials would be required. For example, where pavement has recently been laid and is in good condition. The design also explores opportunities where good quality kerbs such as granite kerbs could be reused, which would have both cost and sustainability advantages.

Other design responses include:

- The re-use of existing high-quality and natural stone kerbs to maintain streetscape character, reduce construction costs and maximise sustainability;
- Pedestrian crossings at side streets will be raised where possible and will be distinguished using stone or concrete setts as appropriate to the locality;
- In some locations, existing street trees have disturbed or broken footpath surfaces. The footpath around such trees will be replaced where appropriate with self-binding gravel to improve the vitality of the trees and ensure accessible pedestrian facilities;
- Informal footpaths through landscaped areas that are set back from the main carriageway will be formed using self-binding gravel as an alternative to asphalt or concrete;
- Where private or commercial property boundaries are realigned, boundary walls and railings will be reinstated to match the existing and may be extended to other properties along the same street to enhance streetscape character; and
- Existing street furniture such as seating will be relocated within the revised streetscape and new street furniture will be provided at locations where opportunity sites have been identified to establish or enhance public spaces.

#### 4.6.12.3 Softscape

Soft landscape design proposals include the following components that provide mitigation for loss of trees, ecological benefits and visual enhancements to the urban realm:

- New tree planting;
- Native hedgerows;
- Native planting;
- Ornamental planting;
- Amenity grass areas; and
- Species-rich grasslands.

Attenuation ponds and SuDS treatments are proposed throughout the length of the route. Tree loss is kept at a minimum in areas where these drainage and SuDS treatments have been provided and mitigation planting has been considered where tree losses do occur. Where required and is feasible, multiple tree pits are to be integrated and linked together as SuDS system.

#### 4.6.12.3.1 Planting Strategy

The planting strategy has been developed to meet the needs of the Dublin City Tree Strategy (DCC 2015a) and the Dublin City Biodiversity Action Plan (DCC 2015b) as follows:

- Where possible the initial conservation of existing biodiversity has been considered;
- Opportunities have been identified to enhance biodiversity through green infrastructure;
- Promote the role of street trees planting consistent with the recommendations of the Dún Laoghaire-Rathdown County Development Plan 2022-2028 (Dún Laoghaire-Rathdown County Council 2022) and Dublin City Tree Strategy (DCC 2015a); and
- Develop the role of SuDS opportunities within the Proposed Scheme to ideally reduce impervious areas for drainage management benefit.

#### 4.6.12.4 Arboricultural Survey

##### 4.6.12.4.1 Scope of Assessment

An Arboricultural Impact Assessment (AIA) Report (Appendix A17.1 in Volume 4 of this EIAR), identifies the likely direct and indirect impacts to trees of the Proposed Scheme along with suitable mitigation measures, as appropriate to allow for the successful retention of significant trees, or to compensate for trees to be removed.

#### 4.6.12.5 Typical Planting Typologies

Several typologies have been developed. These are discussed further below.

##### 4.6.12.5.1 New Street Trees

A variety of new tree species and sizes appropriate for their location are to be planted in urban tree pit systems to allow for protection of the soil structure and allow for good root development (see example Image 4.24).



**Image 4.24: Example of New Tree Planting in an Area of Urban Realm**

#### 4.6.12.5.2 Central Median Planting

Central median planting varies depending on the context of the landscape character and road. Dual carriageways or wide roads to the edge of settlements are more likely to have wider central medians where tree planting and grass verges can be found. A combination of tree and shrub or species-rich grassland is possible to create a formalised corridor of planting within wide a wide section of road.





**Image 4.25: Example of Tree Planting within Species-Rich Grassland**

#### 4.6.12.5.3 Native Planting / Tree Planting

In some locations, edges of existing wooded and native planted areas have been encroached by road widening. There will be replanting of native trees and understorey shrubs to repair these woodland edges (see example Image 4.26).



**Image 4.26: Example of Native Planting Group on Highway Verge**

#### 4.6.12.5.4 Boundary Planting Associated with Commercial and Community Land Use

The interfaces with these types of land use vary across the Proposed Scheme from verges adjacent to industrial units, retail frontages, schools, medical centres, churches, and golf course boundaries. The primary function of planting along these boundaries is to enhance the visual setting of these buildings and spaces whilst creating containment and a buffer between adjacent functions. Proposed planting includes linear tree belts, tree avenues and more informal tree groupings in combination with species-rich grassland and SuDS features (see example Image 4.27).



