Appendix A6.1
Sub Appendix
Appendix 2 –
Junction Design Report

Contents

1. Introduction

This report has been prepared to document the evolution of the design of key junctions along the Bray to City Centre Scheme (hereafter referred the Proposed Scheme). In addition, the report presents the junction assessment results for the final scheme design which demonstrate the expected operation of the junction.

Finally, a theoretical assessment has been carried out to demonstrate the capacity of the junctions for all modes. The methodology adopted is elaborated upon in the following sections.

2. Methodology

The proposed scheme has been designed over the course of a number of years, and during this period the design principles have evolved to improve the movement of people through the junctions for all modes. The final design principles which guided the junction design are documented in the BusConnects Preliminary Design Guidance Booklet. This document sets out the four typical junction arrangements adopted on the project as follows:

- Junction Type 1 – Both bus lanes are dedicated lanes up to the junction stop line and general straight ahead and left-turning traffic is restricted to one lane;
- Junction Type 2 – As per Junction Type 1 but with left turning traffic crossing the bus lane into a dedicated left turn lane in advance of the stop line;
- Junction Type 3 – Bus lanes are terminated just short of the junction to allow left-turners to turn left from a short left-turn pocket in front of the bus lane. Buses can continue straight ahead from this pocket where a receiving bus lane is proposed; and
- Junction Type 4 – Similar to the CYCLOPS junction in Manchester, U.K. the pedestrian crossings are located on the inside of the cycle lanes on all arms of the junction. This assists to minimise pedestrian crossing distances. Signalised pedestrian crossings are proposed across the cycle tracks to allow the pedestrian to cross from the footpath to the pedestrian crossing landing areas, thus avoiding any uncontrolled pedestrian-cyclist conflict. Bus lanes are terminated just short of the junction to allow left turners to turn left from a short left-turn pocket in front of the bus lane. Buses can continue straight ahead from this pocket where a receiving bus lane is proposed.

In addition to the evolution of the design principles, the design has been positively influenced through engagement with the public at various points in the design process. The evolution of the design is documented in this report with a clear rationale provide for the changes at key points in the project as follows:

- Concept Design;
- Emerging Preferred Routes (EPR);
- Second Public Consultation (PC2);
- Third Public Consultation (PC3); and
- Final Proposed Scheme.

2.1 Transport Modelling

Transport modelling has been a key input to the scheme design throughout the project. Given the complexity of the scheme proposals and changes to existing traffic regimes, the design went through an iterative process which was incorporated in the multi-tiered transport modelling approach consisting of strategic, local, and microsimulation modelling. The overall modelling methodology and information flow is summarised in Figure 2-1.

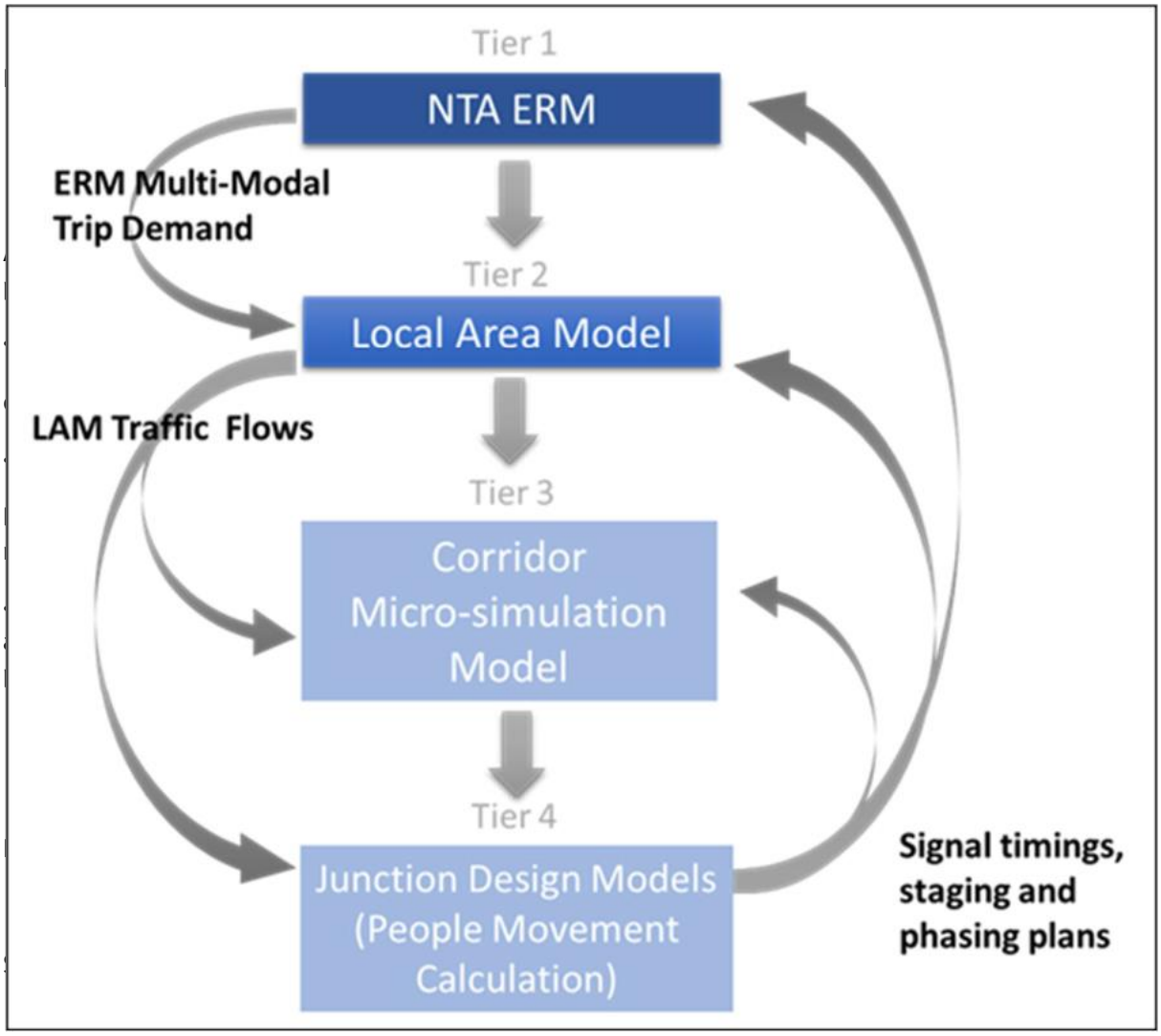


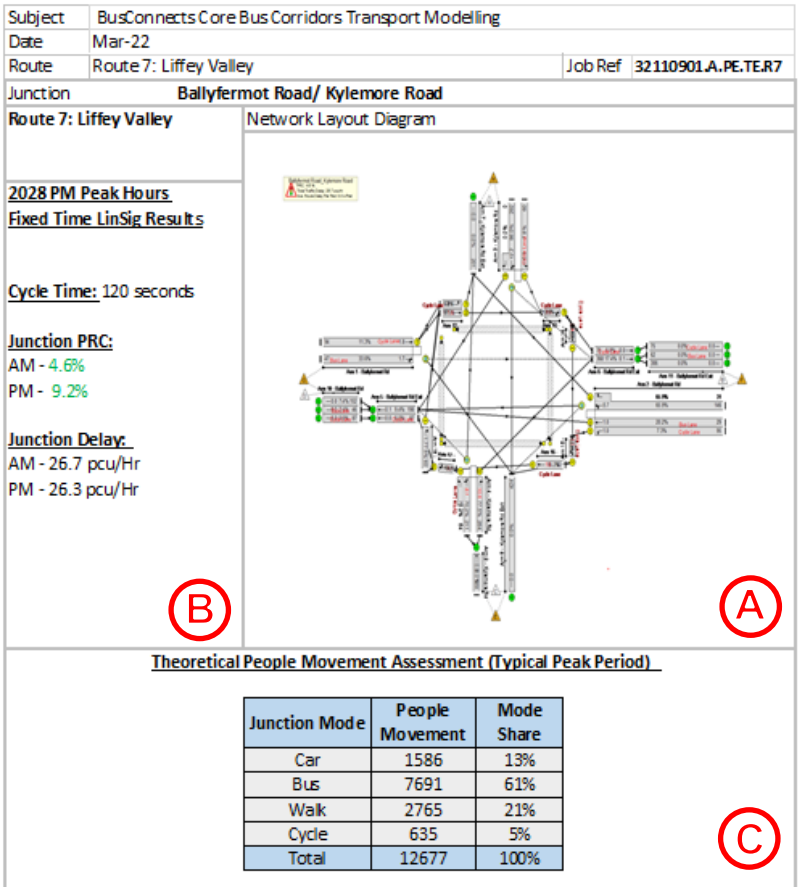
Figure 2-1 Transport Modelling Methodology and Information Flow

As shown above, there are four tiers in the transport modelling hierarchy that were used for the purposes of assessing the proposed scheme:

- East Regional Model (ERM): the primary tool that provides the strategic multi-modal demand outputs for the proposed forecast;
- Local Area Model (LAM): a more refined road network model used to provide consistent road-based outputs to inform the TIA, EIAR, microsimulation model, junction design models and traffic management plan testing;

- Microsimulation Model: represents the end-to-end corridor model of the proposed scheme to assist in the operational validation of proposed designs with the visualisation of the potential proposed scheme impacts and benefits; and
- Local Junction Models: each junction along the proposed CBC were modelled individually to support local junction design development.

For the purposes of the Junction Design and Modelling Report (JDR), results from the local junction models were extracted, which used LinSig, an industry-standard software that provides comprehensive assessment and design of a junction or a network of junctions. The local junction models were used to inform junction design considerations and 'proof of concept' demonstration of the preferred design for the CBC. The signal staging, timing and phasing from LinSig were incorporated into the three tiers of transport modelling hierarchy and it should be noted that this was an iterative approach throughout the design process of BusConnects. Figure 2-2 presents an example of the local junction modelling results from LinSig presented in this report. A description of the images follows.



Subject	BusConnects Core Bus Corridors Transport Modelling
Date	Mar-22
Route	Route 7: Liffey Valley
Job Ref	32110901.A.PE.TE.R7
Junction	Ballyfermot Road/ Kylemore Road

Route 7: Liffey Valley

Network Layout Diagram

2028 PM Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM - 4.6%
PM - 9.2%

Junction Delay:
AM - 26.7 pcu/Hr
PM - 26.3 pcu/Hr

B

A

Theoretical People Movement Assessment (Typical Peak Period)

Junction Mode	People Movement	Mode Share
Car	1586	13%
Bus	7691	61%
Walk	2765	21%
Cycle	635	5%
Total	12677	100%

C

Figure 2-2 Example of a junction modelling results in the JDR

A shows the junction layout in LinSig and the results per lane, which are the following:

- Number of PCUs arriving at the Stop Line – this is the number located at the back of the lane in Figure 2-2 and reflects the traffic flows on its respective lane;

- Degree of Saturation (%) – this is the number located in the middle of the lane in Figure 2-2 and is the ratio of Flow to Capacity per lane. The theoretical capacity of a junction is 90% and anything less than this assumes that the junction is within theoretical capacity; and
- Mean Max Queue (PCU) – this is the number located at the front of the lane in Figure 2 and is Maximum queue (per lane) within a typical cycle.

B shows the following Network Summary Results:

- Cycle (seconds) – Cycle time in seconds;
- PRC (%) – Practical Reserve Capacity, which is the available spare capacity at a junction (i.e. negative PRC = over-capacity; positive PRC = spare capacity);
- Junction Delay (PCU/hr) – the total aggregate delay on all lanes controlled by each Stage
- Stream;

C shows the tabulated information on the People Movement Assessment for the Do-Something 2028 scenario during the AM peak.

It should be noted that modelling bus priority signals is not possible in LinSig due to its dynamic nature. However, this was modelled in the microsimulation model and is reported in the Environmental Impact Assessment Report (EIAR).

2.2 People Movement

An assessment has been carried out to determine the people movement potential the proposed scheme will generate. This adopts a policy led approach to the design of junctions, which prioritises the movement of people as opposed to private modes and maximisation of sustainable modes i.e. walking, cycling and bus are considered in advance of management of general traffic movements at junctions. The outputs of the calculator provide an estimate of people movement per mode per junction and the respective percentage mode share. Figure 2-3 illustrates the People Movement Formulae.

People Movement Formulae	
Cyclists	$\sum\left(\frac{Green\ Time}{headway}\right)\left(\frac{3600}{Cycle\ Time}\right)\left(\frac{CT\ Width}{1.5}\right)$
Buses	$\sum(No.of\ Buses)(Occupancy)(\ Direction)$
General Traffic	$\sum LinSig\ PCU\ Capacity\ Outputs$
Pedestrians	$\sum(Green\ Time)\left(\frac{Walking\ Speed}{Ped.Walking\ Buffer}\right)\left(\frac{Crossing\ Width}{2}\right)\left(\frac{3600}{Cycle\ Time}\right)(No.Crossing\ Points)$

Figure 2-3 People Movement Formulae

The emerging proposed designs were inputted to the People Movement Calculation tool including the junction geometry, junction type and the signal staging, which produced initial people movement outputs and indicative green times per mode. The results provided an initial starting point to facilitate a review of the junction designs, where necessary pedestrian, cyclist and bus infrastructure was optimised accordingly to facilitate additional capacity. The revised designs were then added into the LAM to facilitate traffic modelling.

The LAM outputs provided traffic flows for the opening year (2028) and opening year +15 (2043). The traffic flows were fed into the LinSig models to facilitate a detailed analysis of the proposed junction

operation. The LinSig and DLAM analysis required traffic modelling iterations. The people movement results were also re-evaluated during the iteration process, the results were also used to inform the projected number of cyclists in the operational year in the Cycle Quantification assessment.

Below is a sample Table 2-1 of People Movement results, which captures the People Movement Assessment for Do-Something 2028 scenario for all modes during the morning peak hours at the Ballyfermot Road/ Kylemore Road junction.

Junction Mode	People Movement	Mode Share
Car	1586	13%
Bus	7691	61%
Walk	2765	21%
Cycle	635	5%
Total	12677	100%

Table 2-1 Theoretical People Movement Assessment (Typical Peak Period)

3. Junctions Assessed

A total number of 53 junctions in the Proposed Scheme are presented in this report which are as follows:

1. St. Stephen's Green / Earlsfort Terrace
2. Leeson Street Lower / Hatch Street
3. Leeson Street Lower / Fitzwilliam Place
4. Leeson Street Upper / Grand Parade
5. Leeson Street Upper / Dartmouth Road
6. Sussex Road / Sussex Terrace
7. Leeson Street Upper / Burlington Road
8. Leeson Street Upper / Appian Way
9. Leeson Street Upper / Waterloo
10. Leeson Street Upper / Wellington Place
11. Morehampton Road / Bloomfield Avenue
12. Morehampton Road / Herbert Park
13. Donnybrook Road / Belmont Avenue
14. Donnybrook Road / Eglinton Terrace
15. Donnybrook Road / Anglesea Road
16. Stillorgan Road / Airfield Park / RTE
17. Stillorgan Road / Nutley Avenue

18a. UCD Grade Separated Southbound

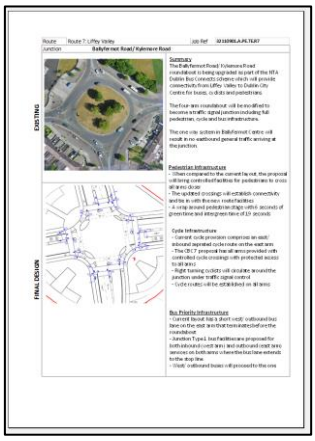
18b. UCD Grade Separated Northbound

19. Stillorgan Road / Foster Avenue
20. Stillorgan Road / Belfield Park
21. Stillorgan Road / Booterstown Avenue
22. N11 Stillorgan Road / Mount Merrion Avenue
23. N11 Stillorgan Road / Treesdale
24. N11 Stillorgan Road / Priory Drive
25. N11 Stillorgan Road / Lower Kilmacud Road

26. N11 Stillorgan Road / Farmleigh Avenue
27. N11 Stillorgan Road / Leopardstown Road
28. N11 Stillorgan Road / Springfield Park
29. N11 Stillorgan Road / Kill Lane
30. N11 Stillorgan Road / Westminster Road
31. N11 Stillorgan Road / Bray Road
32. N11 Bray Road / Clonkeen Road
33. N11 Bray Road / Johnstown Road
34. N11 Bray Road / Cherrywood
35. N11 Bray Road Southbound Slip / Wyattville Road
36. Loughlinstown Roundabout
37. Dublin Road / Stonebridge Road
38. Dublin Road / Shanganagh Road / Corbawn Lane
39. Shanganagh Road / Beechfield Manor
40. Dublin Road / Lower Road
41. Dublin Road / Quinns Road / Cherrington Road
42. Dublin Road / M11
43. Dublin Road / Corke Abbey Avenue
44. Dublin Road / Upper Dargle Road
45. Donnybrook Road / Eglington Road
46. N11 Bray Road / Wyattville Northbound
47. N11 Bray Road / Cherrywood Road
48. Dublin Road / Shanganagh Park
49. Dublin Road / Woodbrook
50. Dublin Road / Chapel Lane
51. Dublin Road / Olcovar
52. N11 Stillorgan Road / Belmont Terrace
53. Hatch Street Lower / Earlsfort Terrace

The junctions design, modelling commentary and results are presented in the same order as above in the next section.

