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Bus Interchange and Terminus in UCD Campus

Route Options Assessment

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Údarás
Náisiúnta Iompair
National **Transport** Authority

Quality information

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Glossary of Terms

- **CBC**: Core Bus Corridor
- **UCD**: University College Dublin
- **GDA**: Greater Dublin Area
- **NTA**: National Transport Authority

Definitions

- **CBC Infrastructure**: All physical facilities required to support the CBC system – stops, CBC lanes, public lighting, etc.
- **Options Assessment:** The assessment process for potentially viable options carried out in order to identify the nature and extent of the effects, both positive and negative, on the existing and planned transport infrastructure and receiving environment. The outcome of the options assessment study is a recommendation for a preferred option for the proposed scheme.

1. Introduction

This report presents the findings of an Options Assessment study that has been undertaken to recommend on the preferred option for bus interchange/terminus facility in University College Dublin (UCD) Campus, which is envisaged as one of the key interchange/terminus locations as part of the 'BusConnects' plan for the Greater Dublin Area (GDA).

'BusConnects' plan comprises aspirations to transform Dublin's bus system, so that journeys by bus will be fast, reliable, punctual, convenient, affordable, and with greater scope for interconnection between routes (see **Figure 1.1**).

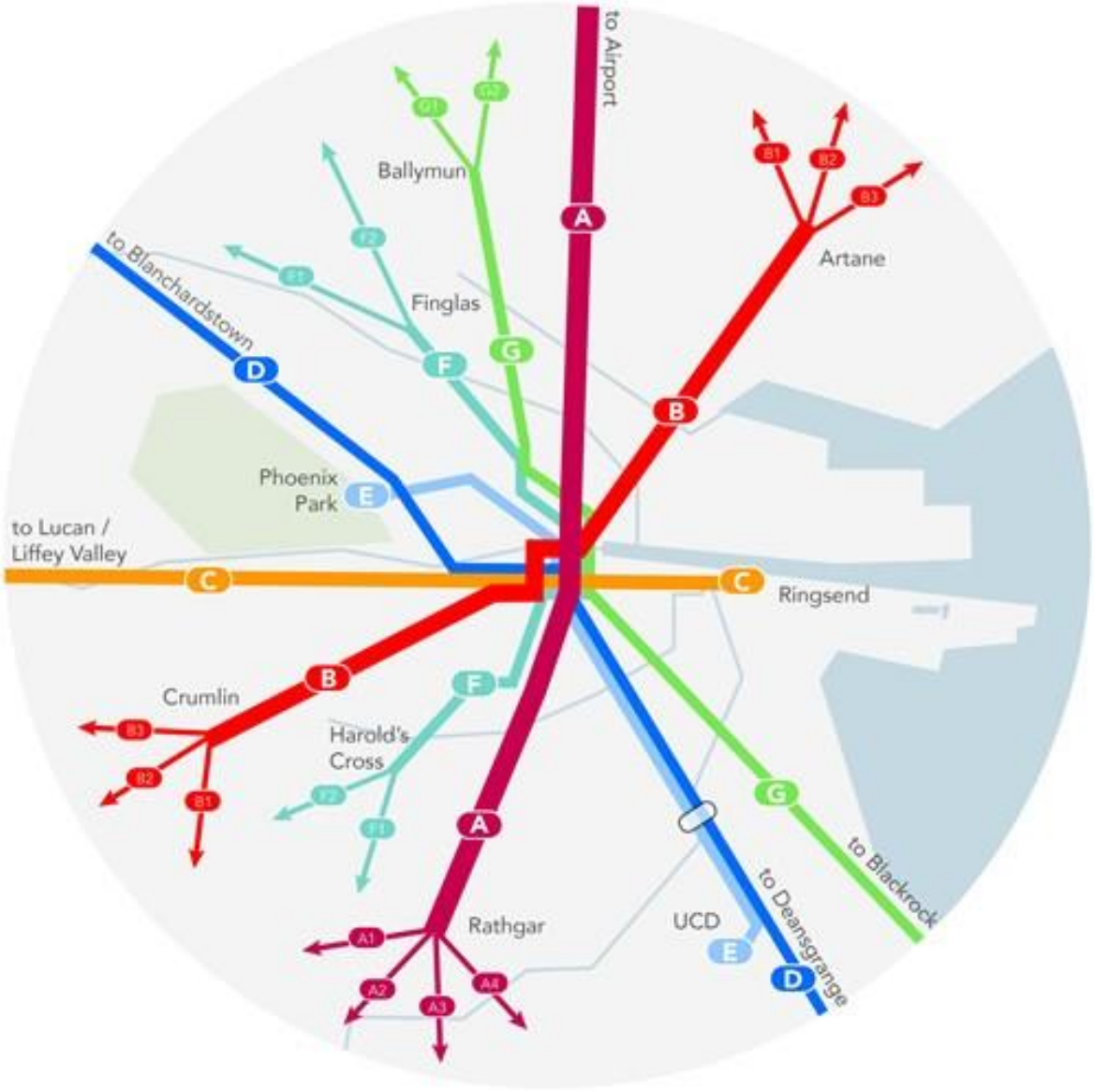

Figure 1.1: Fig. 64 in the Dublin Area Bus Network Redesign Choices Report ('BusConnects')

This Options Assessment study took into account:

- data from existing bus operators that serve UCD; and
- the proposed 'BusConnects' Next Generation Bus Corridors Transport plan.

This Options Assessment report discusses the study work undertaken identifying and assessing:

- bus route options between UCD gates; and
- layout options for a combined interchange/terminus facility at a "fixed" (i.e. confirmed) location in the UCD Campus.

2. Transport Context

2.1 Ireland 2040 – Our Plan

The 'National Planning Framework: Ireland 2040 – Our Plan' (Department of Housing Planning and Local Government, September 2017) sets the long-term context for Ireland's physical development and associated progress in economic, social and environmental terms and in an island. The objectives of 'National Planning Framework: Ireland 2040 – Our Plan', in relation to public transport, include:

- *"Expand attractive public transport alternatives to car transport to reduce congestion and emissions and enable the transport sector to cater for the demands associated with longer term population and employment growth in a sustainable manner…"*
- *"The provision of a well-functioning, integrated public transport system, enhancing competitiveness, sustaining economic progress and enabling sustainable mobility choices."*
- *"Deliver the key public transport objectives of the Transport Strategy for the Greater Dublin Area 2016-2035 by investing in projects such as New Metro North, DART Expansion Programme, BusConnects in Dublin and key bus based projects in the other cities and towns."*

2.2 Greater Dublin Area Transport Strategy 2016 – 2035

The 'Greater Dublin Area Transport Strategy 2016 – 2035' (NTA, 2015) identifies a Core Bus Network for the GDA. This core network represents the most important bus routes in the GDA, which are generally characterised by a high frequency of bus services, high passenger volumes and with significant trip attractors located along the route. The 'Greater Dublin Area Transport Strategy 2016 – 2035' includes objectives to develop the Core Bus Network to achieve, as far as practicable, continuous priority for bus movements on the sections of the Core Bus Network within the Metropolitan Area, with the goal of making the overall bus system more efficient and attractive to users including the core principle, which states: *"Development in the GDA shall be directly related to investment in integrated high quality public transport services and focused on compact urban form."*

Section 2.2.1 of the 'Greater Dublin Area Transport Strategy 2016 – 2035' also states, as a Primary Policy: *"The Strategy must therefore, promote, within its legislative remit, transport options which provide for unit reductions in carbon emissions. This can most effectively be done by promoting public transport, walking and cycling, and by actively seeking to reduce car use in circumstances where alternative options are available."*

The identified core network comprises a number of radial, orbital and regional bus corridors.