**Image 4.27: Example of Commercial Boundary Planting**

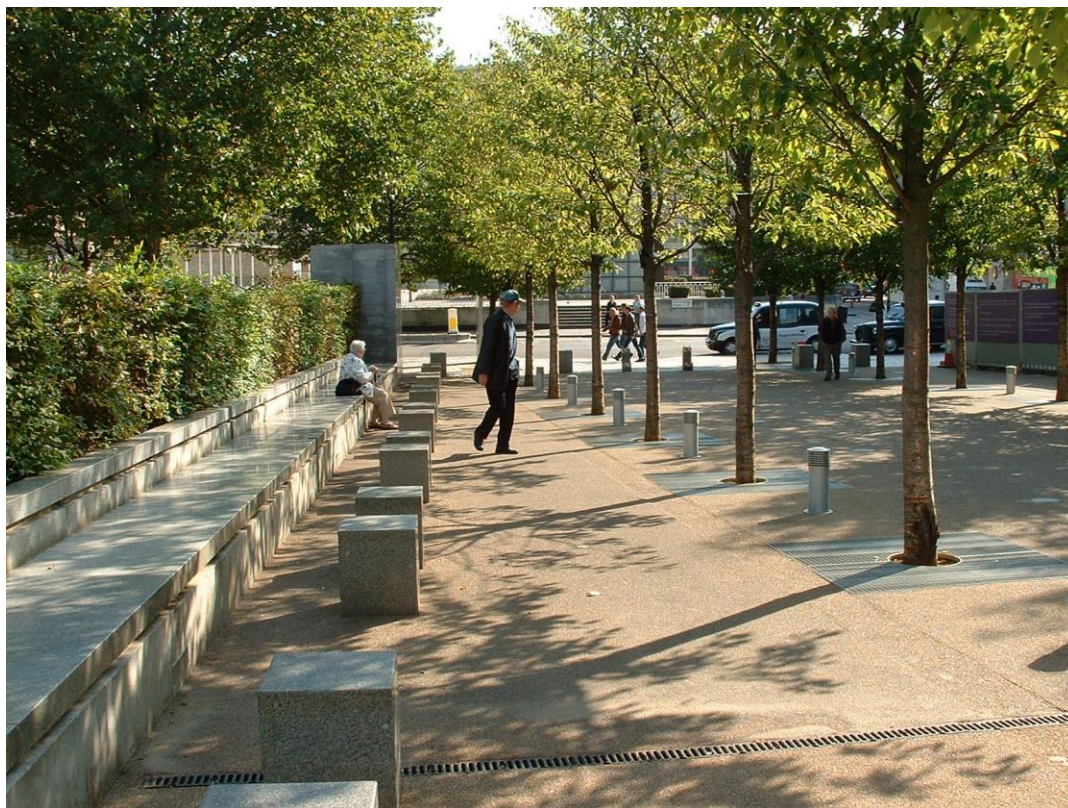
#### 4.6.12.5.5 Residential Interface and Garden Reinstatement

Where encroachment by widening occurs on residential properties the proposals will replace 'like for like'. Ornamental shrubs and trees of a suitable size can contribute to the greening of the road corridor.

#### 4.6.12.5.6 Key Areas of Urban Realm

Intermittently throughout the Proposed Scheme there are several key community and civic spaces where small landscape interventions are proposed. These spaces contain formal planting arrangements including large semi-mature street trees, raised planting beds, seating, public art and play spaces (see example Image 4.28).





**Image 4.28: Example of Key Urban Realm Spaces**

#### **4.6.12.6 Urban Realm Design**

The urban realm design is presented on the Landscaping General Arrangement drawings (BCIDB-JAC-ENV\_LA-0013\_XX\_00-DR-LL-9001) in Volume 3 of this EIAR. Separate descriptions and (illustrative) drawings for each section of the Proposed Scheme are provided in Section 4.5 to further illustrate the proposals.

#### **4.6.13 Lighting**

A review of the existing lighting provision along the extent of the route has been carried out to understand the impact of the Proposed Scheme on lighting columns and associated infrastructure. Several existing columns are proposed to be relocated or replaced to accommodate the Proposed Scheme, as shown on the Street Lighting drawings (BCIDB-JAC-LHT\_RL-0013\_XX\_00-DR-EO-9001) in Volume 3 of this EIAR.

Light Emitting Diode (LED) lanterns will be the light source for any new or relocated public lighting provided. The lighting design will involve works on functional, heritage and contemporary lighting installations on a broad spectrum of lighting infrastructure along the Proposed Scheme. This will include, but not exclusively, luminaires supplied by underground and overhead cable installations and those located on ESB infrastructure.