Contents

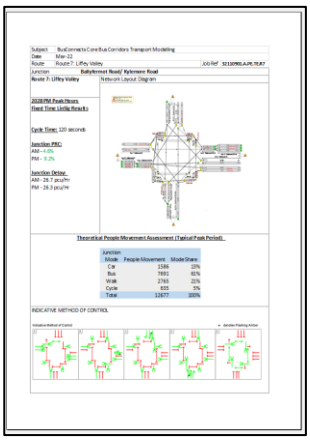


Current Proposal

- Existing;
- Proposed Design;
- Pedestrian Infrastructure;
- Cyclists Infrastructure; and
- Bus Priority.

Design Evolution

- Existing;
- Concept Design;
- Emerged Preferred Route;
- Public Consultation 2 (PC2);
- Public Consultation 3 (PC3); and
- Current Proposal.



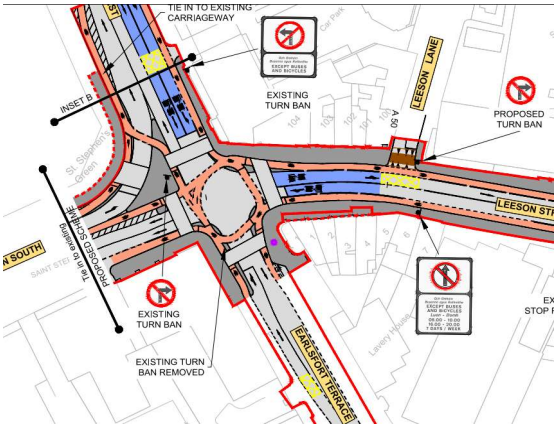
Transport Modelling

- LinSig Network outputs;
- People Movement; and
- Indicative Method of Control.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	1
Junction	**St. Stephen's Green / Earlsfort Terrace Junction**		

EXISTING

FINAL DESIGN



Summary:
Permitted and restricted movements have generally been retained in the new junction design, with the main improvement being the addition of protected cycle approached on each arm and a clearer layout for turning cycle movement through the junction.

Bus only restrictions are retained on the northern arm, with bus and local access restrictions now in place on the eastern (Leeson Street Lower) arm to improve bus priority on the CBC.

Pedestrian Infrastructure
Refuge island on St Stephen's Green corner has been retained and wider crossings added to respond to desire lines and high footfall

Cycle Infrastructure
Protected cycle tracks included in each direction on Leeson Street Lower. Position of cycle facilities on all other junction approaches have been improved to provide a safer approach to and through the junction

Bus Priority Infrastructure
Side Roads: Buses mix with local traffic through Leeson Street Lower. Insufficient width for 2 bus lanes, 2 cycle tracks and 2 general traffic lanes to be accomodated to the north of the junction on Leeson Street Lower without adversely affecting footway widths. Given the high pedestrian footfall in the area, decision taken to provide cycle tracks and allow buses to mix with a small amount of general traffic, which will be limited through bus gate restrictions (local access only)

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	1

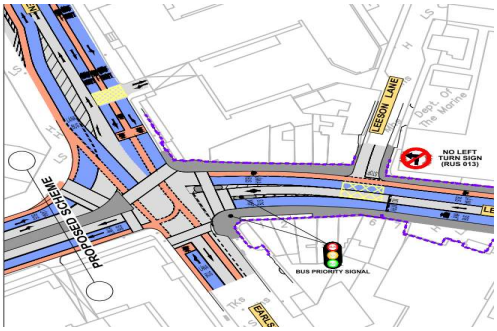
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

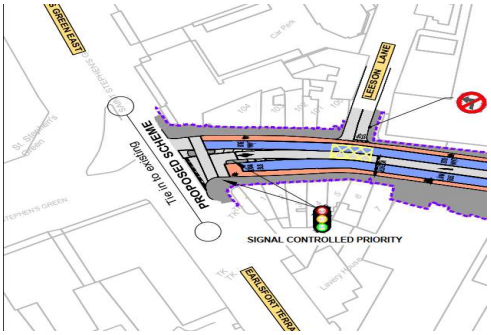
Existing

Concept Design Drawing

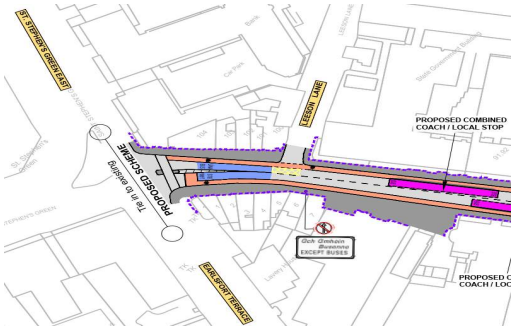
Emerging Preferred Route



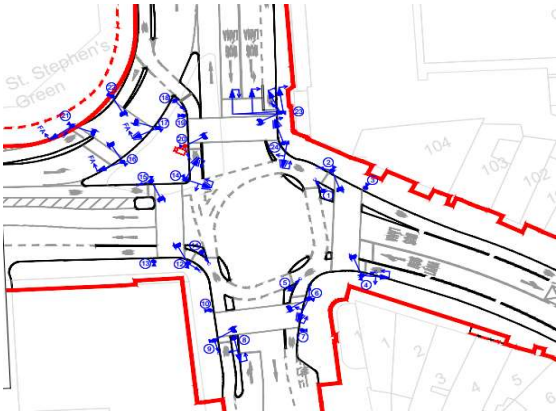
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	1

2028 AM Peak Hours
Fixed Time LinSig Results

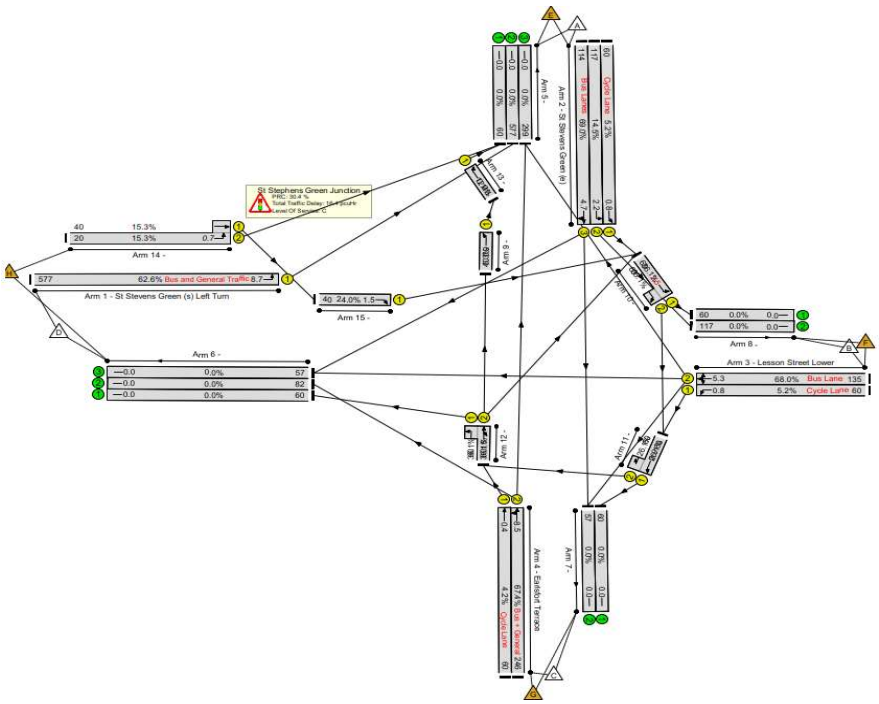
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 16.2%
PM: 30.4%

Junction Delay:
AM: 18.59 pcu/Hr
PM: 16.41 pcu/Hr

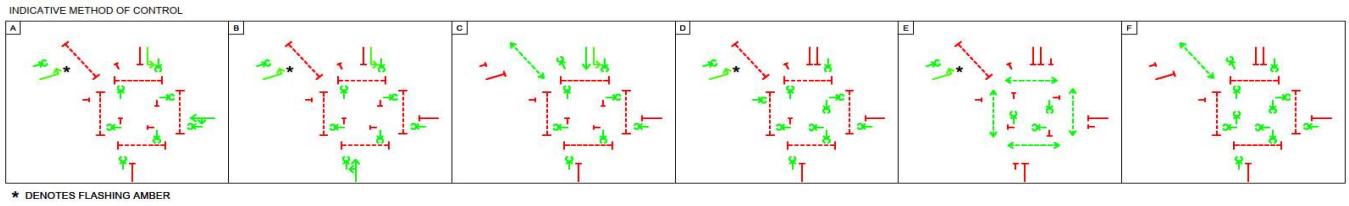
Network Layout Diagram



People Movement Assessment (Typical Peak Period)(Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,892	4%
Bus	95,813	94%
Walk	1,382	1%
Cycle	962	1%
Total	**102049**	**100%**

INDICATIVE METHOD OF CONTROL

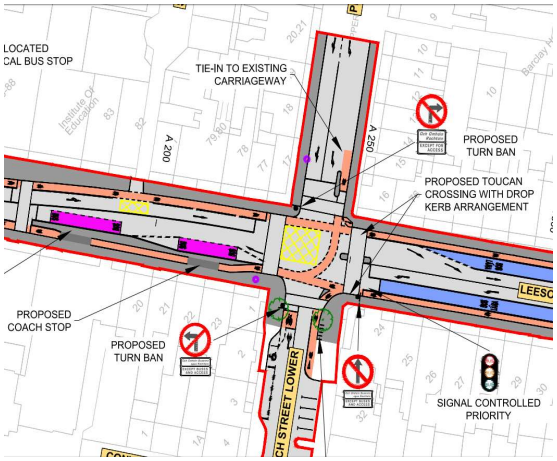


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	2

Junction **Leeson Street Lower / Hatch Street Junction**

EXISTING

FINAL DESIGN



Summary:

Insufficient width for 2 bus lanes, 2 cycle tracks and 2 general traffic lanes to be accomodated to the north of the junction on Leeson Street Lower without adversely affecting footway widths. Given the high pedestrian footfall in the area, decision taken to provide cycle tracks and allow buses to mix with a small amount of general traffic, which will be limited through bus gate restrictions (local access only).

Full bus priority is provided with cycle lanes through the junction. There are improved pedestrian crossing opportunities and improved operational safety at the junction by splitting side road movments.

Pedestrian Infrastructure

Full signal control of the junction has been accommodated to separate turning movement and add a pedestrian crossings on the northern and western arms. Crossing lengths are long, but within the bounds of 19m set out in the Busconnects Design Guide.

Cycle Infrastructure

Cycle lanes have been improved and taken through the junction with protected approaches. ASL cycle lane provided on Eastbound Hatch Road approach to junction to provide tie-in. Pembroke approach now provides protected cycle approach with guidance markings through junction

Bus Priority Infrastructure

Buses and cyclists can move together in north and southbound directions.
Side Roads: Side roads have been split which reduces capacity for the mainline but does improve operational safety at the junction.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	2

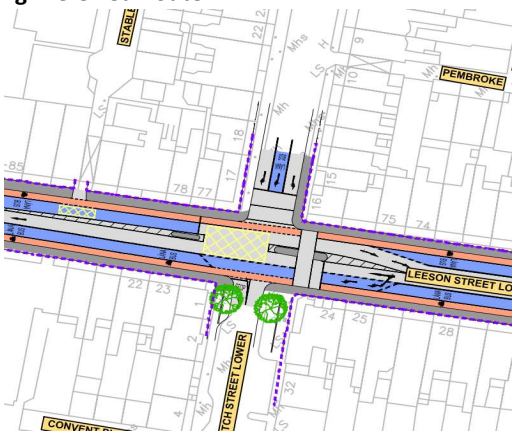
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

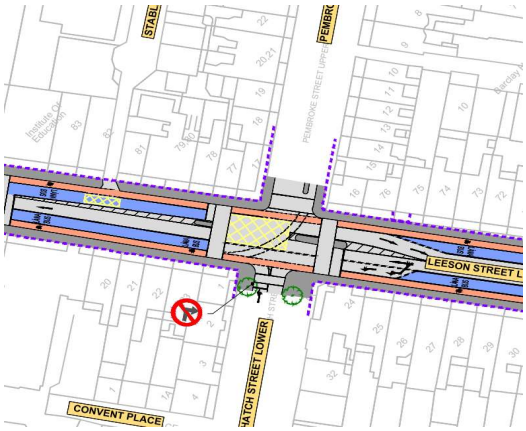
Existing

Concept Design Drawing

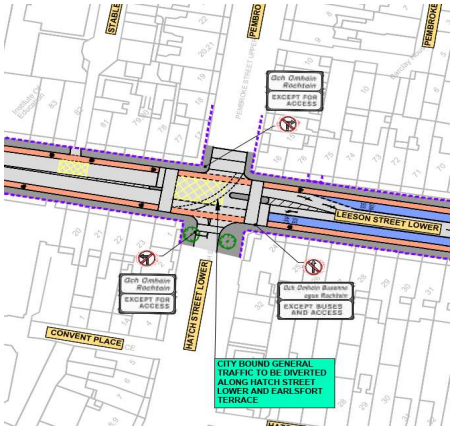
Emerging Preferred Route



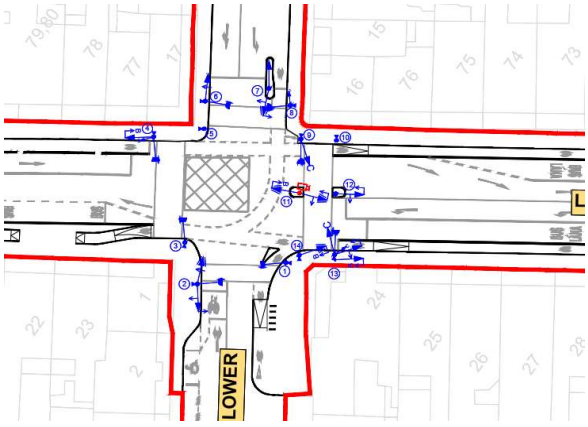
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	2

2028 AM Peak Hours
Fixed Time LinSig Results

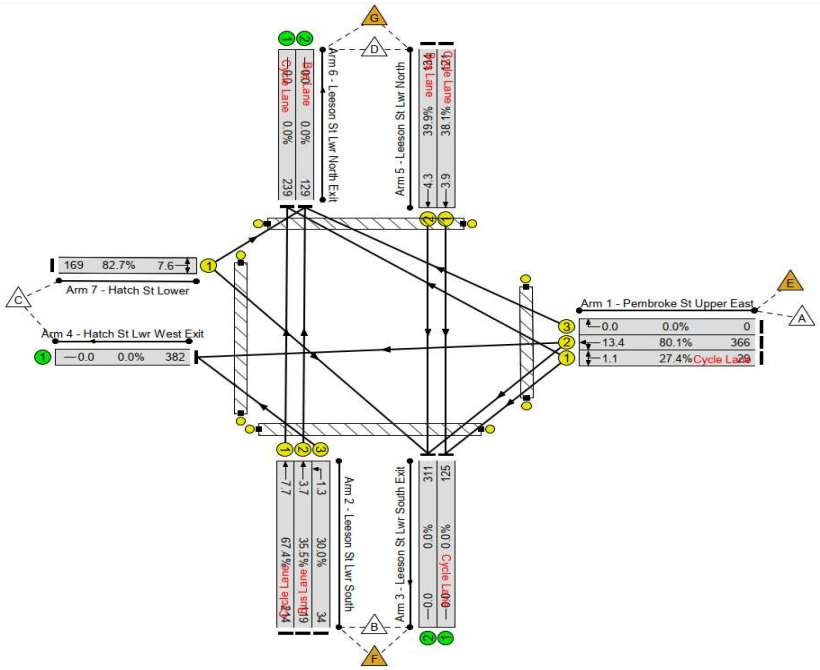
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 8.8%
PM: **-1.6%**

Junction Delay:
AM: 21.44 pcu/Hr
PM: 23.02 pcu/Hr

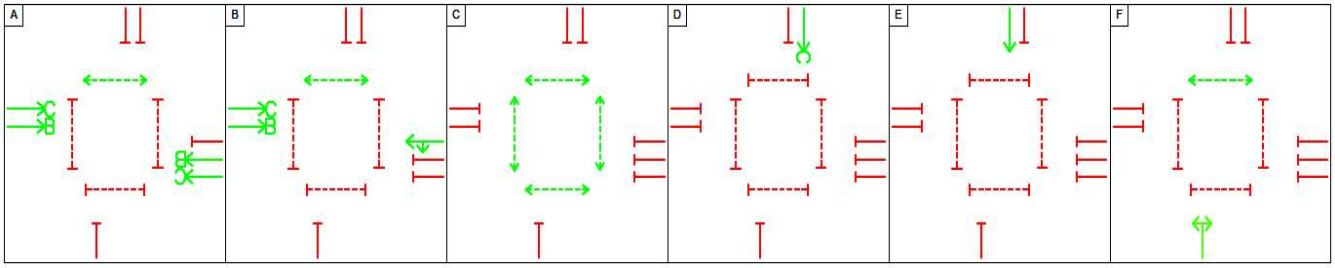
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1372	3%
Bus	35228	76%
Walk	8870	19%
Cycle	911	2%
Total	**46381**	**100%**

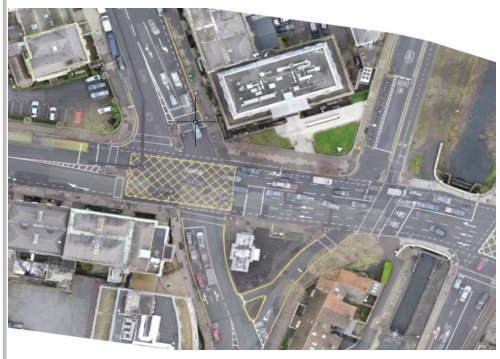
INDICATIVE METHOD OF CONTROL



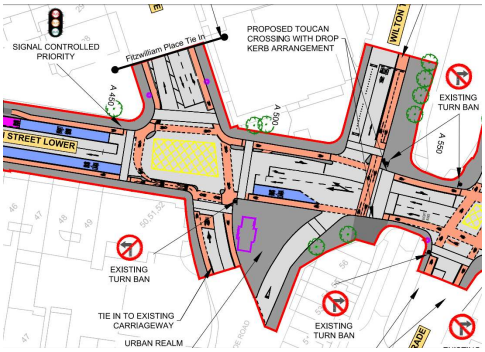
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	3

Junction **Leeson Street Lower / Fitzwilliam Place Junction**

EXISTING



FINAL DESIGN



Summary:

Separate design proposals in place to improve cycling on Fitzwilliam Place have been incoporated into the BusConnects design layout, with full bus priority provided. Junction type 1 (taking bus lanes to the stop line) can be physically accomodated in both directions with full bus priority. Co-ordination of signals will be required to maximise bus priority through the Grand Parade junction (junction 4). Protected cycle crossings on all arms of the junction and improved pedestrian crossing facilities. Reduction in northbound and southbound traffic capacity is expected and some limited redistribution of general traffic onto other routes is likely to result in this area, as reported in the EIAR.