2.3 BusConnects

'BusConnects' is a programme of priority investment for public transport in the 2018 budget, which plans to fundamentally transform Dublin's bus system. The objective of 'BusConnects' is to develop the radial and orbital bus corridors as identified in the 'Greater Dublin Area Transport Strategy 2016 – 2035', so that each will have continuous bus priority; i.e., a continuous bus lane in each direction.

'BusConnects' seeks the development of a more attractive and convenient bus system with greater scope for interconnection between routes, where connecting passengers don't necessarily have to travel to Dublin City Centre.

A section of the Blanchardstown to UCD corridor, which is identified as a continuous bus priority radial corridor in the 'Greater Dublin Area Transport Strategy 2016 – 2035', is proposed to be developed as the following separate CBCs;

- Blanchardstown Town Centre to the Liffey Quays (Ellis Quay), through Ashtown; and
- UCD to City Centre at St Stephens Green (Leeson Street Lower).

Interchange facilities are proposed at the UCD gate and Terminus in UCD Campus, and also at Blanchardstown Town Centre, as shown indicatively in **Figure 2.1**.

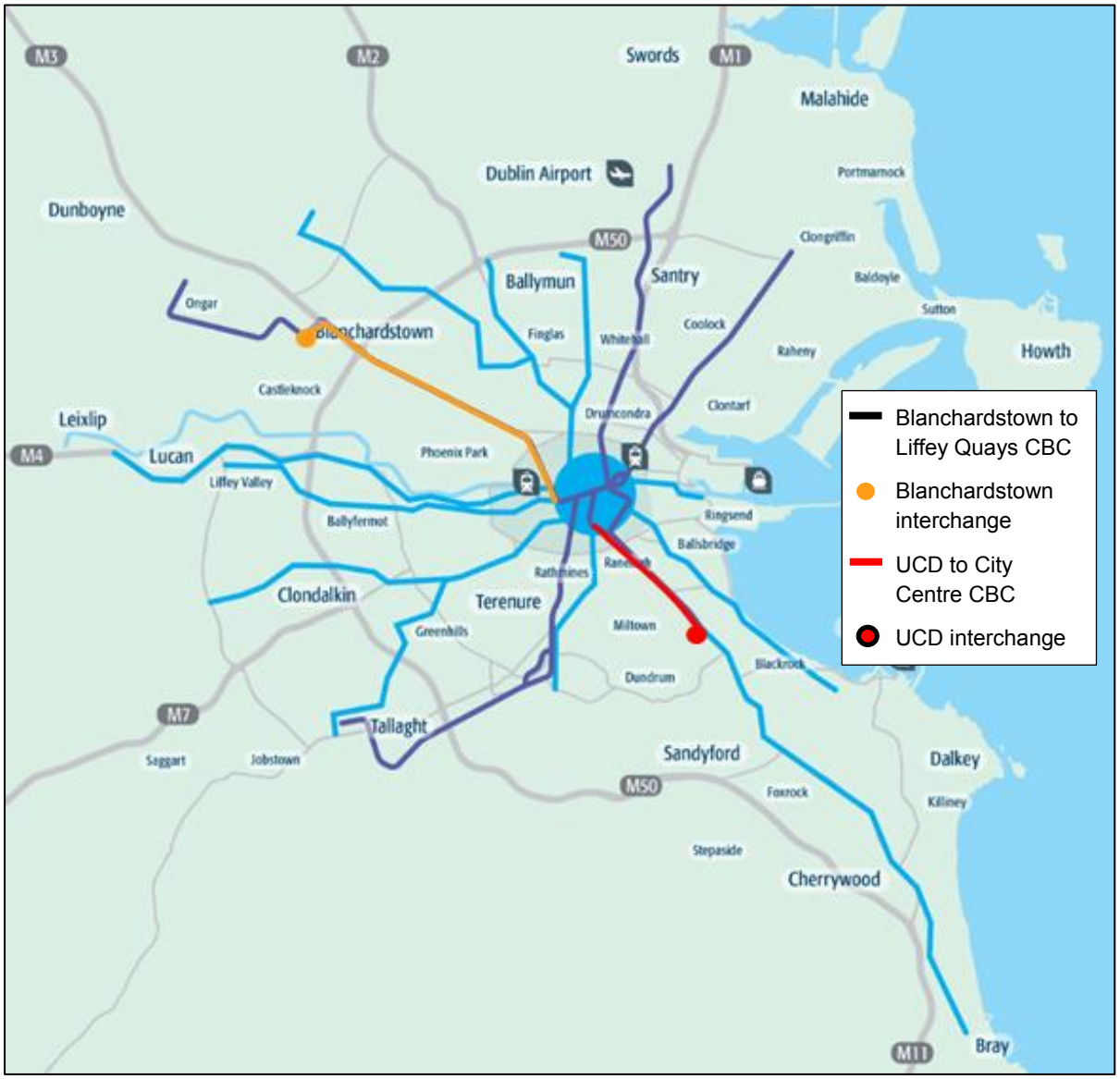

Figure 2.1: Radial Bus Corridors ('BusConnects' Next Generation Bus Corridors Fig. 1)

2.4 Dún Laoghaire-Rathdown County Council Development Plan (2016 – 2022)

The 'Dún Laoghaire-Rathdown County Council Development Plan (2016 – 2022)' seeks to protect and nurture the future growth of Dún Laoghaire-Rathdown both by serving and leading the community by creating the conditions that will attract and sustain social and economic development.

It contains some objectives in relation to bus travel, which are of general relevance to the UCD interchange/terminus study, such as:

- *"An increased travel mode share for walking and cycling; this increase will be mainly related to local trips to work, schools, retail and leisure within the larger urban areas."*
- *"The delivery of major strategic transportation projects and infrastructural improvements such as, the Council Cycle Network and an expanded Bus Network."*

3. Existing UCD Terminus

UCD Campus is located 4km south of Dublin city centre and is a landscaped complex of architectural buildings, accommodating student residences and numerous leisure and sporting facilities.