In locations where road widening and/or additional space in the road margin is required, it is proposed that the public lighting columns will be replaced and relocated to the rear of the footpath to eliminate conflict with pedestrians, eliminating pedestrian obstruction. For existing columns that have specific aesthetic requirements, the intent for the replacement (where applicable) of such columns will include:

- Replacing the existing heritage columns and brackets with identical replica columns and brackets;
- Replacing existing luminaires with approved LED heritage luminaires; and
- Ensuring the electrical installation is compliant with the latest version of the National Rules for Electrical Installations (I.S. 10101) (National Standards Authority of Ireland (NSAI) 2020).

#### **4.6.13.1 New Lighting**

All new public lighting will be designed and installed in accordance with the requirements of the relevant National Standards and guides, including but not limited to:

- Local Authority Guidance Specifications;
- BS EN 13201 Road Lighting (all sections) (BSI 2015);
- ET211:2003 Code of Practice for Public Lighting Installations in Residential Areas (Electro-Technical Council of Ireland 2003);
- BS 5489-1:2020 Code of practice for the design of road lighting (BSI 2020);
- Volume 1 – NRA Specification for Road Works Series 1300 – Road Lighting Columns and Brackets (TII 2011a);
- Volume 4 – NRA Specification for Road Works Series 1400 Electrical Work for Road Lighting and Traffic Signs (TII 2011b);
- IS EN 40-3-1:2013 Lighting Columns. Design and Verification. Specification for Characteristic Loads (NSAI 2013); and
- GN01 – Guidance Notes for Reduction of Obtrusive Light (Institution of Lighting Professionals 2021).

Lighting schemes will comply with the Guidance Notes for the Reduction of Light Pollution (Institution of Lighting Professionals 1992).

#### **4.6.13.2 Lighting at Bus Stops**

The design will include for the standards and requirements for lighting at bus stops.

### **4.6.14 Utilities**

There are a number of measures proposed to protect existing utilities during the Construction Phase of the Proposed Scheme. These are specifically outlined in Chapter 5 (Construction) and Chapter 19 (Material Assets).

Where there are clashes between the existing utility infrastructure, measures are proposed to either protect the infrastructure in place or divert the utility infrastructure as required.

The utility design strategy included the analysis of records provided by all utility providers associated with the Proposed Scheme corridor. The analysis included desktop reviews including review of topographic surveys together with site reconnaissance.

#### **4.6.14.1 Utility Diversions**

Due to the extensive nature of the Proposed Scheme, there are certain areas along the route which will require utility diversions, due to localised conflicts. Identified service conflicts and recommended diversions are described and assessed in Chapter 19 (Material Assets).

### **4.6.15 Drainage**

#### **4.6.15.1 Relevant Standards and Guidance**

The design basis was developed taking account of the Greater Dublin Regional Code of Practice for Drainage Works (DCC 2012), Greater Dublin Strategic Drainage Study (Irish Water 2005), Planning requirements of Local Authorities within the Dublin region, Transport Infrastructure Ireland (TII) requirements and international best practices such as The SuDS Manual (C753) (CIRIA 2015). Agencies consulted include DCC, South Dublin County Council and Irish Water where applicable.

#### 4.6.15.2 Existing Watercourses Crossings

The Proposed Scheme crosses the following watercourses:

- Grand Canal;
- River Dodder at Donnybrook Road;
- Elm Park Stream at UCD;
- Brewery Stream at Stillorgan Road;
- Carrickmines Stream at R837 / N11 roundabout;
- Shanganagh River at Bray Road;
- Rathmichael Stream / Crinken Woodbrook Stream at Woodbrook College; and
- River Dargle at Castle Street.

All watercourses are in culverts where they pass beneath the existing road, except for the Grand Canal, River Dodder and the River Dargle which are crossed by bridges. No works are proposed to change the width of the road at any crossing, therefore the existing culverts will be retained without modification.

#### 4.6.15.3 Existing Drainage Description

The existing road along the Proposed Scheme is served by both surface water and foul / combined drainage networks. Flows are typically collected in standard gully grates and routed via a gravity network to outfall points. There are no SuDS / attenuation measures on the existing drainage networks to treat or attenuate runoff from the existing road.