Pedestrian Infrastructure

Full signal control of the junction has been accommodated to separate turning movement and add a pedestrian crossing on the southern arm. Crossing lengths are long, but within the bounds of 19m set out in the Busconnects Design Guide.

Cycle Infrastructure

Cycle lanes have been improved and taken through the junction with protected approaches. Dublin Cycle Office proposals for Fitzilliam Place approach have also been accomdoated within BusConnects design layout, along with tie-in to existing canalside cycle infrastructure.

Bus Priority Infrastructure

Buses and cyclists can move together and northbound buses and cycles can operate with southbound general traffic due to northbound left turn ban (left turning traffic via Adelaide Road slip road).

Side roads have been split to improve traffic calming and reduce the attractiveness of rat running to parallel routes, which reduces capacity for the mainline.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	3

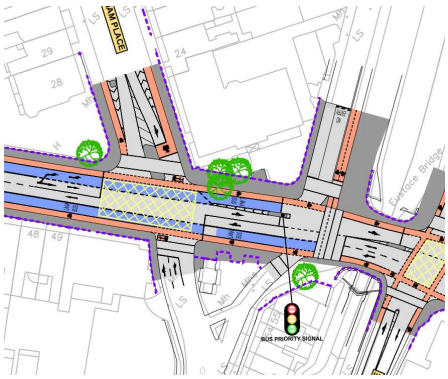
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

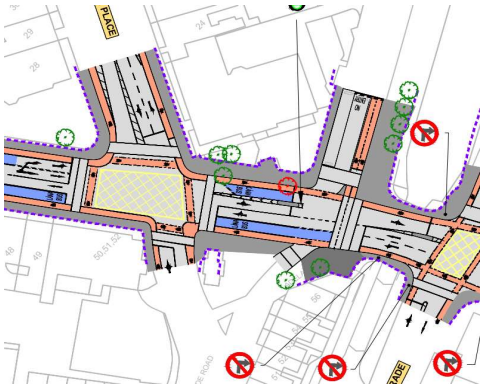
Existing

Concept Design Drawing

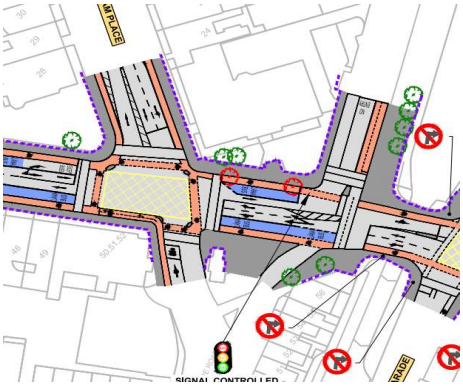
Emerging Preferred Route



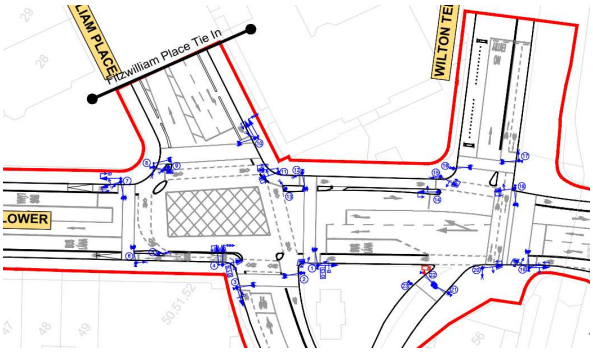
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	3

2028 AM Peak Hours
Fixed Time LinSig Results

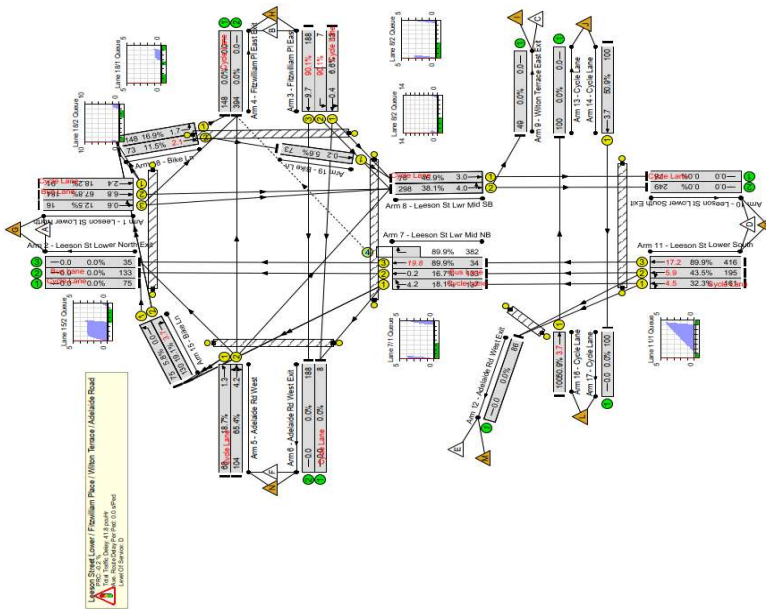
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: **-0.2%**
PM: 5.1%

Junction Delay:
AM: 41.79 pcu/Hr
PM: 34.72 pcu/Hr

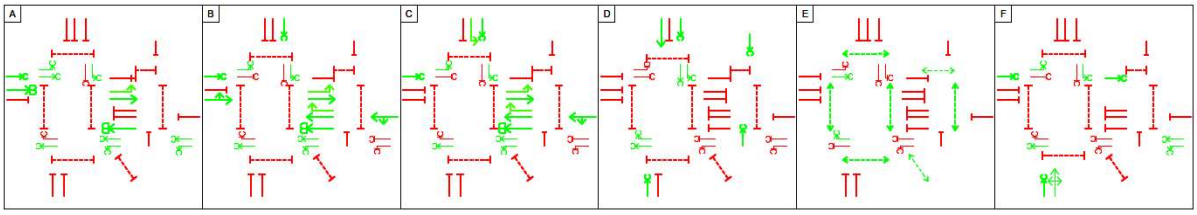
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,160	2%
Bus	56,123	92%
Walk	2,765	5%
Cycle	663	1%
Total	**60711**	**100%**

INDICATIVE METHOD OF CONTROL

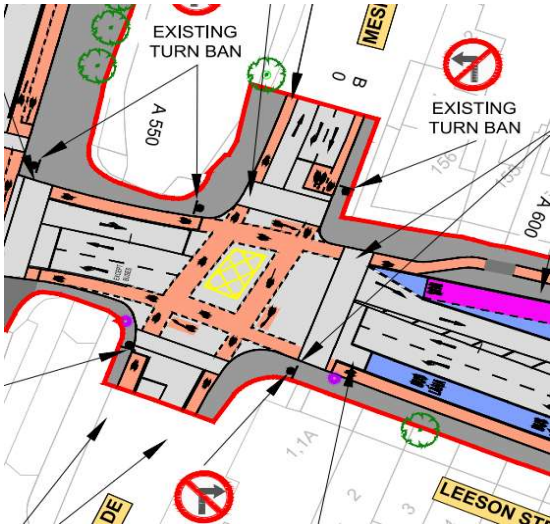


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	4

Junction **Leeson Street Upper / Grand Parade Junction**

EXISTING

FINAL DESIGN



Summary:

Junction closely linked to junction 3 and will need to be fully co-ordinated to ensure bus and cycle progression as designed. Junction type 1 can be physically accomodated in northbound direction. SIgnals are linked in southbound direction to ensure bus progression from priority already granted at the Fitzwilliam Place Junction. Cycle lanes on all arms of the junction and improved pedestrian crossing facilities through the removal of substandard island.
Reduction in northbound and southbound traffic capacity but general traffic is well accomodated and no significant redistribution is expected as a result of this junction arrangement.

Pedestrian Infrastructure
Full signal control of the junction has been accommodated to separate turning movements. Due to space constraints no pedestrian crossing has been added on the northbound side, though nearby pedestrian facility is available at Wilton Terrace. Existing pedestrian crossings have been improved through the removal of substandard island. Crossing lengths are long, but within the bounds of 19m set out in the Busconnects Design Guide.

Cycle Infrastructure
Cycle lanes have been taken through the junction.
Cycle lanes must run seperately as protected crossing on side roads cannot be accomodated. ASL cycle lane provided on Westbound Mespil Road approach to junction to provide tie-in.

Bus Priority Infrastructure
Full bus priority is achieved. Buses and cycles can move together northbound with southbound cycle movements.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	4

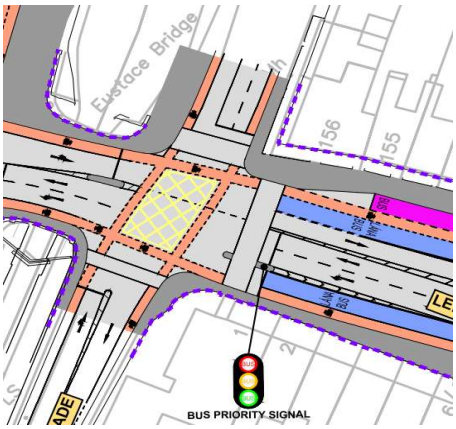
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

Concept Design Drawing

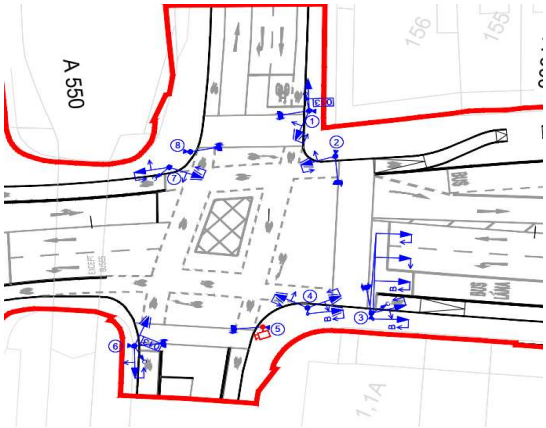
Emerging Preferred Route



Public Consultation 2

Public Consultation 3

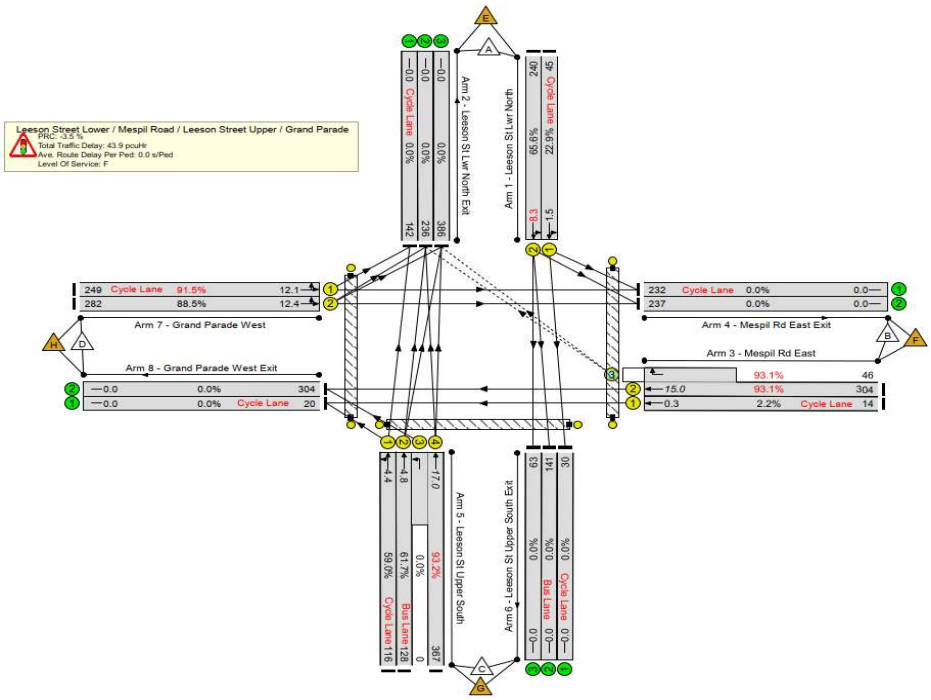
Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	4

2028 AM Peak Hours
Fixed Time LinSig Results

Network Layout Diagram



2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

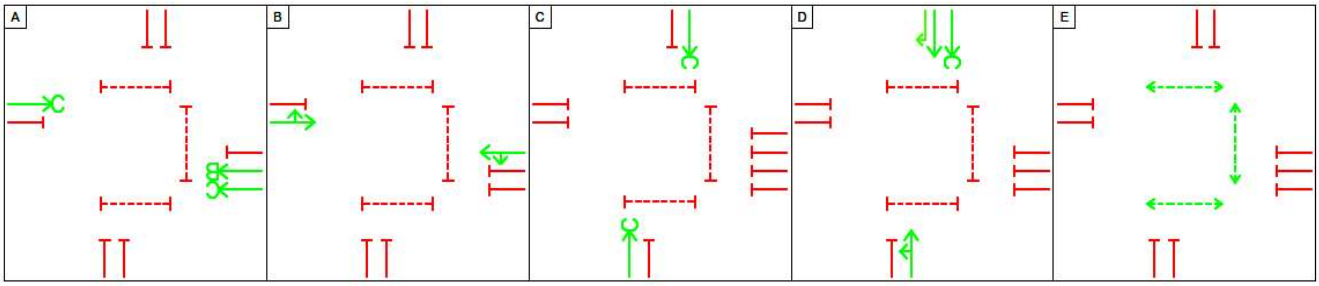
Junction PRC:
AM: **-3.5%**
PM: 3.1%

Junction Delay:
AM: 43.92 pcu/Hr
PM: 30.48 pcu/Hr

People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,744	11%
Bus	10,868	69%
Walk	2,074	13%
Cycle	1,100	7%
Total	**15786**	**100%**

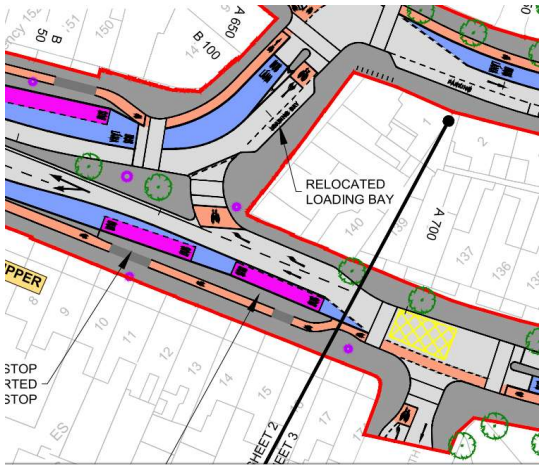
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	5
Junction	**Leeson Street Upper / Dartmouth Road Junction**		

EXISTING

FINAL DESIGN



Summary:

Dartmouth Road and the northbound U-turn junction operate under one traffic signal controller. Bus priority retained through the junction in both directions, and cycle facilities improved. Junction type 1 can be physically accommodated while retaining sufficient traffic capacity.

Pedestrian Infrastructure
Full signal control of the junction has been accommodated and a pedestrian crossing addec on the southern arm to improve pedestrian crossing opportunities.

Cycle Infrastructure
Cycle lanes have been improved and provided through junction. ASL cycle lane provided on side road approach to junction to provide tie-in.