Dublin Bus provides services to the Belfield campus. Aircoach operates a bus service from Dublin Airport to Leopardstown / Sandyford / Stillorgan which passes UCD. Several Bus Éireann services from the GDA directly serve UCD during morning peak.

It is confirmed that a bus interchange/terminus facility will be developed at the location of the existing bus terminus facility (see area in red circle in **Figure 3.1**), in parallel to the upgrade of CBC infrastructure, to facilitate the proposed step change in bus services in the GDA.

Figure 3.1: Existing bus terminus facility in UCD (2014)

The existing terminus facility is strategically located in the centre of the UCD Campus and in close proximity to the main buildings, thus, achieving maximum access convenience, patronage and bus interchange opportunities between any existing and future transport service requirements locally and regionally.

However, the existing facility layout (photo in **Figure 3.2**) does not provide for an optimum interchange in terms of bus vehicles movements, passenger facilities, access and drivers' welfare facilities.

Figure 3.2: Photo of the existing bus terminus facility in UCD

4. Scheme Objectives and Design Criteria

4.1 Introduction

This report section discusses the UCD interchange/terminus scheme key scheme objectives and their associated design criteria, which have been identified based on the 'BusConnects' plan, as listed and discussed in detail below:

- **Direct Bus Interchange**;
- **Improved Connectivity / Accessibility**;
- **Quality Passenger Waiting Facilities**; and
- **Efficient Operation**.

4.2 Direct Bus Interchange

Objective: A key objective of the proposed UCD interchange/terminus scheme is the maximisation of direct interchange between bus services.

Design Criteria: Route options within UCD Campus between gates and the fixed terminus location, as well as the proposed interchange/terminus facility design have been developed with this in mind and, in so far as possible, seek to provide for improved existing or new interchange opportunities between bus services.

4.3 Improved Connectivity and Accessibility

Objective: Another key objective of the scheme is to improve connectivity and accessibility for both buses and users; i.e. minimise walking distances within the facility and to the attractors in the UCD Campus and minimise conflict between pedestrian, cyclist and vehicle movements.

Design Criteria: The design issues that have been considered in developing layout options for the UCD interchange/terminus facility are:

- The existing/proposed road network; this determines the direction of bus vehicle flow within the interchange/terminus facility;
- The pedestrian desire lines to and from the interchange/terminus facility, so allowance for pedestrian movements can be designed accordingly; the design seeks to allow direct pedestrian movements to and from the waiting platforms, i.e. pedestrian crossing proposals maximise safety and minimise walking distances;
- Separation between pedestrians / cyclists and buses to improve safety and efficiency, as well as helping reduce potential conflicts (e.g. designated entrances and exits for buses); and
- Quality cycle facility design to ensure safe and direct cycle access paths and provide adequate bicycle parking space.

4.4 Improved Passenger Waiting Facilities

Objective: The new UCD interchange/terminus should be more than just a place to wait whilst transferring between bus services. Therefore, the aim is to provide safe and comfortable facilities, maximising quality, safety and security of the passenger and operating environment.

Design Criteria: The issues that have been considered in developing layout options for the UCD interchange/terminus facility are:

- Provision of adequate space to allow for comfortable and sheltered waiting areas, queuing, circulation, seating and any other facilities;
- Location of waiting areas as close as possible to bus boarding locations; and
- Orientation of waiting areas to be clearly visible from the surrounding road network (and adjacent buildings) and to provide clear views of buses arrivals and departures;

4.5 Efficient Operation

Objective: Provision of efficient movement of bus to and from the interchange/terminus facility is a key scheme objective.

Design Criteria: The issues that have been considered in developing layout options are:

- Provision for multiple bus services operating;
- Provision of space to allow buses to move independently of each other between and within the bus bays;
- Provision of space to accommodate bus convoys due to unexpected adverse traffic conditions;
- Provision of space for bus layovers, including temporary areas for terminating services, if required;
- Provision of staff welfare facilities (e.g. toilets); and
- Provision of bicycle facilities including bicycle paths leading to the interchange/terminus facility.

4.6 Design Assumptions

The 'BusConnects' plan has not been finalised at the time of this report being prepared (December 2017).

Therefore, a specific assumption has been made regarding the bus services the interchange/terminus facility is catering for; i.e.:

- maximum four high-frequency bus services utilising the facility simultaneously;
- frequency of 3-5 minutes; and
- double decker bus vehicles

5. Route Options

5.1 Introduction

This report section discusses the assessment of route options between UCD gates 1 and 2 (shown in in red circles in **Figure 5.1**) and the fixed interchange/terminus location.

UCD gates 1 and 2 provide access to/from the R138 (Stillorgan Road). Therefore, they maximise bus operational efficiency, as they provide a more direct link to the existing / planned bus network, which uses the R138 (Stillorgan Road), than other UCD gates (shown in **Figure 5.1** in blue circles).