The existing drainage network along the Proposed Scheme can be split into the 13 catchment areas based on topography and the existing pipe network supplied by Irish Water as summarised in Table 4.30. The approximate catchment areas, existing sewer networks, outfalls and watercourses are shown on the existing catchment drawings, refer to the Proposed Surface Water Drainage Works drawings (BCIDB-JAC-DNG\_RD-0013\_XX\_00-DR-CD-9001) in Volume 3 of this EIAR.

**Table 4.30: Proposed Scheme Existing Drainage**

Existing Catchment Reference	Approx. Drainage Catchment Area (km <sup>2</sup> )	Existing Network Type	Existing Outfalls
Catchment 1	0.39	Foul / Combined	Foul / combined network drains to Ringsend WwTP with sewer overflows to the River Liffey
Catchment 2	2.90	Surface Water (Storm)	Network outfalls to the River Dodder
Catchment 3	1.72	Surface Water (Storm)	Network outfalls to the Elm Park Stream
Catchment 4	2.30	Surface Water (Storm)	Network outfalls to the Booterstown Stream
Catchment 5	1.30	Surface Water (Storm)	Network outfalls to the Priors Stream
Catchment 6	1.20	Surface Water (Storm)	Network outfalls to the Brewery Stream
Catchment 7	8.16	Surface Water (Storm)	Network outfalls to the Kill O The Grange Stream
Catchment 8	3.04	Surface Water (Storm)	Network outfalls to the Cabinteely Stream
Catchment 9	1.80	Surface Water (Storm)	Network outfalls to the Carrickmines Stream
Catchment 10	2.86	Surface Water (Storm)	Network outfalls to the Shanganagh Watercourse
Catchment 13	2.29	Surface Water (Storm)	Network outfalls to the Irish Sea
Catchment 11	5.87	Surface Water (Storm)	Network outfalls to the Rathmichael Watercourse
Catchment 12	0.802	Surface Water (Storm)	Network outfalls to the River Dargle

Catchments 1 and 2 cover the Proposed Scheme from St Stephen's Green to the intersection between the R138 and Nutley Lane. This area is served by a surface water network, which discharges to Ringsend WwTP with a sewer overflow to the River Liffey. The approximate total network catchment area is 3.29km<sup>2</sup>.

Catchment 3 covers the Proposed Scheme from the intersection between the R138 and Nutley Lane to the UCD entrance. This area is served by a surface water network, which discharges to the River Dodder. The approximate total network catchment area is 1.72km<sup>2</sup>.

Catchment 4 covers the Proposed Scheme from the UCD entrance to the intersection between the Lower Kilmacud Road and the N11. This area is served by a surface water network, which discharges to the Booterstown Stream. The approximate total network catchment area is 2.30km<sup>2</sup>.

Catchment 5 covers the Proposed Scheme from the intersection between the Lower Kilmacud Road and the N11 to the House of St John of God. This area is served by a surface water network, which discharges to the Priory Stream. The approximate total network catchment area is 1.30km<sup>2</sup>.

Catchment 6 covers the Proposed Scheme from the intersection between the House of St John of God and Foxrock Golf Course. This area is served by a surface water network, which discharges to the Brewery Stream. The approximate total network catchment area is 1.20km<sup>2</sup>.

Catchment 7 covers the Proposed Scheme from Foxrock Golf Course to Killbogget Park. This area is served by a surface water network, which discharges to the Kill O' The Grange Stream. The approximate total network catchment area is 8.16km<sup>2</sup>.

Catchment 8 covers the north of the Proposed Scheme from Foxrock Golf Course to Killbogget Park. This area is served by a surface water network, which discharges to the Cabinteely Stream. The approximate total network catchment area is 3.04km<sup>2</sup>.

Catchment 9 covers the Proposed Scheme from Killbogget Park to St Columcille's Hospital. This area is served by a surface water network, which discharges to the Carrickmines Stream. The approximate total network catchment area is 1.80km<sup>2</sup>.

Catchment 10 covers the Proposed Scheme from Killbogget Park to St Joseph Medical Centre. This area is served by a surface water network, which discharges to the Shanganagh Watercourse. The approximate total network catchment area is 2.86km<sup>2</sup>.

Catchment 13 covers the Proposed Scheme at St Joseph Medical Centre. This area is served by a surface water network, which discharges to the Irish Sea. The approximate total network catchment area is 2.29km<sup>2</sup>.

Catchment 11 covers the Proposed Scheme from St Joseph Medical Centre to the Dargle View Golf Course. This area is served by a surface water network, which discharges to the Rathmichael Watercourse. The approximate total network catchment area is 5.87km<sup>2</sup>.