Bus Priority Infrastructure
Full bus priority provided.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	5

Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

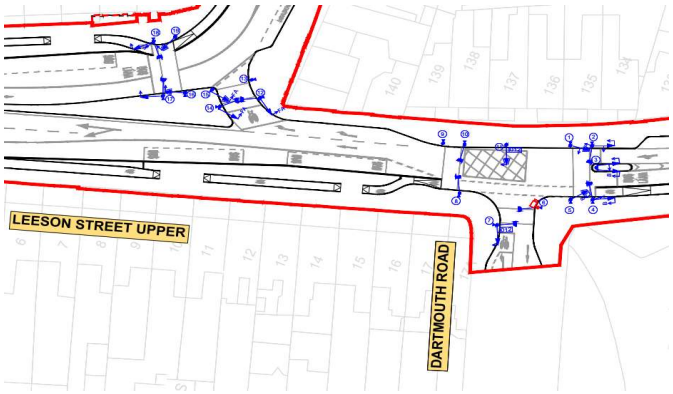
Existing

Concept Design Drawing

Emerging Preferred Route

Public Consultation 2

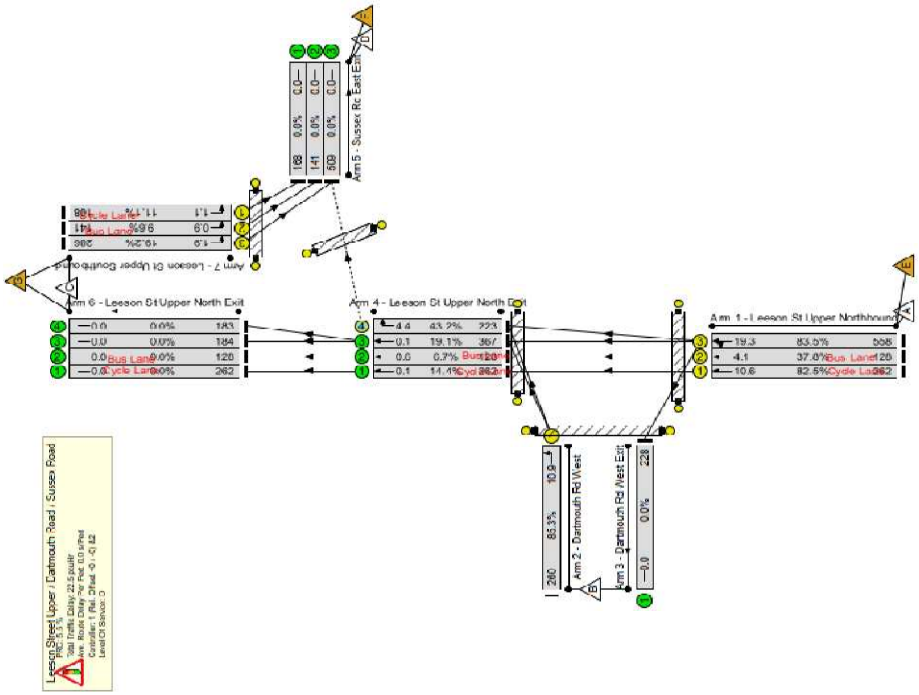
Public Consultation 3



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	5

2028 AM Peak Hours
Fixed Time LinSig Results

Network Layout Diagram



2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

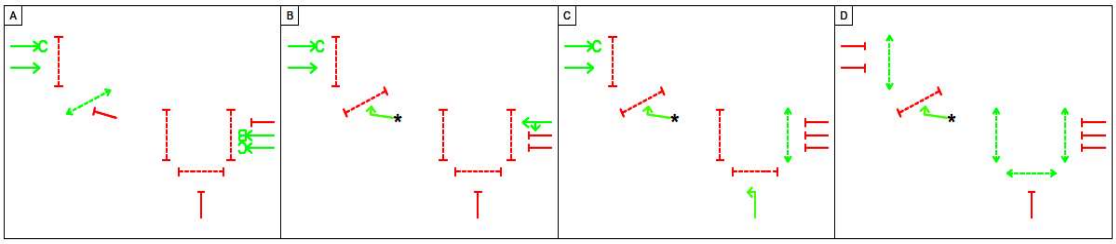
Junction PRC:
AM: 5.5%
PM: 8.9%

Junction Delay:
AM: 22.48 pcu/Hr
PM: 15.22 pcu/Hr

People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,168	5%
Bus	17,798	80%
Walk	2,074	9%
Cycle	1,075	5%
Total	**22115**	**99%**

INDICATIVE METHOD OF CONTROL



* DENOTES FLASHING AMBER

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	6

Junction **Sussex Road / Sussex Terrace Junction**

EXISTING

FINAL DESIGN

Summary:

Bus priority retained through the junction in both directions, and cycle facilities improved. Junction type 1 can be physically accomodated without significant capacity impact. Cycle lanes have been improved and taken through the junction with protected approaches.

Pedestrian Infrastructure
Full signal control of the junction has been accommodated and add pedestrian crossings on the southern arm to improve pedestrian crossing opportunities.

Cycle Infrastructure
Cycle lanes have been improved and provided through junction with protected approach to improve safety across the junction.

Bus Priority Infrastructure
Full bus priority provided.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	6

Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

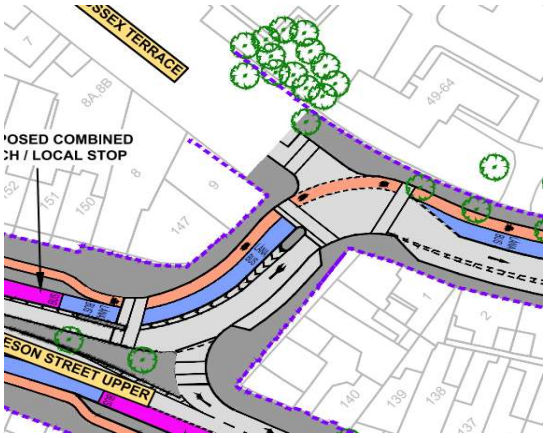
Existing

Concept Design Drawing

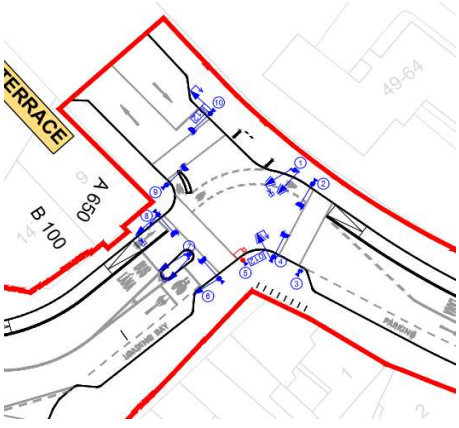
Emerging Preferred Route

Public Consultation 2

Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	6

2028 AM Peak Hours
Fixed Time LinSig Results

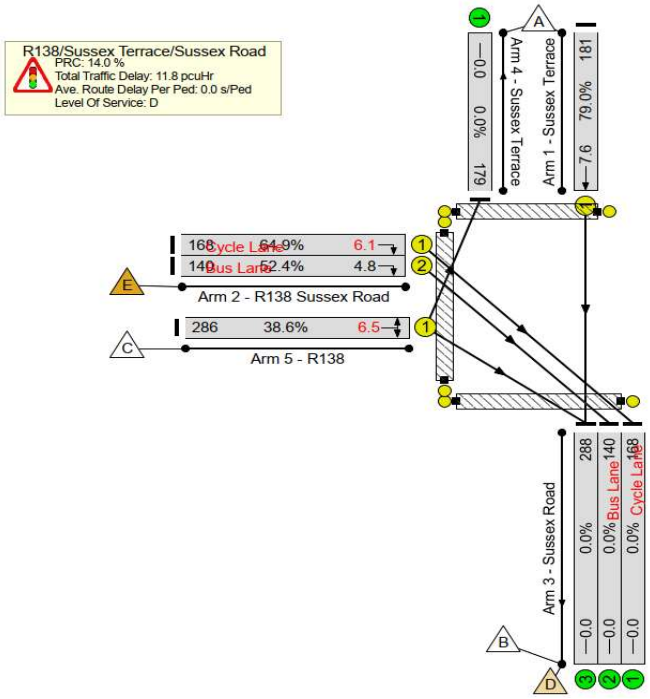
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 14%
PM: 13.9%

Junction Delay:
AM: 11.78 pcu/Hr
PM: 13.37 pcu/Hr

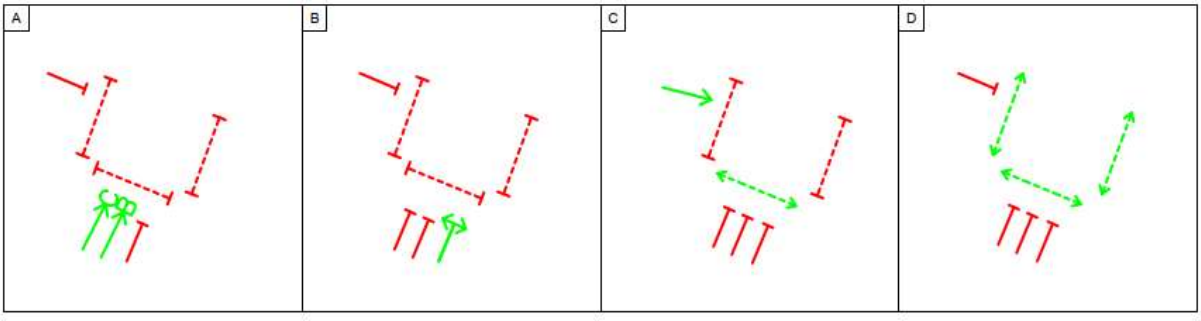
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,163	7%
Bus	13,598	82%
Walk	1,382	8%
Cycle	419	3%
Total	**16562**	**100%**

INDICATIVE METHOD OF CONTROL

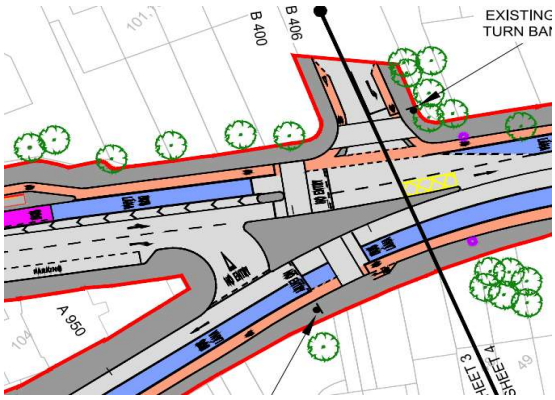


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	7

Junction **Leeson Street Upper / Burlington Road Junction**

EXISTING

FINAL DESIGN



Summary:

Junction type 1 can be physically accomodated in both directions without significant capacity impact. Bottlenecks in this area occur at Fitzwilliam Place and Appian Way, but junction layout at Burlington Road do not significantly influence network operation.

Pedestrian Infrastructure
Pedestrian facilities improved with larger crossing island between Sussex Road and Leeson Street Upper.

Cycle Infrastructure
Cycle lanes provided through junction with protected turnings. Lead in lanes provided to Toucan crossings to aid cycle movements between the Leeson Street Upper northbound and Burlington Road.

Bus Priority Infrastructure
Full bus priority provided. Bus and cycle movements can operate together.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	7

Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

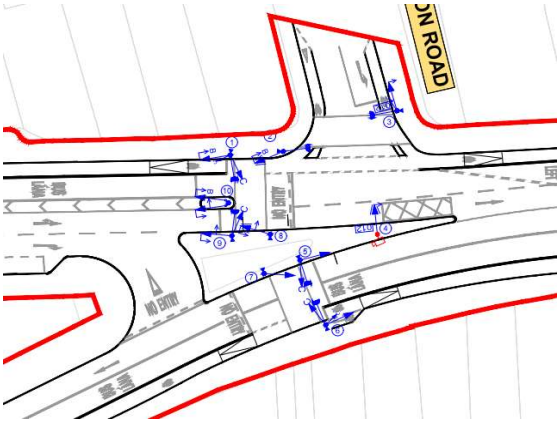
Concept Design Drawing

Emerging Preferred Route

Public Consultation 2

Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	7

2028 AM Peak Hours
Fixed Time LinSig Results

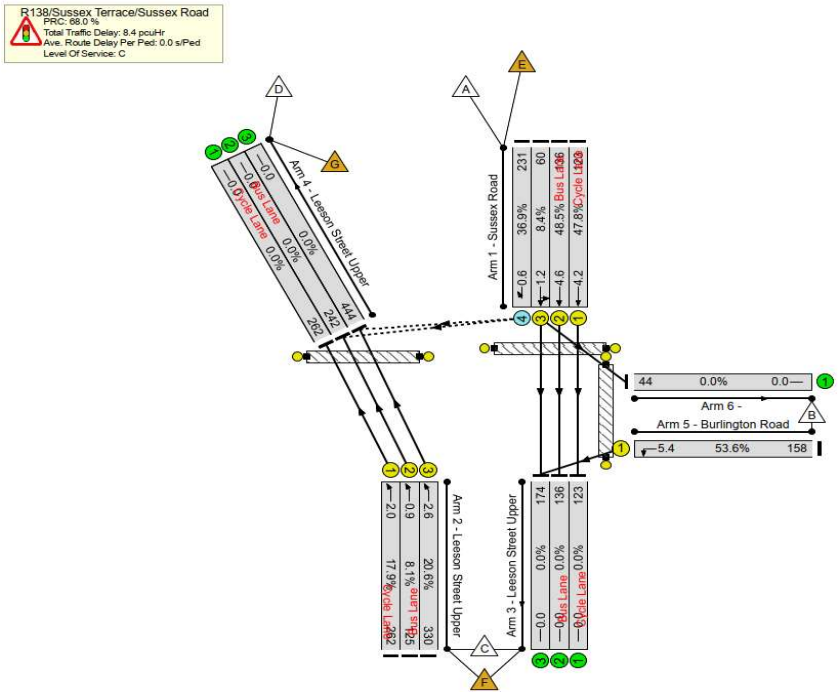
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 68%
PM: 5.2%

Junction Delay:
AM: 8.4 pcu/Hr
PM: 11.91 pcu/Hr

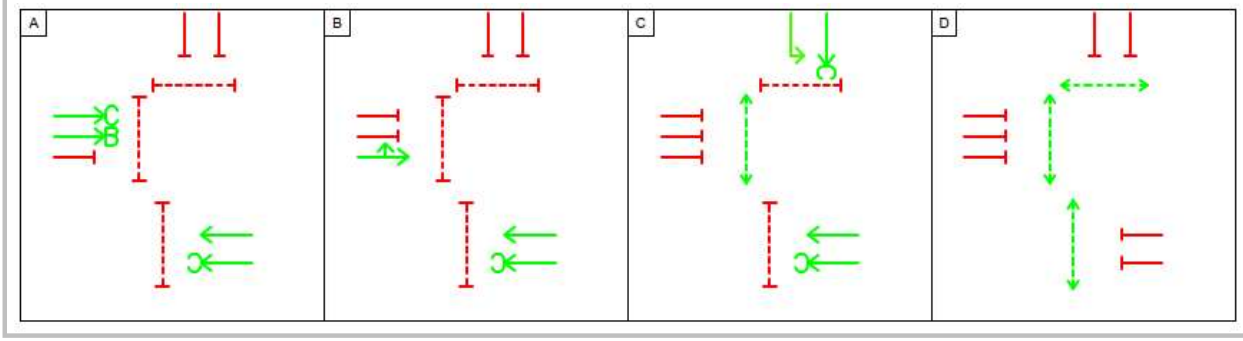
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,892	4%
Bus	95,813	94%
Walk	1,382	1%
Cycle	962	1%
Total	**102049**	**100%**

INDICATIVE METHOD OF CONTROL

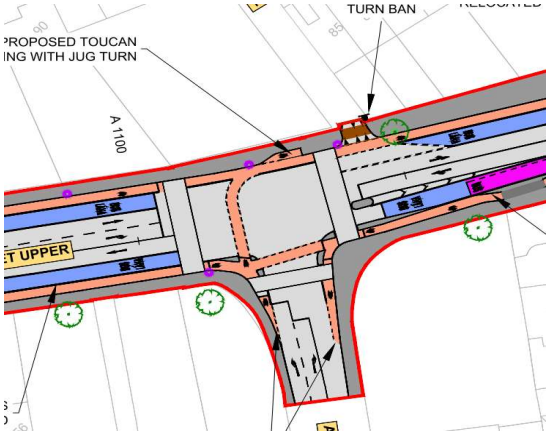


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	8

Junction	**Leeson Street Upper / Appian Way Junction**

EXISTING

FINAL DESIGN



Summary:

Appian Way provides a key pinchpoint on the corridor, given the number of bus movements to be accomodated and the proximity of the junction to Waterloo and Wellington junctions. Junction Type 1 can be physically accommodated in both diections. The junction requires to be closely co-ordinated with Waterloo and Wellington junctions (junction 9 and 10) in order to maximise progression for bus, cycle and general traffic. There are left turning buses from Leeson Street Upper northbound into Appian Way, which requires separate phasing of bus and cycle movements on this approach.
Pedestrian crossings have been improved and cycle lanes have been improved and taken through the junction with protected approaches.

Pedestrian Infrastructure
Signal controlled pedestrian crossings provided with additional crossing provided along desire lines.

Cycle Infrastructure
Cycle lanes have been provided through the junction with protected approaches. Cycle lanes provided leading from side road at Appian Way. Lead in lanes provided to Toucan crossing to aid cycle movements between Southbound Leeson Street Upper and Appian Way.