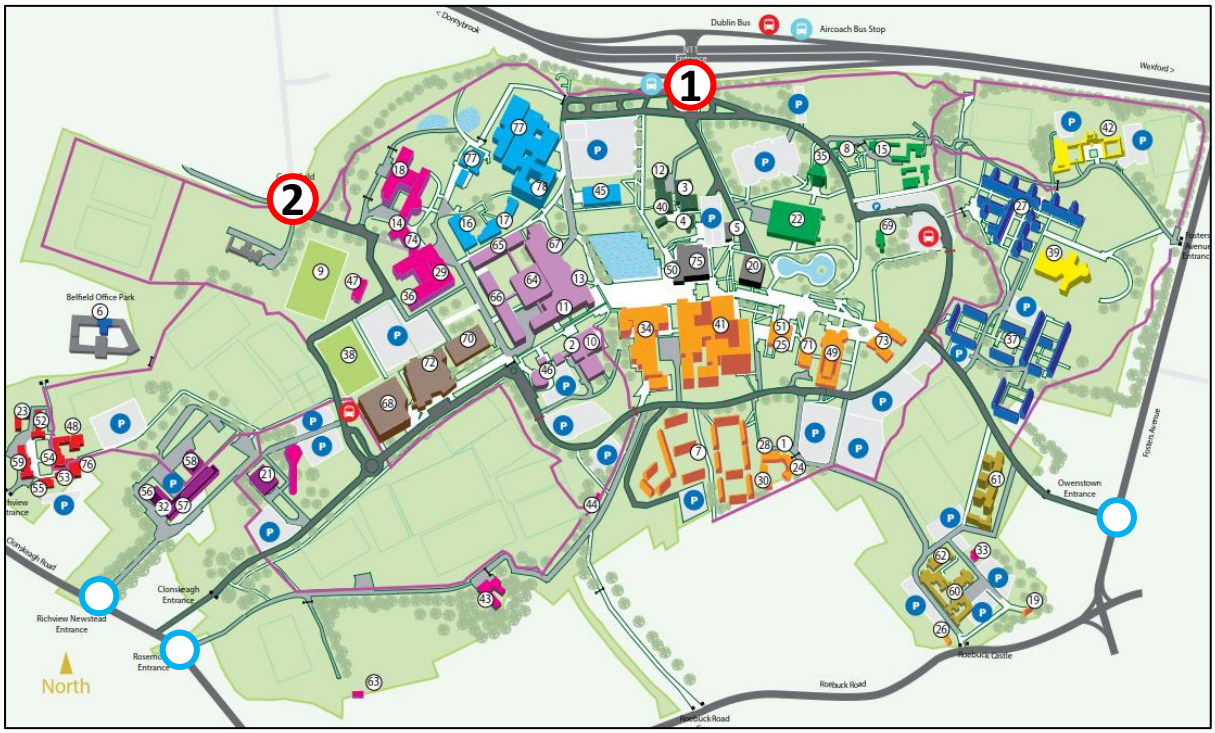

Figure 5.1: UCD gates that provide access to/from Stillorgan Road

5.2 Route Options Identification Assumption

The identification of routes options through UCD Campus was based on the assumption that a future bus service operation would be following the principles of a 'Root & Branch' operation type; i.e. a service operation that would enable services from the wider locality converge on an interchange/terminus location and, similar to the existing situation, provide for certain services to terminate, while others could continue onto bus service routes.

5.3 Proposed Route Options

In light of the above and following on from an assessment of the existing road network in the UCD Campus, four route options have been developed and assessed:

The route options examined are listed and discussed below:

- **Option 1A**;
- **Option 1B**;
- **Option 2A**; and
- **Option 2B**.

Route Option 1A

- Route Option 1A is illustrated in **Figure 5.2**.
- This route option would involve buses accessing UCD Campus through the main N11 vehicular entrance.
- Buses would circulate following the existing traffic management around the existing information point hut, which is located near the N11 entrance.
- Buses would then travel two-way onto the internal main Campus road that traverses the campus north – east, as far as the existing bus terminus location.

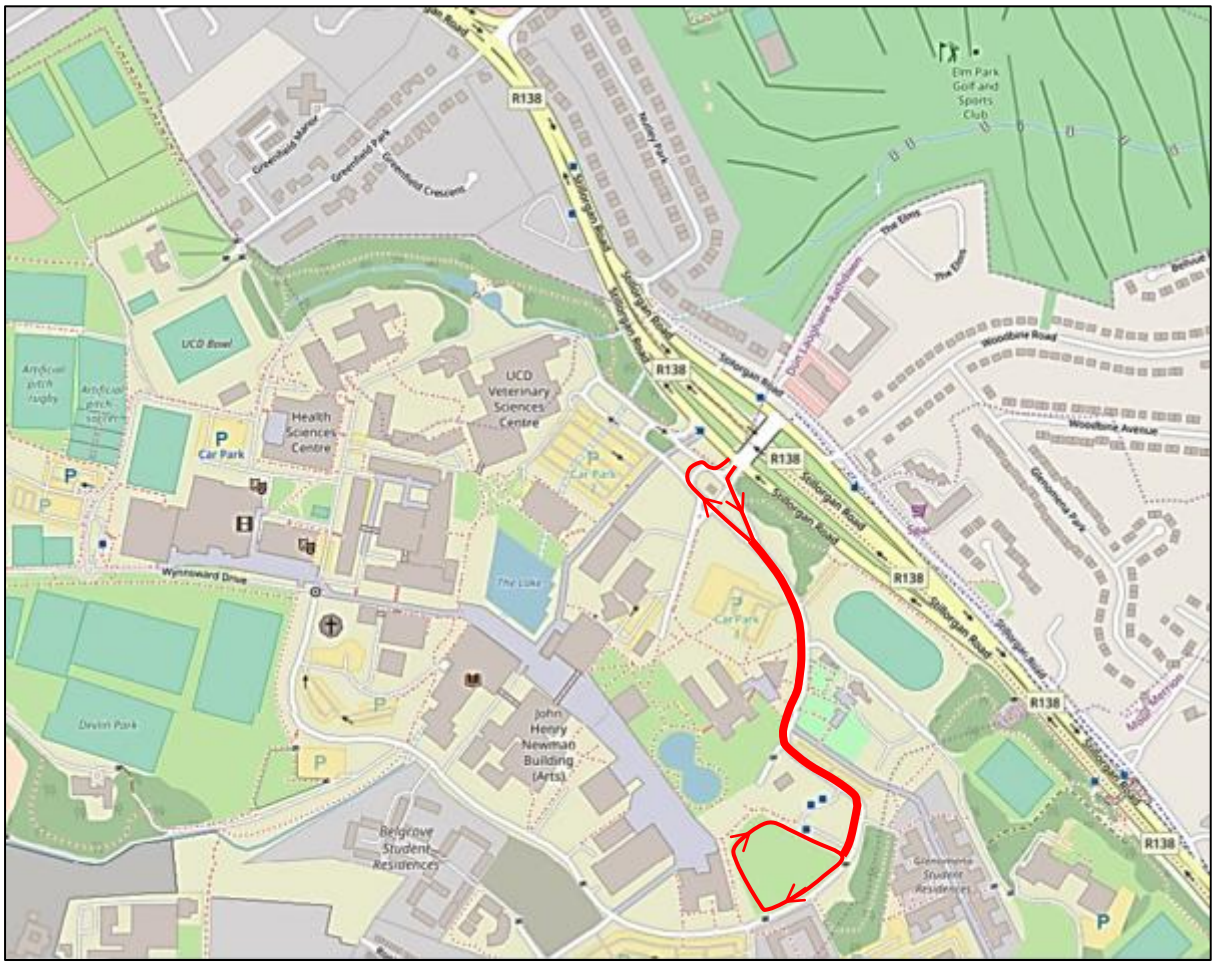

Figure 5.2: Route Option 1A

Route Option 1B

- Route Option 1B is illustrated in **Figure 5.3**.
- This route option would involve buses accessing UCD Campus through the main N11 vehicular entrance.
- However, buses would circulate following the existing car parking access / egress management.
- Buses would then travel two-way onto the internal main Campus road that traverses the campus north – east, as far as the existing bus terminus location.