Catchment 12 covers the Proposed Scheme from the Dargle View Golf Course to the city centre of Bray. This area is served by a surface water network, which discharges to the River Dargle. The approximate total network catchment area is 0.802km<sup>2</sup>.

#### **4.6.15.4 Proposed Drainage / Runoff**

The principles for the preliminary drainage design are as follows:

- All drainage structures for newly paved areas are designed with a minimum return period of no flooding in 1:30 years with a 20% climate change allowance. Unless informed otherwise via hydraulic models, drainage structures for existing paved areas are assumed to have been designed with a return period of no flooding in 1:5 years;
- A SuDS drainage design has been developed for all newly paved areas in accordance with the SuDS hierarchy set out in the Drainage Design Basis. SuDS are provided to ensure no increase on existing runoff rates from new or existing paved areas;
- Due to the largely impermeable nature of soils across Dublin, infiltration rates were assumed to be zero for calculating the required attenuation volumes of any SuDS measures. This is a conservative approach and ensures SuDS measures are not knowingly undersized at this stage of the design. Where necessary, permeability tests will need to be completed so that infiltration rates can be considered in a future design stage;



- All runoff from road pavement or any other paved areas is collected in a positive drainage system. Over-the-edge discharges are not permitted; and
- Narrow filter drains or fin drains are not expected for inner city roads.

Each catchment area has been broken down into sub-catchments in order to define the change in impermeable surface area as a result of the Proposed Scheme. Where there is a net increase in impermeable surface area, a form of attenuation will be required prior to discharge. Where there is no net change or a net decrease, then no form of attenuation will be required prior to discharge. A summary list of the sub-catchments, the associated chainage, and impermeable surface area differential is given below in Table 4.31. The following table contains a column entitled 'Net Change' which takes account of the change of use from impermeable to permeable areas and vice versa.

**Table 4.31: Summary of Increased Permeable and Impermeable Areas**

Existing Catchment Reference	Approx. Drainage Catchment Area (km <sup>2</sup> )	Road Corridor Area (m <sup>2</sup> )	Change of use to Impermeable Areas (m <sup>2</sup> )	Change of Use to Permeable Areas (m <sup>2</sup> )	Net Change (m <sup>2</sup> )	Percentage Change (%)
Catchment 1	A18450 – A18350	1,937	90	0	90	4.65%
Catchment 2	A18350 – A18100	6,071	303	108	195	3.21%
Catchment 3	A18100 – A17950	7,191	874	0	874	12.15%
Catchment 4	A17950 – A17750	3,888	271	0	271	6.97%
Catchment 5	A17750 – A17500	5,573	1,259	0	1,259	22.59%
Catchment 6	A17500 – A17200	9,861	2,053	1,518	535	5.43%
Catchment 7	A17200 – A17100	2,200	183	0	183	8.32%
Catchment 8a	A17100 – A16750	8,440	2,332	0	2,332	27.63%
Catchment 8b	A16750 – A16475	5,630	647	0	647	11.49%
Catchment 9a	A16475 – A17100	15,734	1,486	0	1,486	9.44%
Catchment 10	A16475 – A16050	13,372	2,717	0	2,717	20.32%
Catchment 11	A16050 – A15900	2,440	388	0	388	15.90%
Catchment 12	A15900 – A15700	2,737	116	0	116	4.24%
Catchment 13	A15700 – A15150	6,017	107	0	107	1.78%
Catchment 14	A15150 – A15100	3,833	270	153	117	3.05%
Catchment 15	A15100	2,617	109	0	109	4.17%
Catchment 16	A15100 – A14700	7,391	596	0	596	8.06%
Catchment 17	E200 – E050	867	673	0	673	77.62%
Catchment 18	A14775 – A14450	2,299	718	0	718	31.23%
Catchment 19	A14475 – A14200	2,956	420	6	414	14.01%
Catchment 20	A14200 – A13875	11,936	725	819	-94	-0.79%
Catchment 21	A13875 – A13700	7,298	639	165	474	6.49%
Catchment 22	A13700 – A13450	7,197	470	119	351	4.88%
Catchment 23	A13450 – A13200	13,125	359	112	247	1.88%
Catchment 24	A13200 – A12900	15,220	534	0	534	3.51%
Catchment 25	A12900 – A12500	15,272	102	98	4	0.03%
Catchment 26	A12500 – A12300	6,922	38	0	38	0.55%
Catchment 27	A12300 – A12200	3,646	60	0	60	1.65%
Catchment 28	A12200 – A11850	15,263	183	47	136	0.89%
Catchment 29	A11850 – A11550	6,276	150	98	52	0.83%
Catchment 30	A11550 – A11300	11,121	316	139	177	1.59%
Catchment 31	A11300 – A11150	8,135	164	52	112	1.38%
Catchment 32a	A10800 – A10500	12,623	361	132	229	1.81%
Catchment 32b	A10800 – A10500	12,500	234	256	-22	-0.18%
Catchment 33	A10500 – A9800	11,162	257	101	156	1.40%
Catchment 34	A9800 – A9300	15,068	377	54	323	2.14%
Catchment 35	A9300 – A9200	4,400	63	18	45	1.02%