Bus Priority Infrastructure
Full bus priority provided. Southbound and Northbound bus and cycles can operate together. Bringing the bus lane to the stop line on the nearside lane maximises priority for these movements at the same time as meeting bus priority requirements on the mainline.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	8

Design Evolution

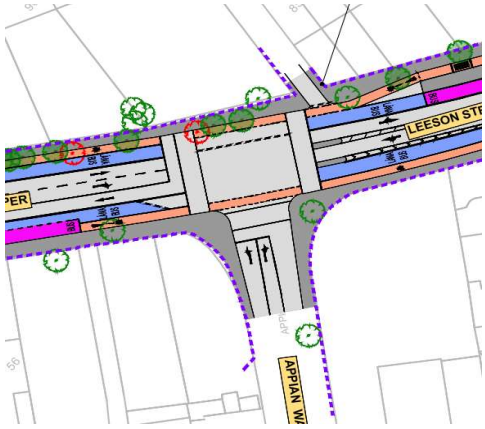
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

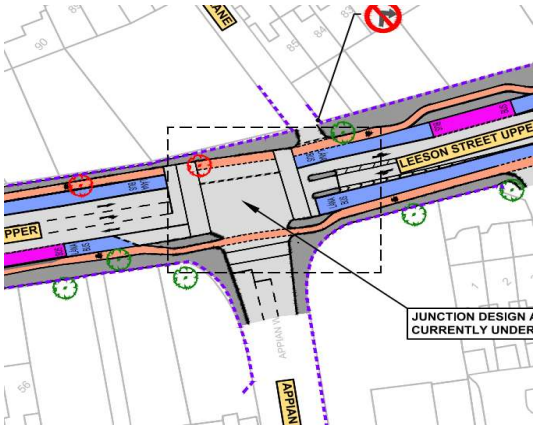
Concept Design Drawing

Emerging Preferred Route

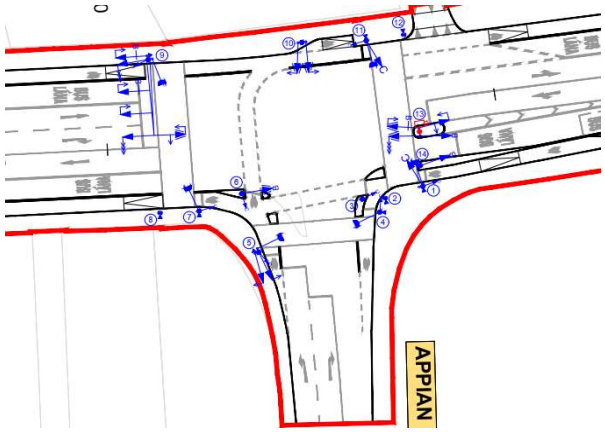
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	8

2028 AM Peak Hours
Fixed Time LinSig Results

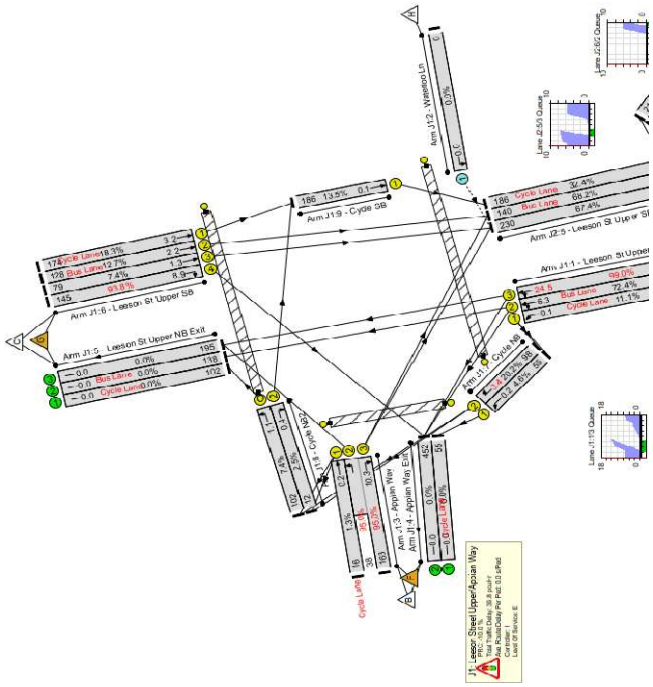
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 10.1%
PM: **-10%**

Junction Delay:
AM: 24.87 pcu/Hr
PM: 59.95 pcu/Hr

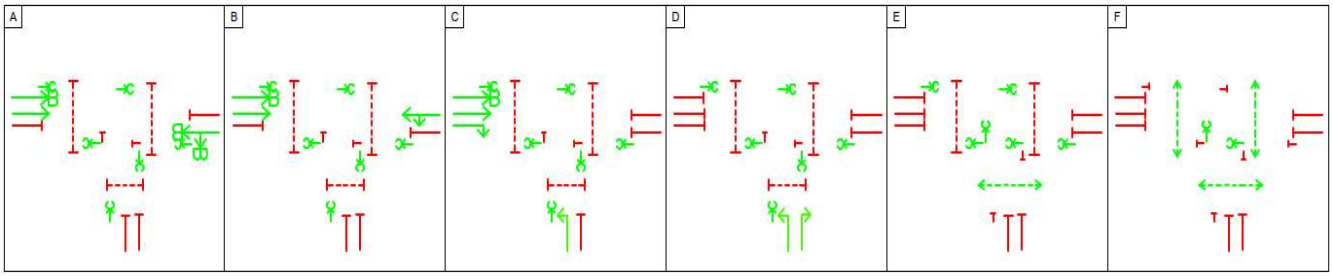
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,513	3%
Bus	71,243	91%
Walk	3,341	4%
Cycle	969	1%
Total	**78066**	**99%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	9

Junction **Leeson Street Upper / Waterloo Junction**

EXISTING

FINAL DESIGN

Summary:

Junction Type 1 can be physically accommodated in both directions.
Pedestrian crossings have been improved with additional crossings provided on desire lines.
Cycle lanes have been improved and taken through the junction with protected approches, including separate crossing for cycle right turn into Waterloo Road.

Pedestrian Infrastructure
Pedestrian crossings have been improved, and pedestrian crossing lengths have been reduced with the introduction of split phase pedestrian crossings to a central refuge island. Although no crossing is provided on the southern arm, the junction is in very close proximity to the next available crossing at the Wellington junction (junction 10)

Cycle Infrastructure
Cycle lanes have been introduced and taken around the junction with protected approaches.

Bus Priority Infrastructure
Full bus priority has been provided.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	9

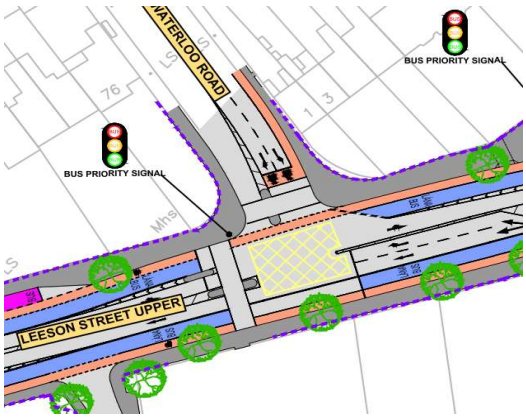
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

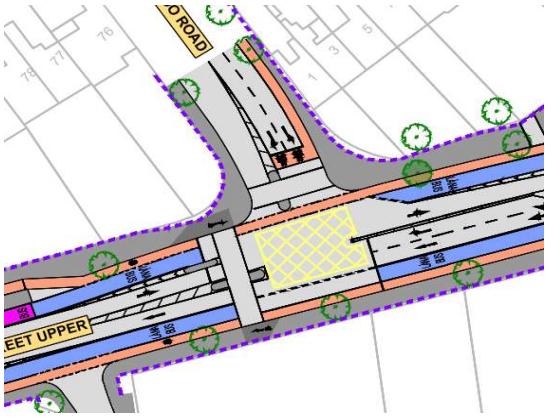
Existing

Concept Design Drawing

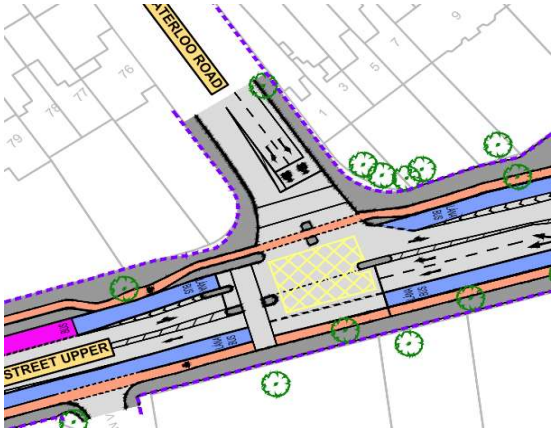
Emerging Preferred Route



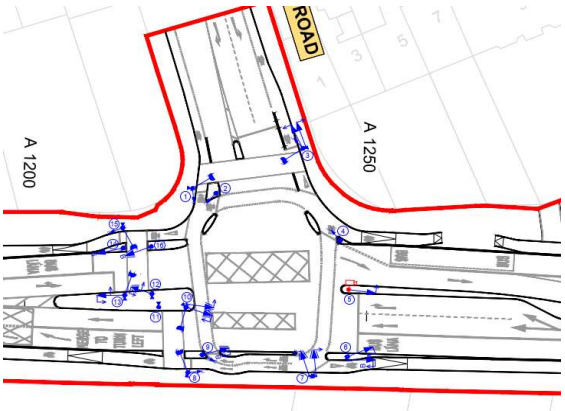
Public Consultation 2



Public Consultation 3



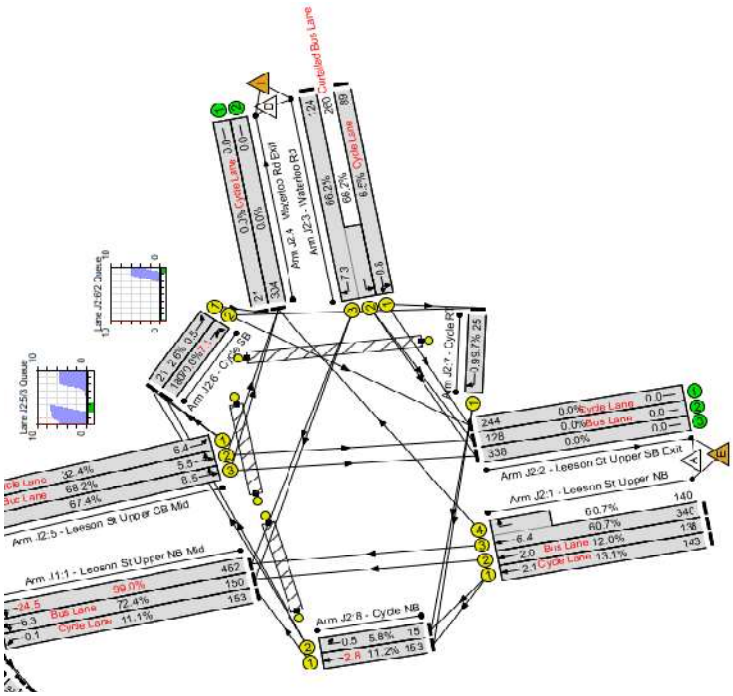
Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	9

2028 AM Peak Hours
Fixed Time LinSig Results

Network Layout Diagram



2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

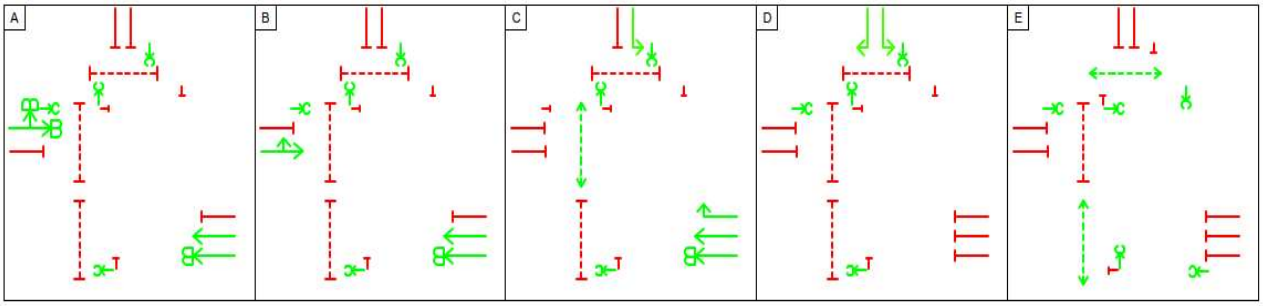
Junction PRC:
AM: 10.1%
PM: **-10%**

Junction Delay:
AM: 48.48 pcu/Hr
PM: 59.95 pcu/Hr

People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,674	2%
Bus	75,338	95%
Walk	1,382	2%
Cycle	967	1%
Total	**79361**	**100%**

INDICATIVE METHOD OF CONTROL

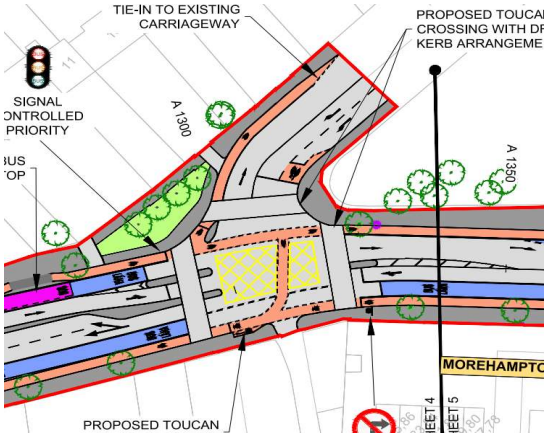


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	10

Junction **Leeson Street Upper / Wellington Place Junction**

EXISTING

FINAL DESIGN



Summary:

Right turn onto Wellington Place banned with routing via Waterloo Road or alterative routing. This retains greater northbound and southbound mainline capacity and makes Wellington place less of a pinchpoint than Appian Way or Waterloo Road. Junction Type 1 can be physically accommodated in both directions.
Side road splitter islands have been removed and pedestriand crossings have been improved. Cycle lanes have been improved and have been taken through the junction and around the side road with protected approaches.

Pedestrian Infrastructure
Additional pedestrian crossings have been provided along desire lines. Crossing lengths are long but within the bounds of 19m set out in the BusConnects Design Guide.

Cycle Infrastructure
Cycle lanes are provided through junction with protected approaches. Left turn protection cycle lanes added on the southbound approach and on Wellington Place. Cycle lanes taken across junction from Wellington Place northbound to Leeson Street Upper. Lead in lanes provided to Toucan crossing to aid cycle movements between the Leeson Street Upper northbound and Wellington Place. ASL cycle lane provided on approach to junction from Wellington Place to provide tie-in.

Bus Priority Infrastructure
Buses, cycles and northbound traffic can operate together. Bus and general traffic are split southbound to accomodate Junction Type 1 Layout with southbound cycles operating with southbound buses. There is a reduction in northbound and southbound traffic capacity, which leads to some reassignment of general traffic to parallel routes.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	10

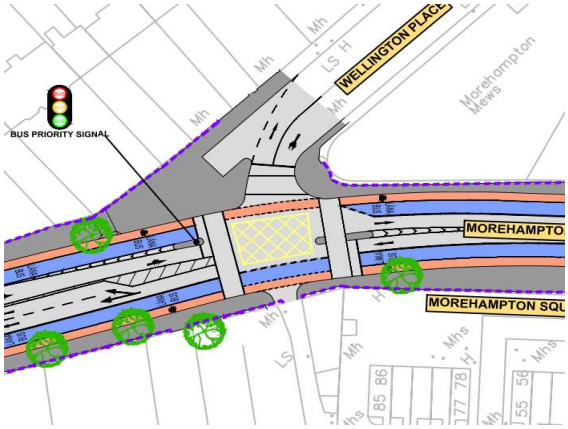
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

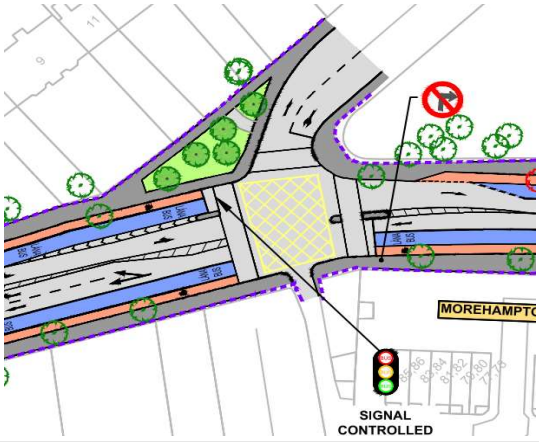
Concept Design Drawing

Emerging Preferred Route

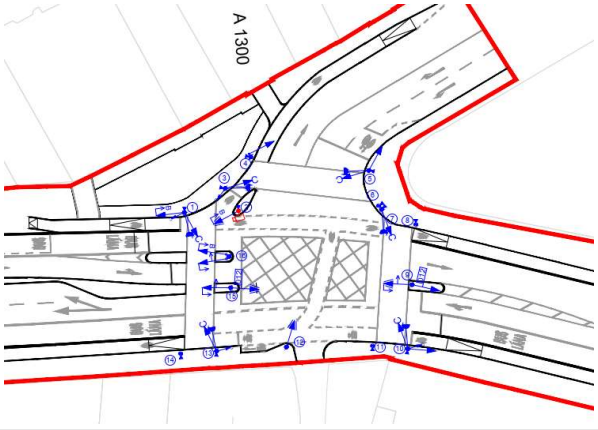


Public Consultation 2

Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	10

2028 AM Peak Hours
Fixed Time LinSig Results

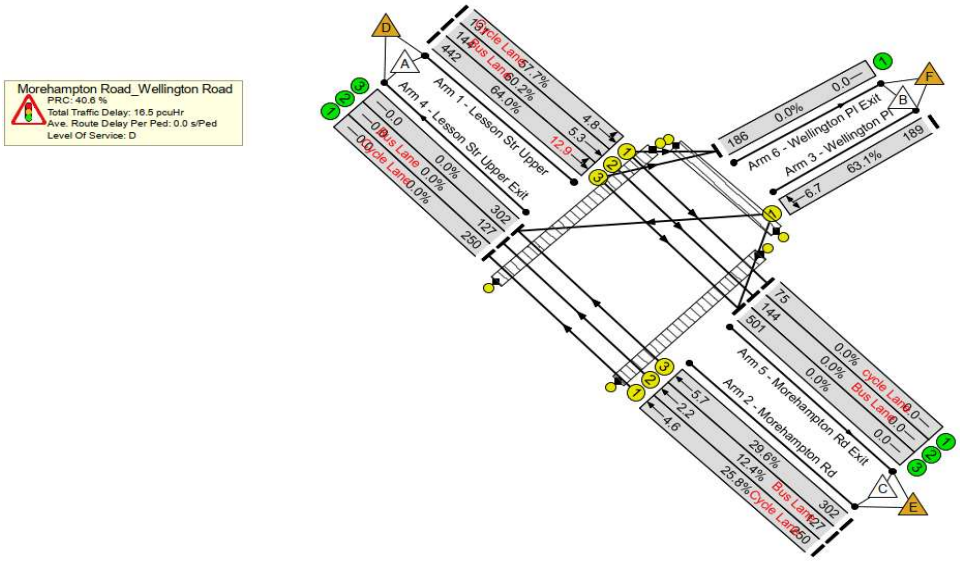
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 40.6%
PM: 2.1%