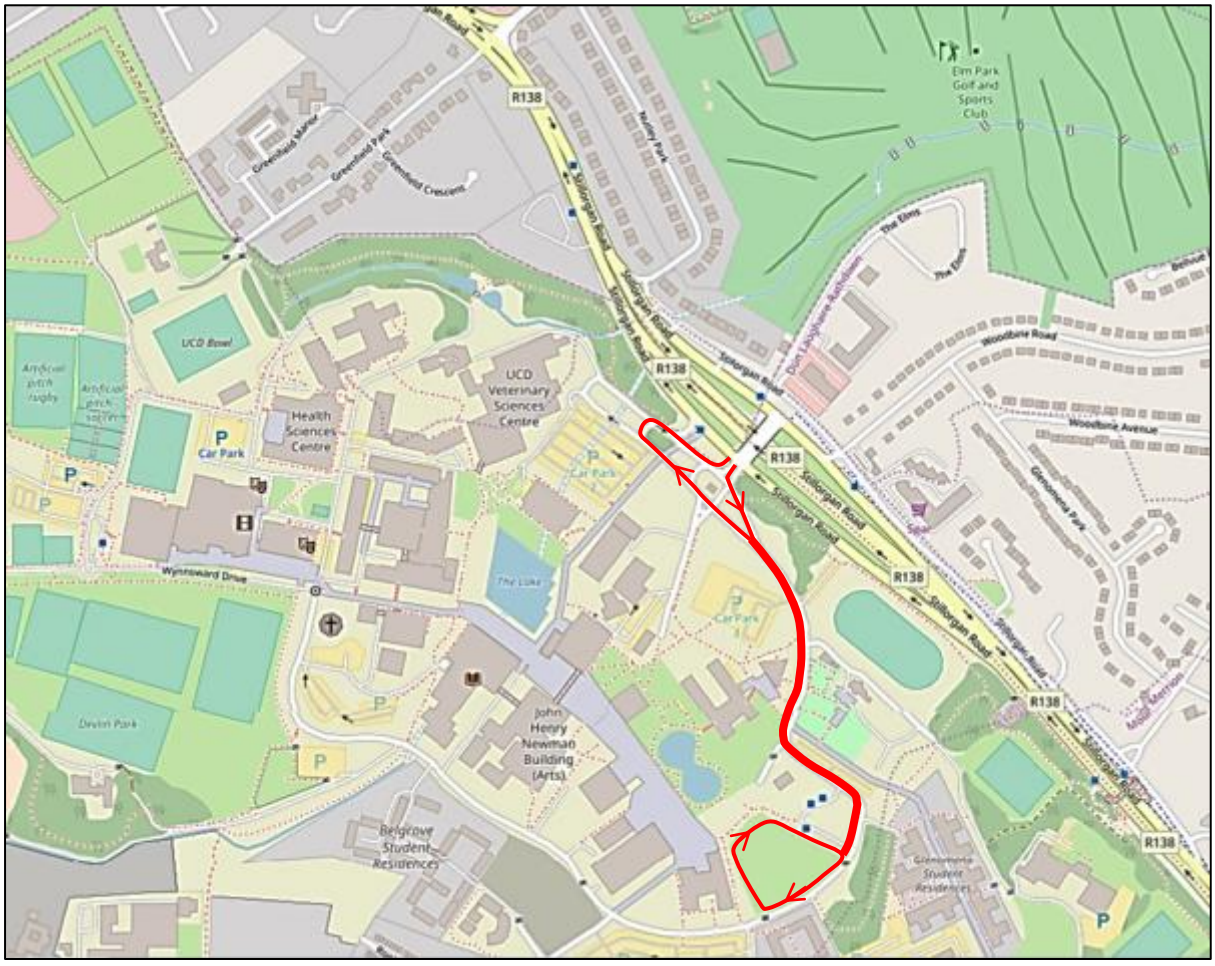

Figure 5.3: Route Option 1B

Option 2A

- Route Option 2A is illustrated in **Figure 5.4**.
- This route option would involve buses entering UCD Campus through the main N11 vehicular entrance and exiting the Campus through the Greenfield Entrance, which is located on the western periphery of the Campus, following the existing car parking access / egress circulation.
- Buses would then travel two-way onto the internal main Campus road that traverses the campus north – east, as far as the existing bus terminus location.