Existing Catchment Reference	Approx. Drainage Catchment Area (km <sup>2</sup> )	Road Corridor Area (m <sup>2</sup> )	Change of use to Impermeable Areas (m <sup>2</sup> )	Change of Use to Permeable Areas (m <sup>2</sup> )	Net Change (m <sup>2</sup> )	Percentage Change (%)
Catchment 36	A9200 – A8525	22,449	1,468	124	1,344	5.99%
Catchment 37a	A8525 – A8350	7,109	197	0	197	2.77%
Catchment 37b	A8525 – A8350	7,109	296	208	88	1.24%
Catchment 38	A8350 – A8150	9,600	384	474	-90	-0.94%
Catchment 39	A8150 – A7850	9,880	395	396	-1	-0.01%
Catchment 40a	A7850 – A7750	3,416	157	0	157	4.60%
Catchment 40b	A7850 – A7750	3,416	42	0	42	1.23%
Catchment 41a	A7750 – A7550	6,945	216	3	213	3.07%
Catchment 41b	A7750 – A7550	6,945	391	225	166	2.39%
Catchment 42	A7550 – A7450	4,137	173	56	117	2.83%
Catchment 43	A7450 – A7150	11,858	331	478	-147	-1.24%
Catchment 44a	A7150 – A6850	13,369	472	205	267	2.00%
Catchment 44b	A7150 – A6850	11,046	742	9	733	6.64%
Catchment 45	A6850 – A6800	3,532	48	172	-124	-3.51%
Catchment 46	A6800 – A6650	4,182	170	0	170	4.07%
Catchment 47a	A6800 – A6550	10,137	479	0	479	4.73%
Catchment 47b	A6800 – A6550	10,137	202	0	202	1.99%
Catchment 48a	A6550 – A6250	7,383	615	13	602	8.15%
Catchment 48b	A6550 – A6250	7,829	626	0	626	8.00%
Catchment 49a	A6250 – A6150	5,020	59	25	34	0.68%
Catchment 49b	A6250 – A6151	5,020	67	40	27	0.54%
Catchment 50a	A6100 – A6150	2,180	21	0	21	0.96%
Catchment 50b	A6100 – A6150	2,180	20	46	-26	-1.19%
Catchment 51	A6100 – A5700	16,304	52	53	-1	-0.01%
Catchment 52	A5700 – A5550	3,820	48	21	27	0.71%
Catchment 53	A5550 – A5450	2,021	119	24	95	4.70%
Catchment 54a	A5450 – A5100	12,440	325	12	313	2.52%
Catchment 54b	A5450 – A5100	12,440	622	174	448	3.60%
Catchment 55a	A5100 – A5050	2,414	86	229	-143	-5.92%
Catchment 55b	A5100 – A5050	2,414	284	159	125	5.18%
Catchment 56a	A5050 – A4925	6,092	142	179	-37	-0.61%
Catchment 56b	A5050 – A4925	6,092	85	159	-74	-1.21%
Catchment 57a	A4925 – A4600	13,637	379	82	297	2.18%
Catchment 58b	A4925 – A4600	13,637	639	163	476	3.49%
Catchment 59a	A4600 – A4350	19,849	691	13	678	3.42%
Catchment 59b	A4600 – A4350	19,849	240	0	240	1.21%
Catchment 60a	A4350 – A4150	8,280	430	66	364	4.40%
Catchment 60b	A4650 – A4150	8,280	296	0	296	3.58%
Catchment 61	A4150 – A4100	6,902	142	96	46	0.67%
Catchment 62a	A4100 – A3950	8,671	428	0	428	4.94%
Catchment 62b	A4100 – A3850 (UCD Bus Interchange)	22,100	4461	170	4291	19.24%
Catchment 63	A3950 – A3850	6,579	85	0	85	1.29%
Catchment 64	A3850 – A3400	5,060	174	410	-236	-4.66%
Catchment 65	A3400 – A3200	8,300	76	107	-31	-0.37%
Catchment 66	A3200 – A3100	3,844	77	54	23	0.60%
Catchment 67	A3100 – A000	94,592	219	754	-535	-0.57%