Junction Delay:
AM: 16.47 pcu/Hr
PM: 21.95 pcu/Hr

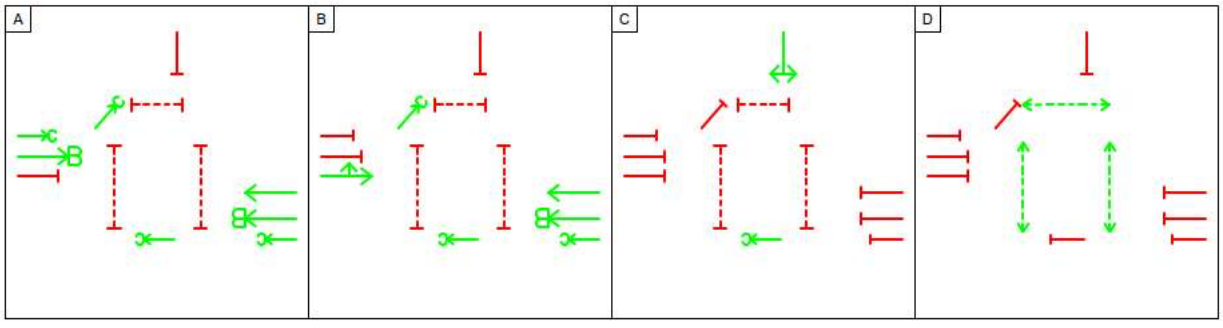
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,413	3%
Bus	66,150	93%
Walk	2,074	3%
Cycle	952	1%
Total	**71589**	**100%**

INDICATIVE METHOD OF CONTROL

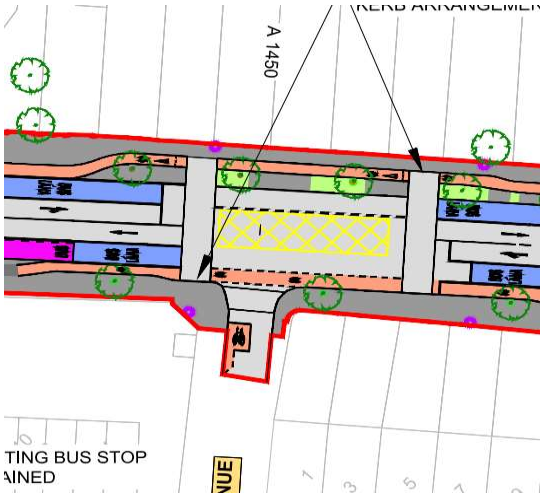


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	11

Junction **Morehampton Road / Bloomfield Avenue Junction**

EXISTING

FINAL DESIGN



Summary:

Junction Type 1 can be physically accommodated in both directions. Cycle lanes have been improved and have been taken through the junction. Additional pedestrian crossing have been provided along desire lines.

Pedestrian Infrastructure

Additional pedestrian crossing has been provided along desire lines. Crossing lengths are long but within the bounds of 19m set out in the BusConnects Design Guide. Southern crossing moved further south to reduce impact on mature trees.

Cycle Infrastructure

Cycle lanes have been provided across junction. Southbound cycle track has been offset from road to allow for retention of trees and to improve visibility at crossings.
ASL cycle lane provided on side road approach to junction to provide tie-in.

Bus Priority Infrastructure

Full bus priority provided. Buses and cycles can operate together with minor delay to general traffic as a result.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	11

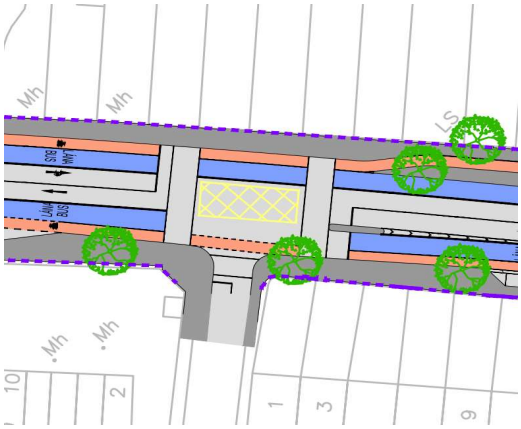
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

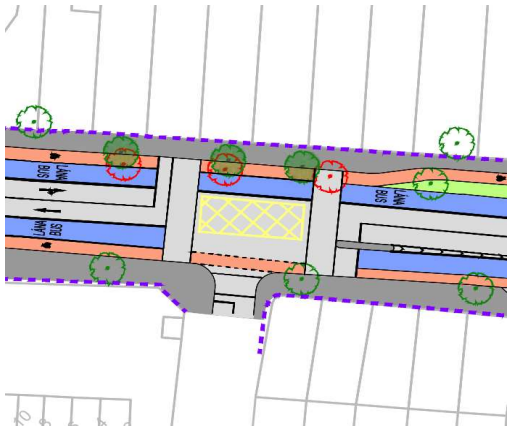
Existing

Concept Design Drawing

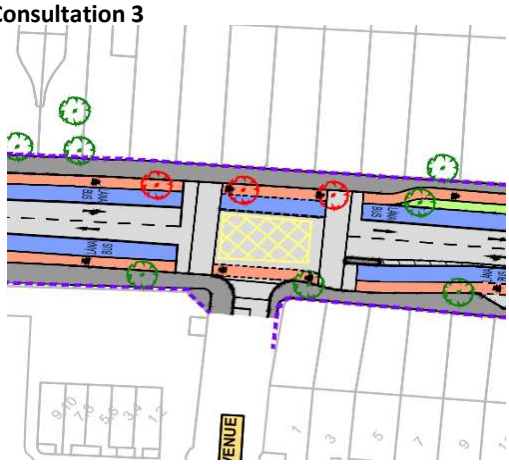
Emerging Preferred Route



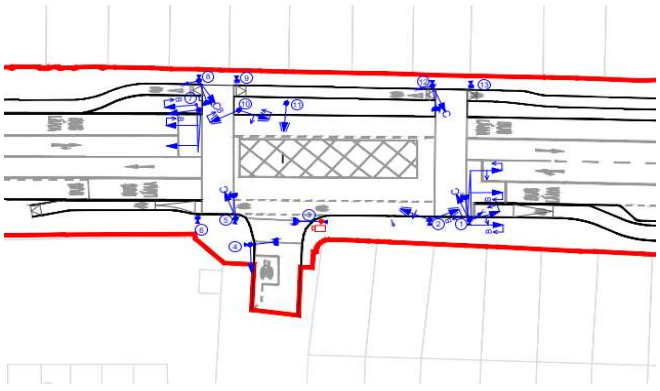
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	11

2028 AM Peak Hours
Fixed Time LinSig Results

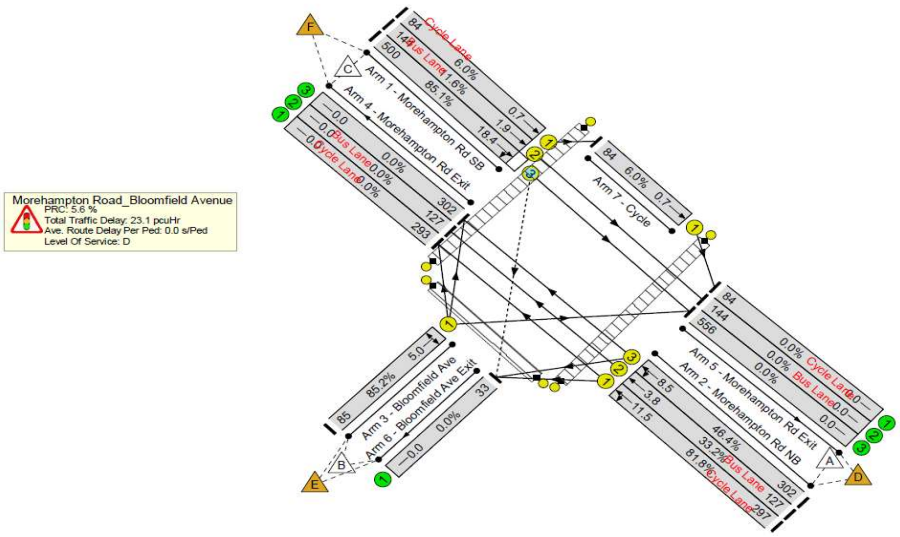
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 5.6%
PM: 6%

Junction Delay:
AM: 23.08 pcu/Hr
PM: 18.74 pcu/Hr

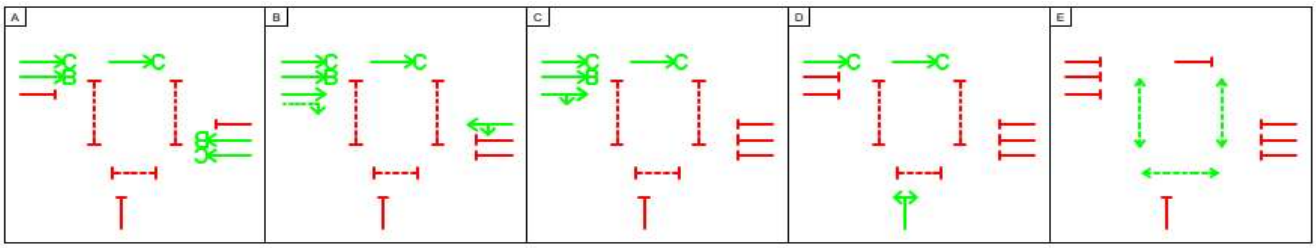
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,607	2%
Bus	85,470	95%
Walk	2,074	2%
Cycle	756	1%
Total	**89907**	**100%**

INDICATIVE METHOD OF CONTROL

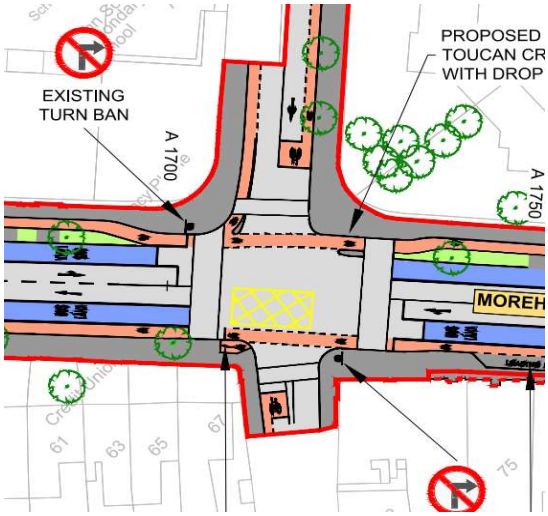


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	12

Junction **Morehampton Road / Herbert Park Junction**

EXISTING

FINAL DESIGN



Summary:

Junction Type 1 can be physically accommodated in both directions. Cycle lanes have been improved and have been taken through the junction and protected around Herbert Road. Pedestrian crossings have been improved.

Pedestrian Infrastructure

Pedestrian crossings provided along all desire lines. Wrap around pedestrian phase included in full signal.

Cycle Infrastructure

Cycle lanes provided through junction. Protected cycle lanes provided onto Herbert Park. Lead in lanes provided to Toucan crossing to aid cycle movements between Morehampton Road northbound and Herbert Park.
ASL cycle lane provided on side roads approach to junction to provide tie-in.

Bus Priority Infrastructure

Full bus priority provided. Buses and cycles can operate together with some minor delay to general traffic as a result.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	12

Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

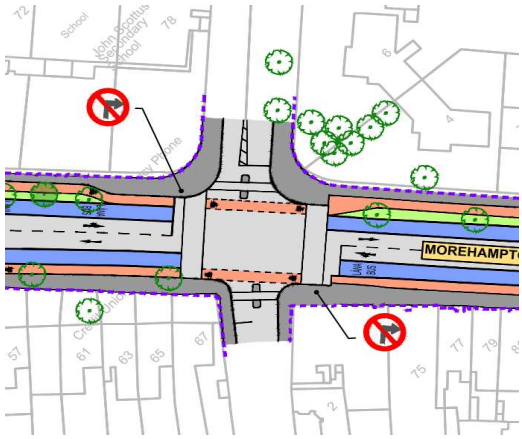
Existing

Concept Design Drawing

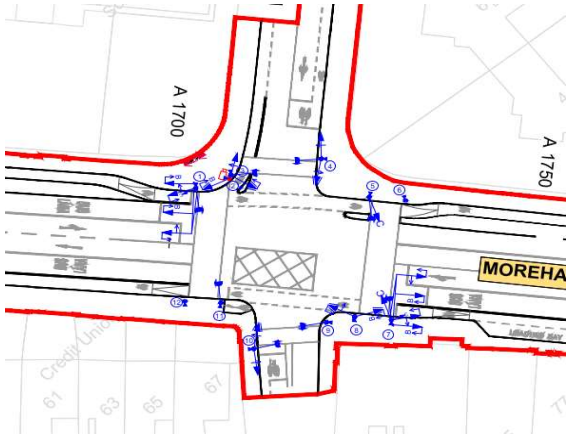
Emerging Preferred Route

Public Consultation 2

Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	12

2028 AM Peak Hours
Fixed Time LinSig Results

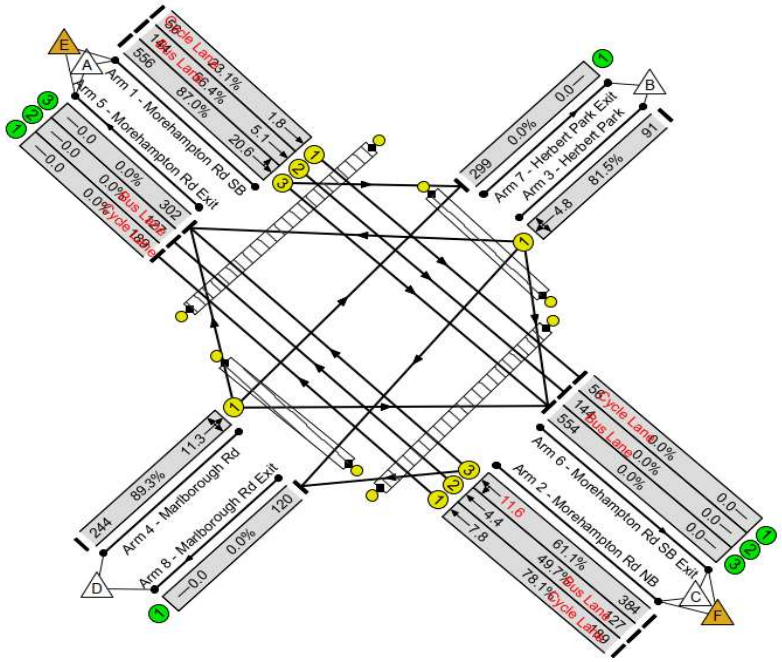
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: **-8.2%**
PM: 4.7%

Junction Delay:
AM: 39.17 pcu/Hr
PM: 30.97 pcu/Hr

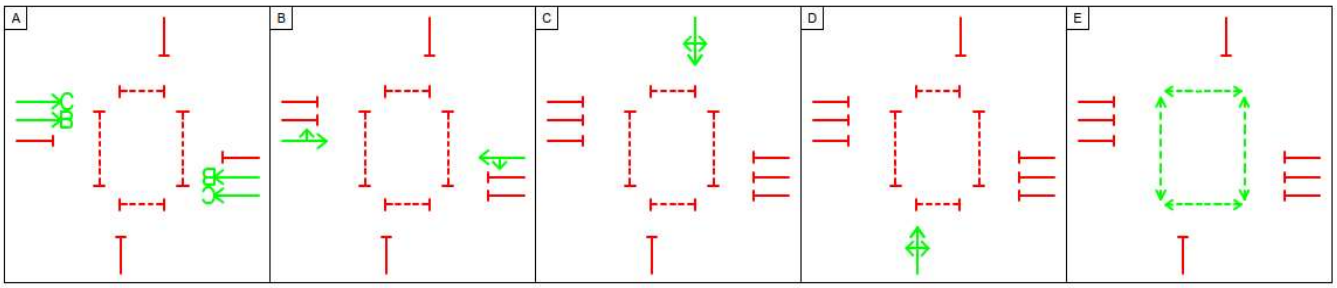
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,982	6%
Bus	26,775	83%
Walk	2,765	9%
Cycle	611	2%
Total	**32133**	**100%**

INDICATIVE METHOD OF CONTROL

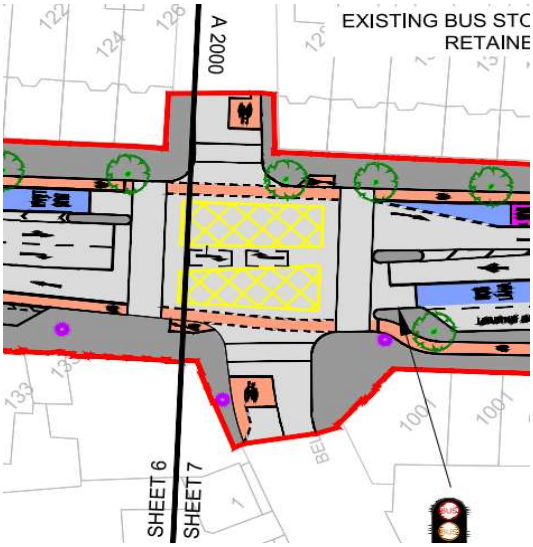


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	13

Junction **Donnybrook Road / Belmont Avenue Junction**

EXISTING

FINAL DESIGN



Summary:

Junction Type 1 can be physically accommodated in both directions. Cycle lanes have been improved taken through the junction. Pedestrian crossings have been improved. Loading bay on northbound approach is retained. Indicative right turn storage pockets provided within the junction to act as guide for turning traffic. Right turn traffic is relatively light and is not expected to block back, allowing general traffic to proceed. Bus and cycle movements fully protected.