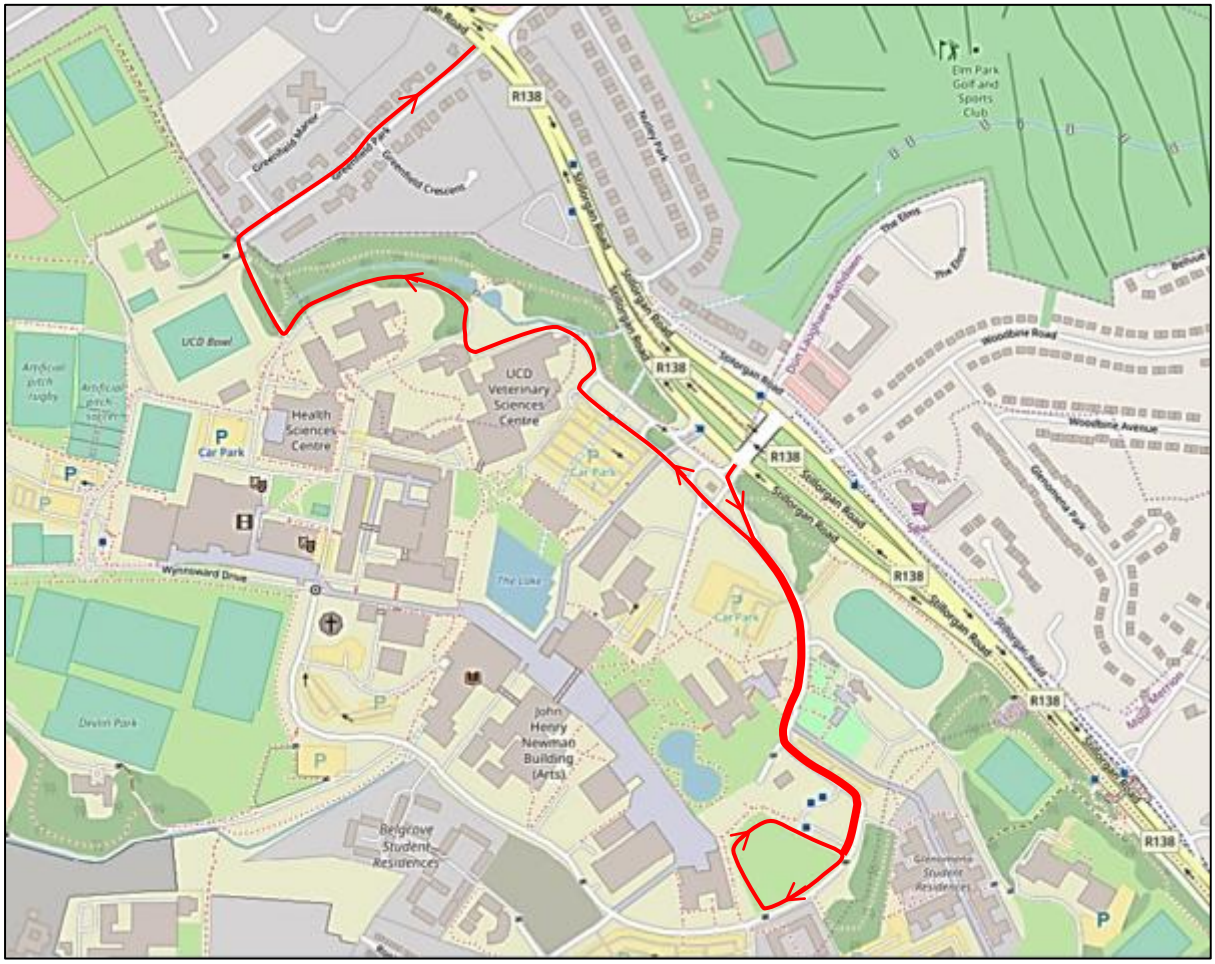

Figure 5.4: Route Option 2A

Option 2B

- Route Option 2B is illustrated in **Figure 5.5**.
- This route option would involve buses entering and exiting UCD Campus through the Greenfield Entrance, which is located on the western periphery of the Campus, following the existing car parking access / egress circulation.
- Buses would travel two-way onto the internal main Campus road that traverses the campus north – east, as far as the existing bus terminus location.

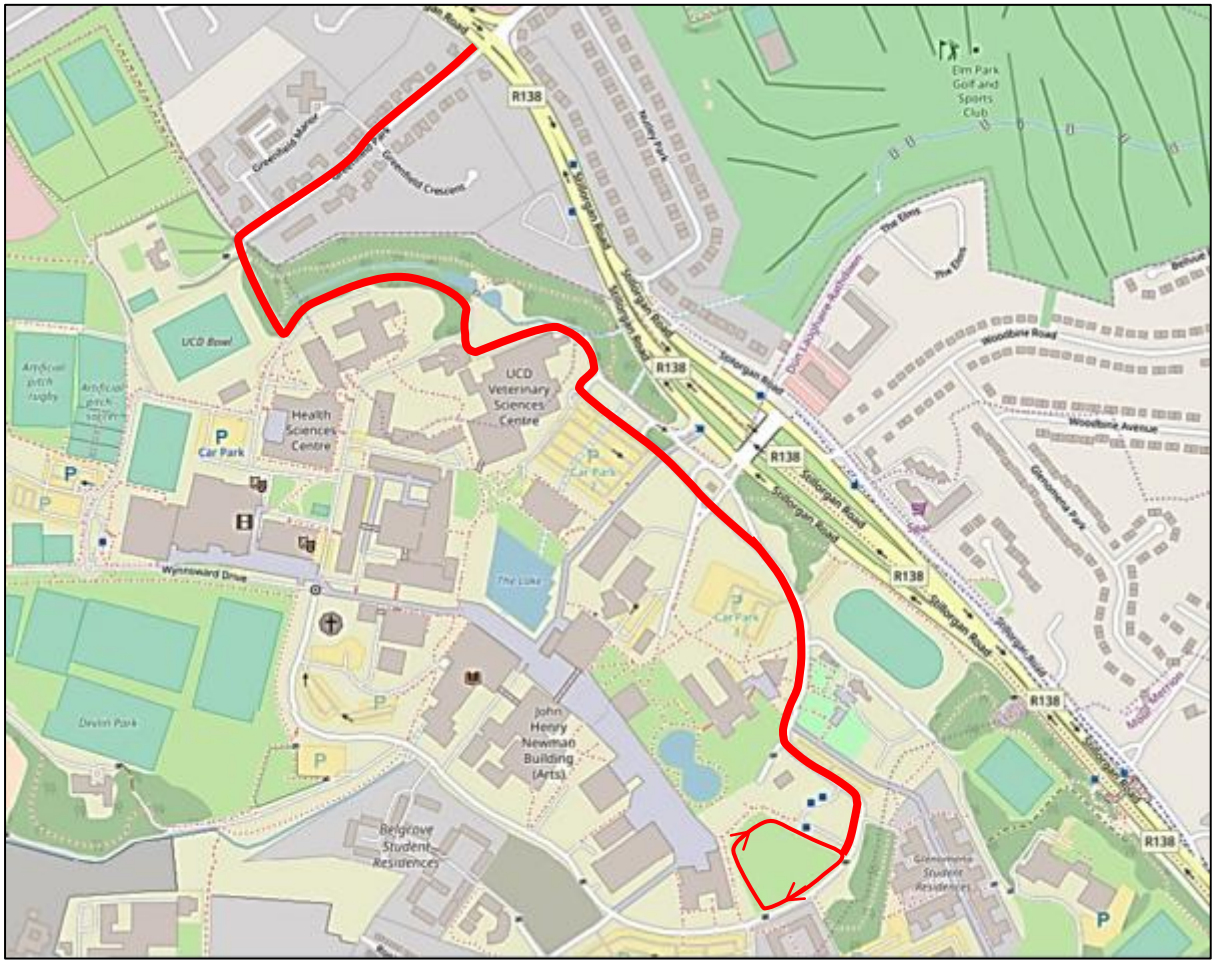

Figure 5.5: Route Option 2B

5.4 Assessment of Route Options

The route options have been assessed based on the following criteria:

- Directness of route;
- Impact on UCD Campus traffic management; and
- Bus services operational efficiency.

Table 5.1 shows the route options assessment ranking.

Table 5.1: Route Options Assessment

Criteria	Option 1A	Option 1B	Option 2A	Option 2B
Directness				
Impact on traffic management				
Operational efficiency				

Colour	Description
	Significant advantages over the other options
	Some advantages over other options
	Neutral compared to other options
	Some disadvantages compared to other options
	Significant disadvantages compared to other options

5.5 Preferred Route

When comparing the identified Route Options 1A, 1B, 2A and 2B, based on distance and impact on the receiving environment, Option 1A is deemed to be the preferred route because:

- it is the most direct route between the N11 entrance and the terminus facility; and
- impacts less upon the existing UCD Campus traffic management.

Also, Option 1A:

- ensures optimum bus operational efficiency; and
- links directly to the main UCD N11 entrance.

6. Interchange/Terminus Layout Options

6.1 Introduction

This report section discusses the assessment of layout options prepared for the proposed interchange/terminus facility in UCD, located in the existing bus terminus facility area, see **Figure 6.1**.

Figure 6.1: Existing bus terminus facility in UCD (2014)

6.2 Interchange/Terminus Design Considerations

The terminus layout design options have been developed based on the key considerations:

- requirement for layover;
- vehicle movements;
- pedestrian movements;
- provision of cycle parking;
- provision of welfare facilities for bus drivers; and
- minimisation of the impact on local road network, which could otherwise impact on bus schedules and service consistency.

6.3 Proposed Layout Options

Following on from an assessment of the existing site, three bus interchange/terminus layout options have been developed and assessed:

- **Option 1**: 4 Bays / 6 Layover;
- **Option 2**: 4 Bays / 2 Layover; and
- **Option 3**: 4 Bays / 4 Layover.