#### 4.6.15.5 Proposed Drainage System

The principal objectives of drainage design are as follows:

- To drain surface water from existing and proposed pavement areas throughout the Proposed Scheme and maintain the existing standard of service;
- To maintain existing runoff rates from existing and newly paved surfaces using Sustainable Urban Drainage Systems (SuDS);
- To minimise the impact of the runoff from the carriageway on the surrounding environment using SuDS and/or silt traps;
- No drainage features like gullies or manholes will be located at, or any ponding will be allowed to occur at, pedestrian cross-walk locations or at bus-stop locations. Where any such drainage features currently exist at such locations, they will be relocated. Drainage of newly paved areas includes SuDS measures to treat and attenuate any additional runoff. These measures ensure that there is:
  - No increase in existing runoff rates from newly paved areas; and
  - The provision of appropriate treatment to ensure runoff quality.
- A hierarchical approach to the selection of SuDS measures has been adopted with 'Source' type measures e.g. tree pits implemented in preference to catchment type measures e.g. attenuation tanks.

The following drainage types are proposed for the Proposed Scheme catchments comprising newly paved and combined existing / newly paved areas, as indicated on the Proposed Surface Water Drainage Works (BCIDB-JAC-DNG\_RD-0013\_XX\_00-DR-CD-9001) in Volume 3 of this EIAR:

- Sealed Drainage which collects, conveys, and discharges runoff via a sealed pipe network. For the purposes of the Proposed Scheme, this type of drainage comprises sealed pipes which are connected to side entry gullies within the kerb line. These gullies will be located in the kerb line between the cycle-track and the bus lane and/or the footpath and the cycle track depending on the highway profile;
- Grass Surface Water Channels and Swales are provided as road edge channels. These receive flows from the sealed pipe network and are designed to convey, attenuate, and treat runoff prior to discharge;
- Filter Drains are provided as road edge channels. These comprise a perforated pipe with granular surround and are designed to convey, attenuate, and treat runoff prior to discharge;
- Tree Pits are provided in close proximity to the road. These receive flows from the sealed pipe network and are designed to convey, attenuate, and treat runoff prior to discharge;
- Attenuation Tanks are provided where there is insufficient attenuation volume provided by the proposed SuDS drainage measures, an attenuation tank is required to provide the required volume;
- Pavement Capping Layer Attenuation is used under the UCD Bus Interchange. Gullies discharge directly to the capping layer under the pavement. The capping layer discharges at its lowest point to the nearby drainage system; and
- Oversized pipes are provided where there is insufficient space available for SuDS measures it is proposed to provide some attenuation volume online using oversized pipes.

SuDS measures are included for each catchment where there is an increase in the impermeable drainage area to ensure no increase in runoff and provision is made for treatment.

For catchments where there is no change in the impermeable surface area, the existing sealed pipe network will be retained with new gully connections provided as appropriate. As for any new drainage network, the gullies will be located in the kerb line between the cycle-track and the bus lane and/or the footpath and the cycle track depending on the road profile. For catchments where there is no change in the impermeable surface area and no change to the kerb line the current drainage will remain unchanged.

#### **4.6.15.6 Runoff Attenuation and Sustainable Drainage Systems (SuDS)**

SuDS measures and/or attenuation systems will be provided to ensure no increase in existing runoff rates from newly paved and combined existing / newly paved catchment areas. The capacity of the proposed SuDS measures and attenuation systems was based on the incoming flows and existing discharge rates for each catchment. A range of storm durations was tested for each catchment from 30 minutes to 24 hours to ensure that the proposed measures are sufficient.

#### **4.6.15.7 Pollution Control**

One of principal objectives of the road drainage system is to minimise the impact of the runoff from the roadways on the surrounding environment via the provision of:

- Filter drains;
- Swales;
- Tree pits;
- Oil / petrol interceptors;
- Silt traps; and
- Attenuation features as necessary.

Pollution Control measures from the proposed road development will be designed in accordance with the TII Publications (Standards), namely DN-DNG-03022 Drainage Systems for National Roads (TII 2015a), DN-DNG-03066 Design of Earthworks Drainage, Network Drainage, Attenuation & Pollution Control (TII 2015b) and DN-DNG-03065 Road Drainage and the Water Environment (TII 2015c).