Pedestrian Infrastructure

Signal controlled pedestrian crossings provided with additional crossing provided along desire lines. Wrap around pedestrian phase included in full signal. Crossing lengths are long, but within the bounds of 19m set out in the Busconnects Design Guide.

Cycle Infrastructure

Cycle lanes are provided through junction. Lead in lanes provided to Toucan crossings to aid northbound and southbound cycle movements from Donnybrook road onto Belmont Avenue and Victoria Avenue.
ASL cycle lane provided on side road approachs to junction to provide tie-in.

Bus Priority Infrastructure

Full bus priority provided. Buses and cycles can operate together with significant reduction in capacity for mainline general traffic.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	13

Design Evolution

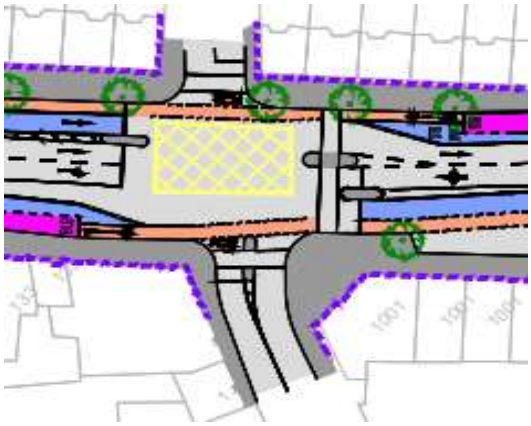
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

Concept Design Drawing

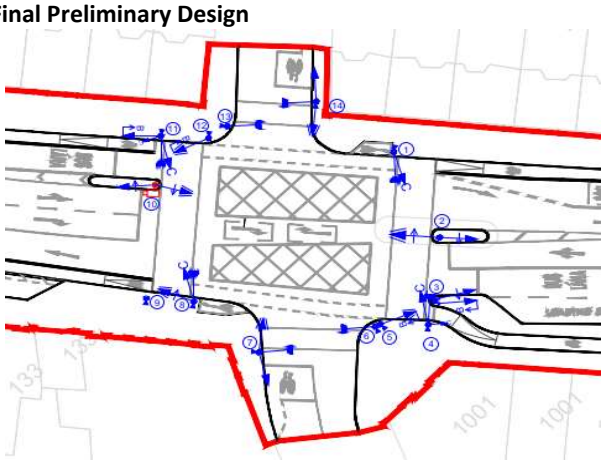
Emerging Preferred Route

Public Consultation 2



Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	13

2028 AM Peak Hours
Fixed Time LinSig Results

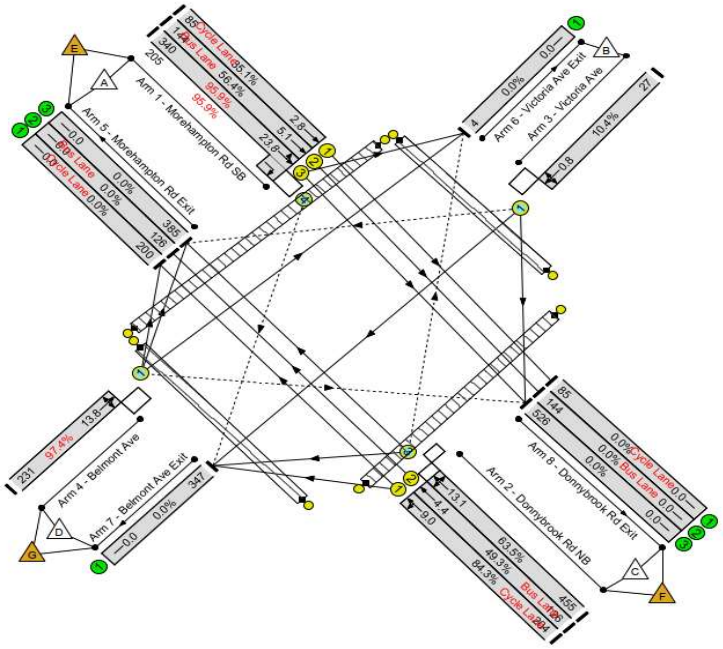
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: **-8.2%**
PM: 4.7%

Junction Delay:
AM: 39.17 pcu/Hr
PM: 30.97 pcu/Hr

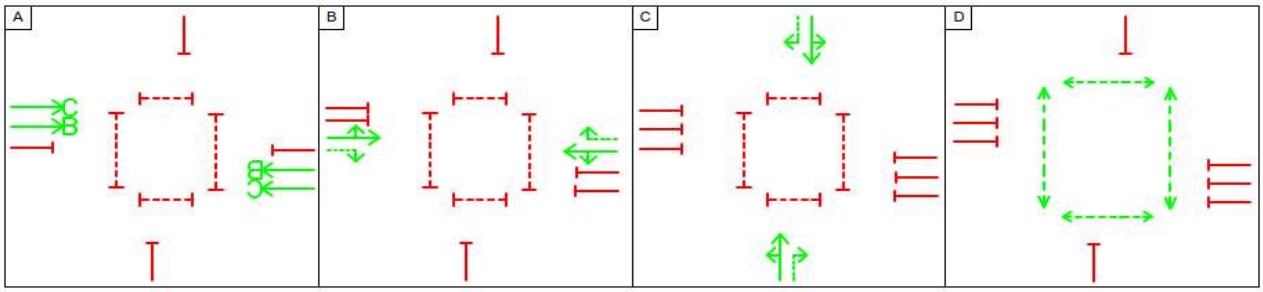
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,136	7%
Bus	26,775	83%
Walk	2,765	8%
Cycle	732	2%
Total	**32408**	**100%**

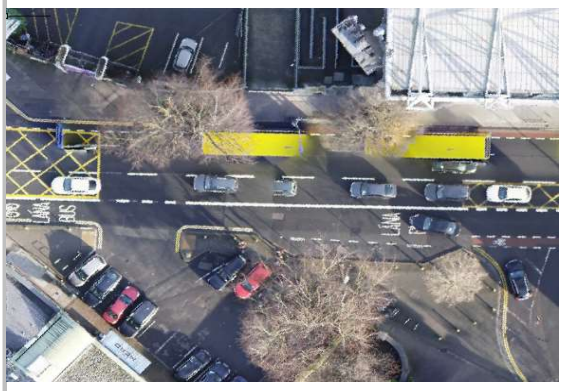
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	14

Junction	**Donnybrook Road / Eglinton Terrace Junction**

EXISTING



FINAL DESIGN

Summary:

Signal control of side road originally proposed but removed to improve bus and traffic progression of the mainline and to improve co-ordination of signalling through Donnbrook. Signalling on northbound mainline to seperate bus and general traffic movements retained, with stop line pulled back to ensure suitable access to local parking and side road accesses. Access to stadium parking at corner of Eglinton Terrace retained.

Cycle Infrastructure

Cycle movements operate during both bus and general traffic phases northbound.

Bus Priority Infrastructure

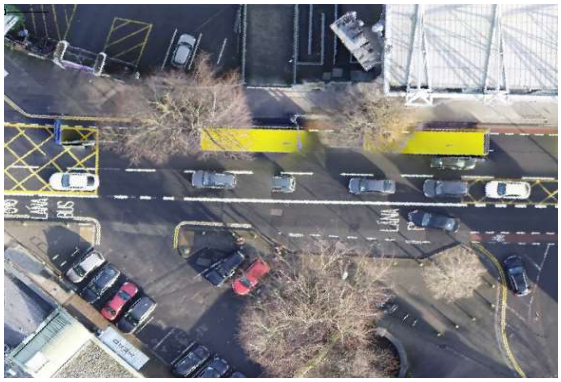
Full bus priority provided southbound, and bus delay minimised northbound by allowing buses to proceed ahead of general traffic where it mixes in advance of Belmont Avenue junction (junction 14).

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	14

Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

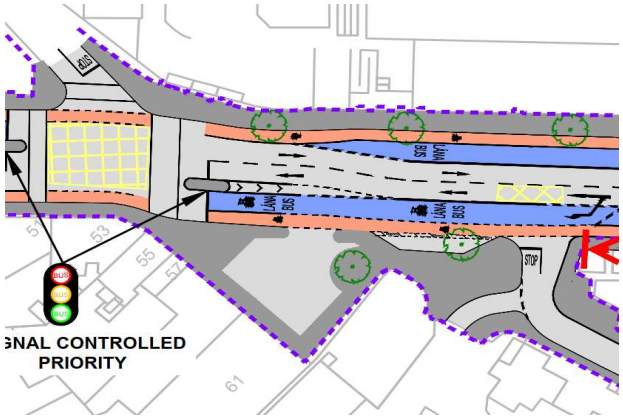
Existing



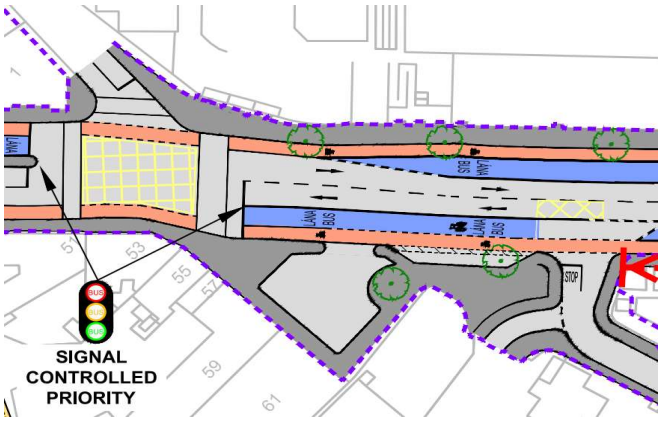
Concept Design Drawing

Emerging Preferred Route

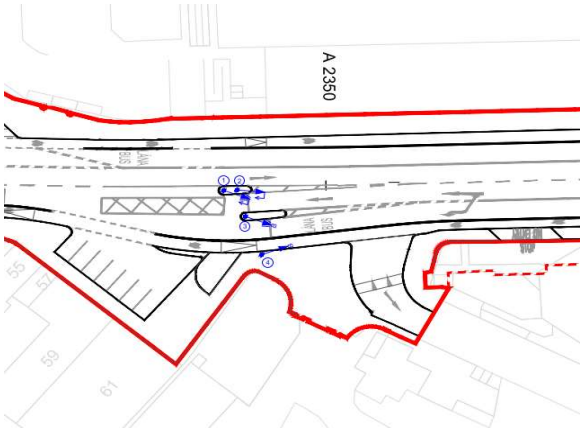
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	14

2028 AM Peak Hours
Fixed Time LinSig Results

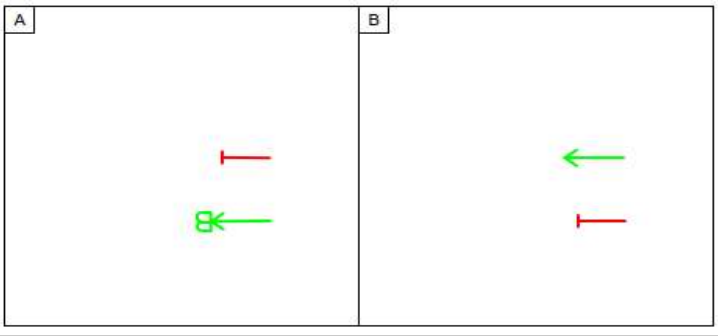
Network Layout Diagram

No Linsig analysis as simple bus pre-signal arrangement
(bus signal demanded as necessary)

People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,270	8%
Bus	25,253	92%
Walk	0	0%
Cycle	0	0%
Total	**27523**	**100%**

INDICATIVE METHOD OF CONTROL

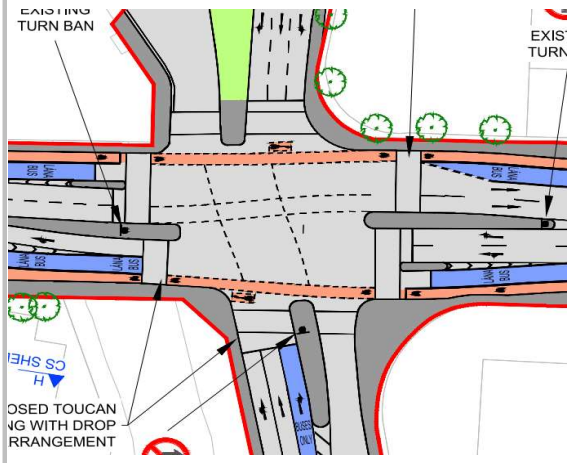


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	15

Junction **Donnybrook Road / Anglesea Road Junction**

EXISTING

FINAL DESIGN



Summary:

Anglesea Birdge and Anglesea Road junction represents a key pinchpoint for the corridor, given the many movements to be catered for at the junction by all modes as the corridor begins to narrow as it approaches the city. Junction Type 1 can be phyically accomodated in both directions to maximise bus priority through this key pinchpoint. Cycle lanes have been improved and have been taken through the junction and protected. Pedestrian crossings have been improved with wider refuges within the junction. Left turn slips removed and existing right turn bans retained in design.

Pedestrian Infrastructure

Pedestrian infrastructure has been improved with staggered crossings provided to central reserve islands. Options with single crossings were found to be in excess of 20m, creating and uncomfortable crossing experience for vulnerable pedestrians and also adding considerably to the integreen time needed at the junction (which is already operating at capacity). Footpath built out on northbound side of Donnybrook Road and seperate refuge island removed to reduce the number of pedestrian paths required to cross Beaver Row. Crossings have been adjusted to run perpendicular to junction to minimise crossing times.

Cycle Infrastructure

Cycle lanes are provided through junction. Right turn cycle waiting areas provided to aid northbound and southbound cycle movements from Donnybrook Road onto Anglesea Road and Beaver Row. A fully protected cycle crossing arrangement was considered but not feasible without compromising bus priority through this pinch point.

Bus Priority Infrastructure

Full bus priority provided. Bus and cycle movements can run together. There is reduced capacity for general traffic but bus and cycle movements are protected from general traffic delay.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	15

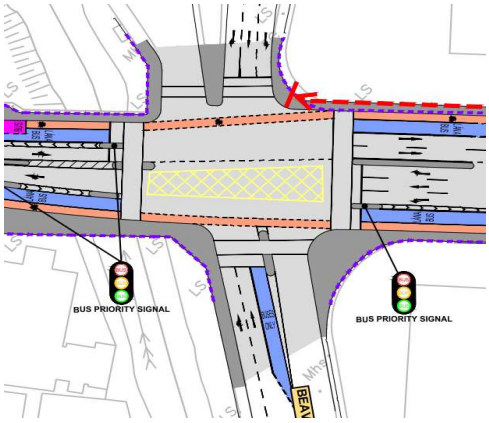
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

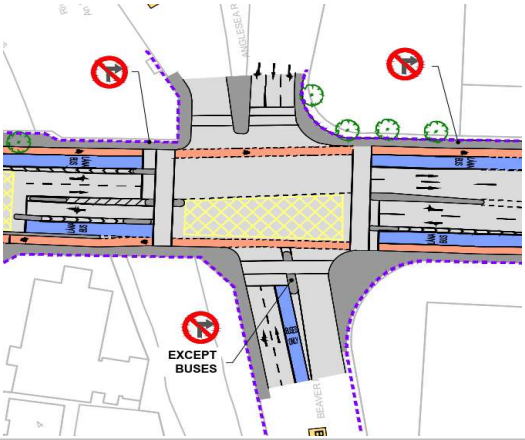
Existing

Concept Design Drawing

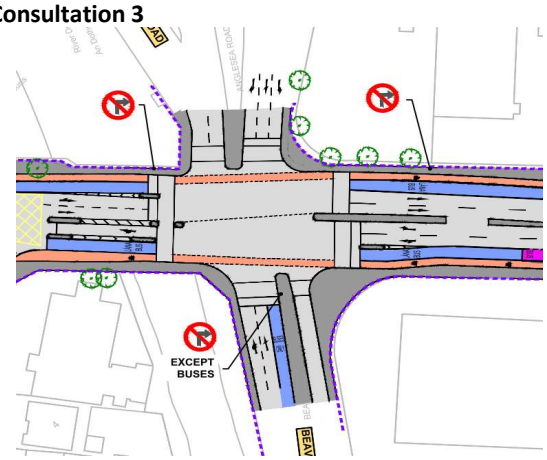
Emerging Preferred Route



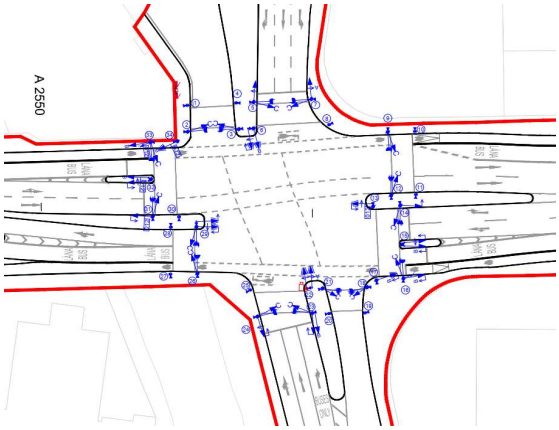
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	15