Appendix A includes drawings of all design options.

Layout Option 1: 4 Bays / 6 Layover

Layout Option 1, as shown in **Figure 6.2**, would provide the following features:

- 4 bus bays;
- 6 bus layover spaces; and
- Separate access and egress for buses.

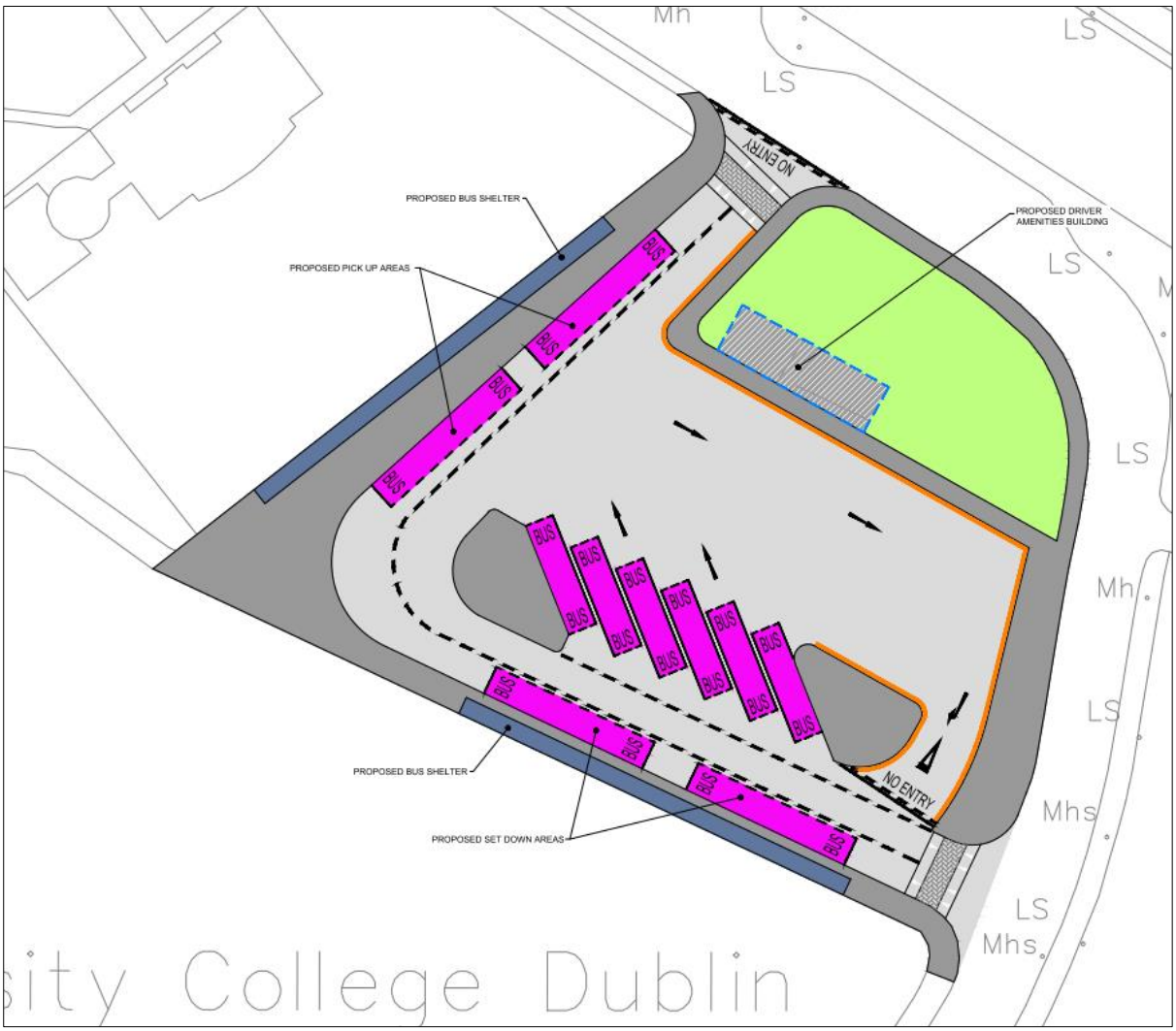

Figure 6.2: Interchange/Terminus Layout Option 1

Layout Option 2: 4 Bays

Layout Option 2, as shown in **Figure 6.3**, would provide the following features:

- 4 bus bays; and
- Separate access and egress for buses.