The proposed road drainage system is shown in the Proposed Surface Water Drainage Works drawings (BCIDB-JAC-DNG\_RD-0013\_XX\_00-DR-CD-9001) in Volume 3 of this EIAR. The proposed system incorporates a variety of drainage measures including, kerb and gully drainage, carrier drains, tree pits, sealed pipes, swales / carrier drains, filter drains, attenuation areas and pollution control as required in accordance with the above design standards. Pollution Control will be achieved during the conveyance of the road runoff to the attenuation features along the gullies and pipes to grassed swales / carrier drains and filter drains where the drainage is allowed filter through the vegetation and filter medium.

The attenuation ponds will include a forebay and oil / petrol interceptor at each outfall location. Any section of drainage where there are no swales or filter drains will also have an oil / petrol interceptor installed at the outfall.

The oil / petrol interceptors will be designed as per DN-DNG-03066 (TII 2015b) and CIRIA R142 Control of Pollution from Highway Drainage Discharges (CIRIA 1994). A minimum class 2 bypass interceptor will be installed where required. Where there is treatment by filtration in a swale, tree pit or filter drain an oil / petrol interceptor will not be required.

#### **4.6.16 Maintenance**

All traffic signal, CCTV and communications equipment are designed based on long-term maintenance requirements. All equipment will be accessible without significant disrupting pedestrian, bicycle, or vehicle traffic.

Apparatus have been designed and located to allow for easy access and the safe maintenance of the Proposed Scheme into the future. This included provision, where practicable, of:

- Use of retention sockets, where applicable, for the erection of Traffic Signal, CCTV, Above Ground Detection, and other equipment mounting poles to allow for the ease of installation, maintenance and replacement;
- The use of lightweight equipment poles, where appropriate, such as cantilever signal poles. Products that allow for maintenance activities to be undertaken from ground level, where practicable, such as tilt down poles or poles with wind-down mechanisms;
- Placement of poles and retention sockets within 7m of chambers to provide ease of installation and replacement of cables;

- Location of chambers away from pedestrian desire lines, and areas of tactile paving;
- Chambers to be placed at 180m centres, where practicable, on longitudinal duct runs to allow for the ease of installation and replacement of cables;
- Safe areas for the access and parking of maintenance vehicles, where practicable; and
- Controller, and other, cabinets located in positions that allow for safe access and clear visibility of the operation of an adjacent road junction.

#### **4.6.17 Safety and Security**

In addition to public lighting, it is proposed to install traffic monitoring cameras at key locations including junctions to enable the monitoring of traffic flows along the Proposed Scheme and provide rapid identification of any events that are causing, or are likely to cause, disruption to bus services on the route and to road users in general. Junctions System Design information is included in the drawings (BCIDB-JAC-TSM\_SJ-0013\_XX\_00-DR-TR-9001) in Volume 3 of this EIAR.

These will be high-definition digital cameras with a digital communications network providing transmission of video and camera monitoring / control functionality.

#### **4.6.18 Land Use and Accommodation Works**

The Proposed Scheme has retained as far as practicable the existing horizontal and vertical layout along the route to minimise the amount of land acquisition required. However, in order to construct the Proposed Scheme, it is necessary to compulsorily acquire individual plots of land along sections of the route.

The extent of the permanent land acquisition required temporarily for construction of the Proposed Scheme is shown on the General Arrangement Drawings (BCIDB-JAC-GEO\_GA-0013\_XX\_00-DR-CR-9001) included in Volume 3 of this EIAR.

Construction of the Proposed Scheme requires land acquisition from several different parties, as outlined below:

- Residential properties (houses / residential blocks);
- Commercial Properties;
- Plots owned by schools / colleges / universities / churches;
- Private landings; and
- Private access.

Mitigation accommodation works are proposed in the affected locations, including reconstruction of boundary walls and fences, as required, as outlined in Section 4.6.18.1.

##### **4.6.18.1 Summary of Accommodation Works and Boundary Treatment**

There are a number of areas along the extents of the route where the Proposed Scheme will result in the requirement for accommodation works and boundary treatments. Specific accommodation works are considered on a case-by-case basis.

To maintain the character and setting of the Proposed Scheme, the approach to undertaking the new boundary treatment works along the corridor is replacement on a 'like for like' basis in terms of material selection and general aesthetics, unless a section of street can benefit from urban improvement appropriate to the area.

## **4.7 References**

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#### Guidance and Legislation

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Number 14 of 2005 – Disability Act 2005 (as amended)