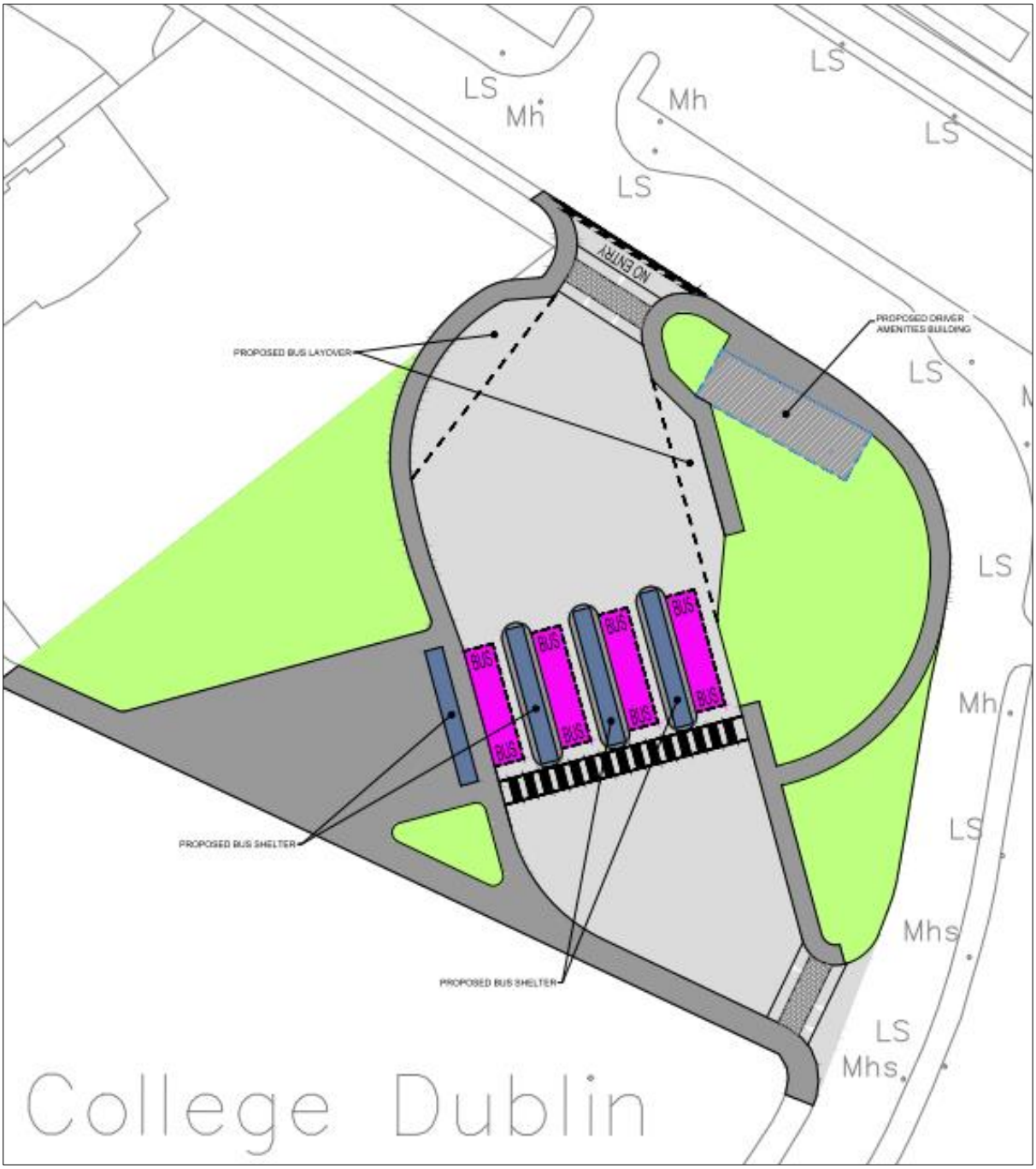

Figure 6.3: Interchange/Terminus Layout Option 2

Layout Option 3: 4 Bays / 4 Layover

Layout Option 3, as shown in **Figure 6.4**, would provide the following features:

- 4 bus bays;
- 4 layover spaces; and
- Separate access and egress for buses.

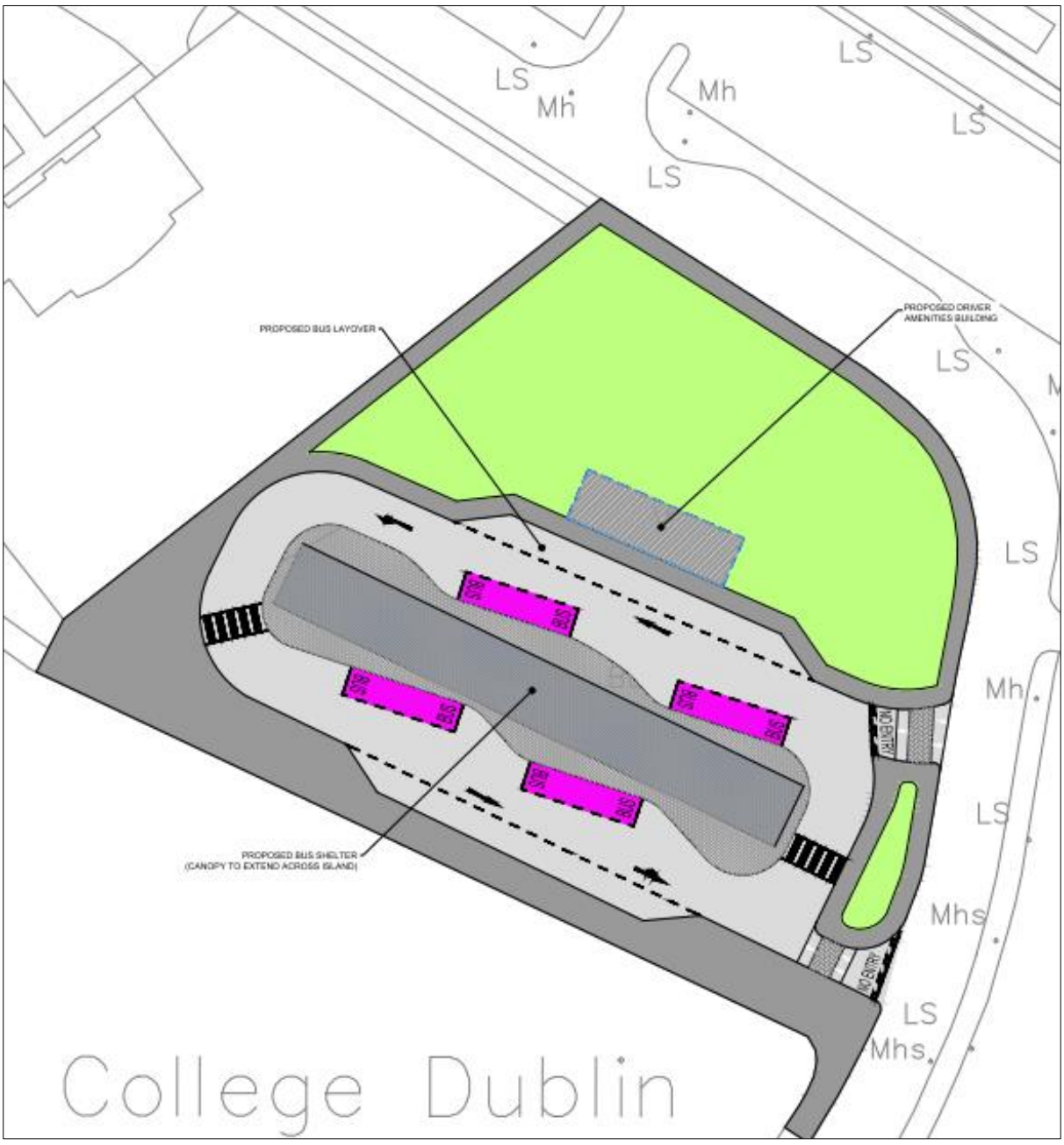

Figure 6.4: Interchange/Terminus Layout Option 3

6.4 Assessment of Layout Options

The route options have been assessed based on the following criteria:

- Infrastructure Works Cost;
- Layover Space;
- Bus Vehicle Movements;
- User Safety; and
- Traffic Impact.

Table 6.1 shows the layout options assessment ranking.

Table 6.1: Layout Options Assessment

Criteria	Option 1	Option 2	Option 3
Infrastructure Works Cost			
Layover Space			
Bus Vehicle Movements			
User Safety			
Traffic Impact			

Colour	Description
	Significant advantages over the other options
	Some advantages over other options
	Neutral compared to other options
	Some disadvantages compared to other options
	Significant disadvantages compared to other options

6.5 Preferred Layout Option

When comparing the layout Options 1, 2 and 3, and based on the key design criteria identified for a bus terminus layout in UCD, Option 1 is deemed to be the preferred option.

Compared to Options 2 and 3, Option 1:

- can be implemented at a lower infrastructure works cost than Options 2 and 3;
- achieves optimum space for layover;
- provides adequate space for bus movements than Options 2 and 3;
- ensures pedestrian / cyclists safety; and
- minimises impact on local road network.

Appendix A Drawings

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