2028 AM Peak Hours
Fixed Time LinSig Results

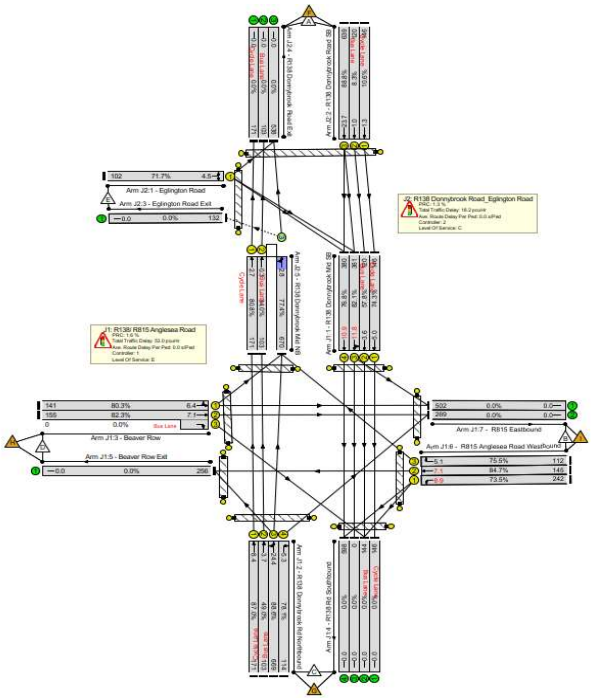
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 1.6%
PM: 0%

Junction Delay:
AM: 52.98 pcu/Hr
PM: 51.68 pcu/Hr

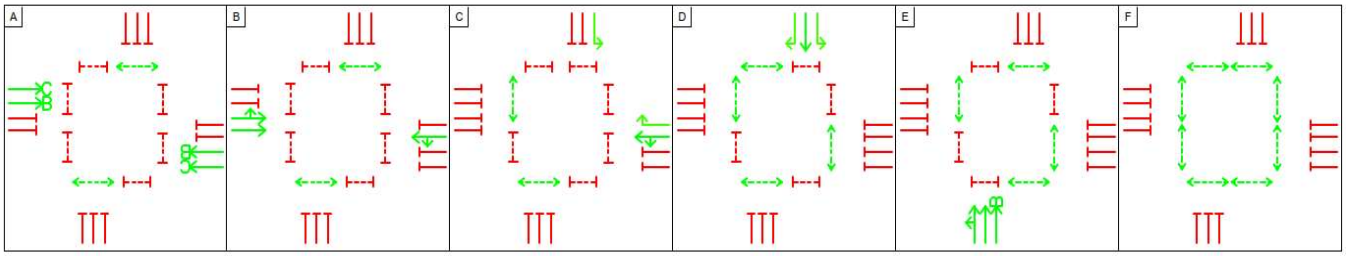
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,418	12%
Bus	21,893	75%
Walk	2,765	10%
Cycle	787	3%
Total	**28863**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	16
Junction	**Stillorgan Road /Airfield Park / RTE Junction**		

EXISTING

FINAL DESIGN

Summary:

Bus priority improved by taking bus lanes to stop line (junction Type 1).Cycle lanes have been improved and have been taken through the junction and protected around side roads. Pedestrian crossings have been improved and grade separated pedestrian bridge retained.

Pedestrian Infrastructure

Pedestrian crossing provision added to the northern arm to improve ease of movement for pedestrians. Pedestrian landing areas at crossings removed, to provide single signal controlled crossing of road carriageway and cycle track.

Cycle Infrastructure

Cycle lanes have been improved with protected approaches around junction. Updated arrangement provided to minimise cycle lane clash with footbridge crash barrier on southern arm. Cycle lanes redesigned to tie in to more recent entrance to RTE and Airfield approaches.

Bus Priority Infrastructure

Full bus priority provided. Bus and cycle movements can run together. There is slightly reduced capacity for general traffic.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	16

Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

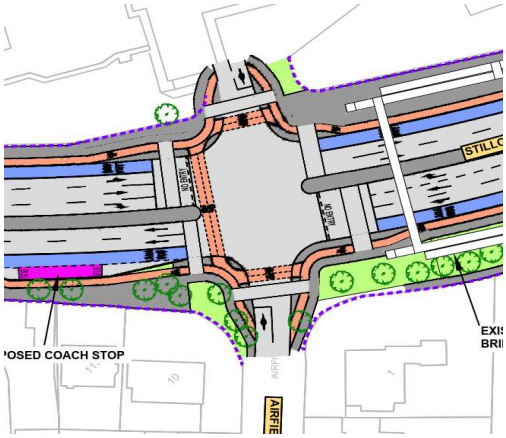
Existing

Concept Design Drawing

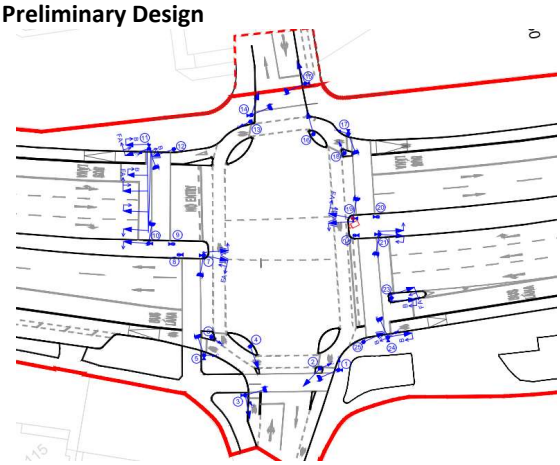
Emerging Preferred Route

Public Consultation 2

Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	16

2028 AM Peak Hours
Fixed Time LinSig Results

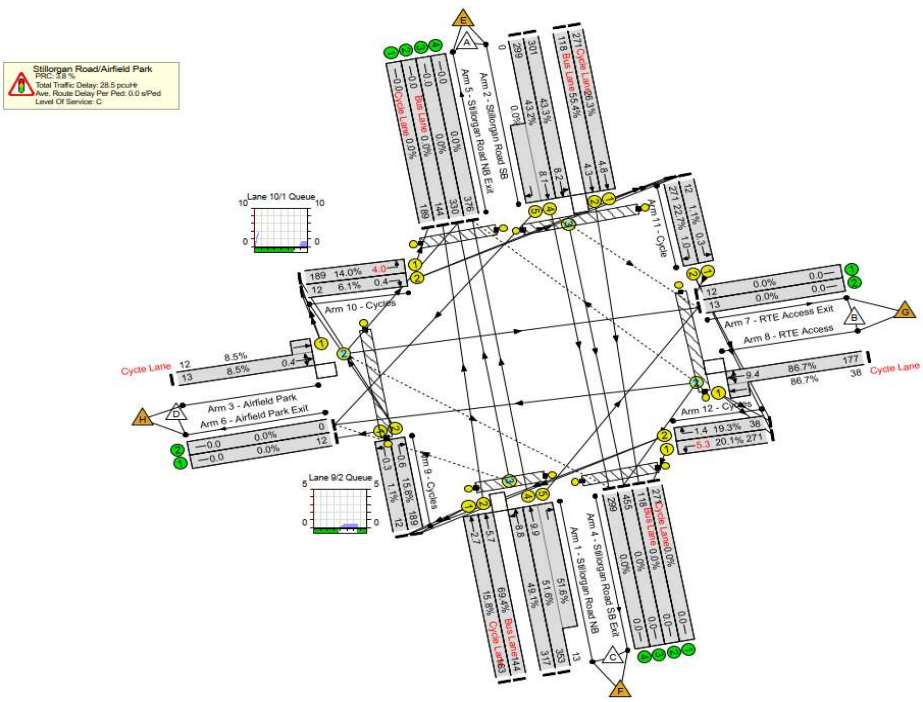
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 16.9%
PM: 3.8%

Junction Delay:
AM: 22.38 pcu/Hr
PM: 28.52 pcu/Hr

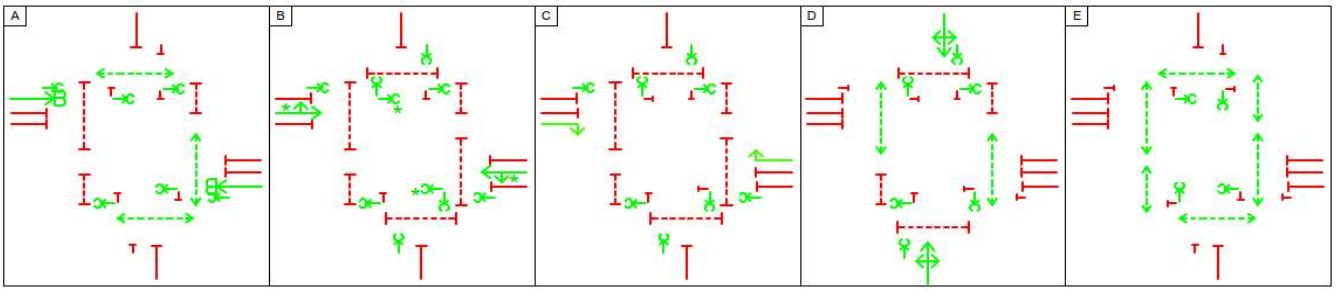
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3949	12%
Bus	22050	66%
Walk	6451	19%
Cycle	1213	4%
Total	**33663**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	17
Junction	**Stillorgan Road / Nutley Avenue Junction**		

EXISTING

FINAL DESIGN

Summary:

Junction Type 1 can be phyically accomodated in both directions to maximise bus priority. Cycle lanes have been improved and have been taken through the junction and protected around side roads. Slip road turn onto Nutley Lane removed and tie-in to Nutley Road has been updated to reflect CBC13 design only with future-proofing to allow for future connections to CBC14/15. Pedestrian crossings have been improved with wider refuge for pedestrians in the median.

Pedestrian Infrastructure

Pedestrian crossing provision added to the southern and western arms to meet all desired crossing oppoertunities. Slip road turn onto Nutley Lane removed to provide adidtional space for pedestrians.

Cycle Infrastructure

Cycle lanes have been improved with protected approaches around junction. Updated arrangement provided to improve Nutley Lane tie-in. Single signal controlled crossing of road carriagway and cycle track provided. Cycle track offset to make the seperate crossings of road and cycle track clear to pedestrians.

Bus Priority Infrastructure

Full bus priority provided. Northbound and southbound buses can run in operation with cycles.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	17

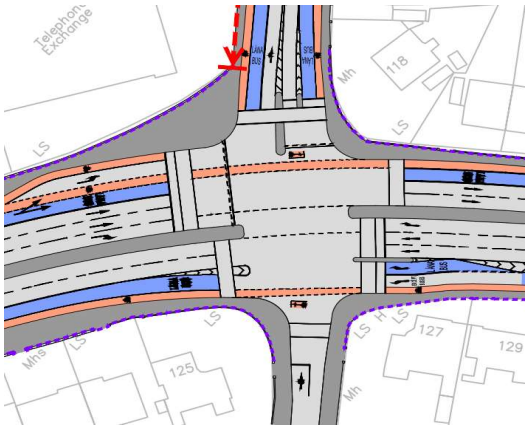
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

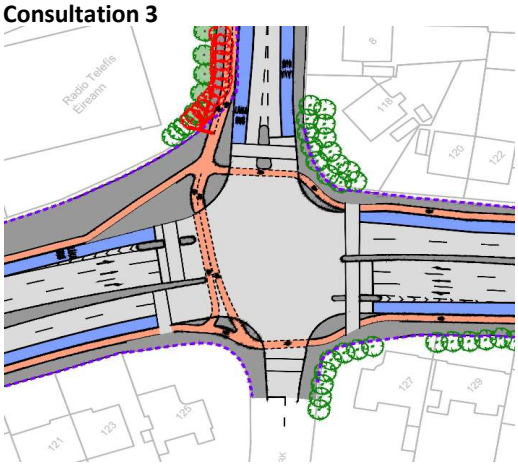
Concept Design Drawing

Emerging Preferred Route

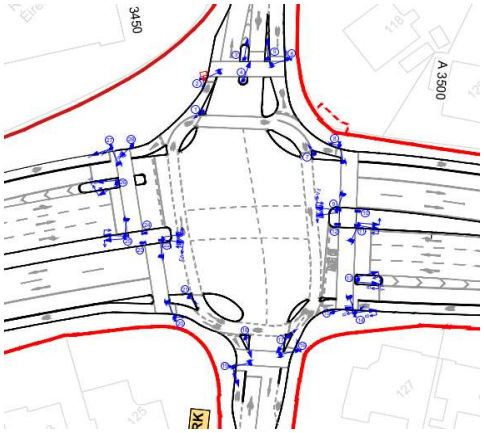


Public Consultation 2

Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	17

2028 AM Peak Hours
Fixed Time LinSig Results

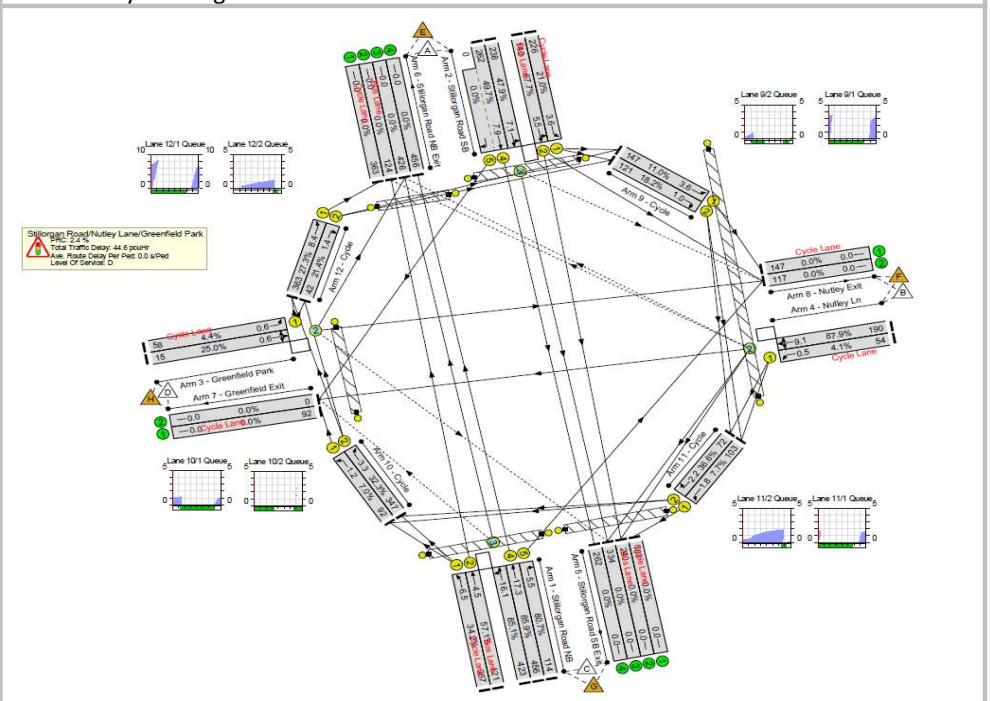
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 2.4%
PM: 2.4%

Junction Delay:
AM: 44.65 pcu/Hr
PM: 41.41 pcu/Hr

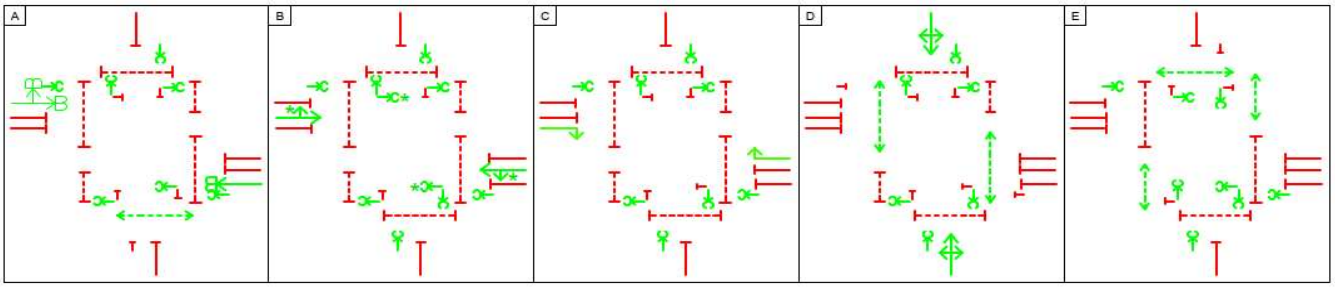
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,963	8%
Bus	29,978	81%
Walk	2,765	8%
Cycle	1,065	3%
Total	**36771**	**100%**

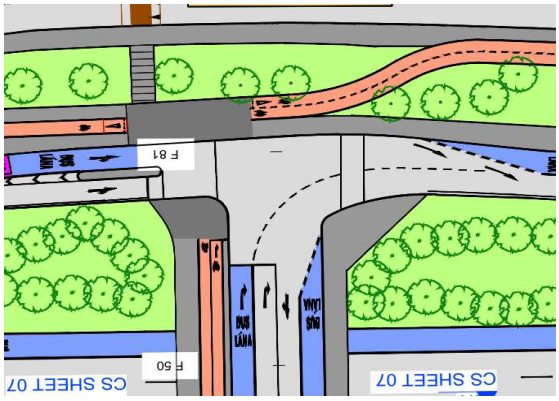
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	18
Junction	**UCD Grade Seperated Southbound Junction**		

EXISTING

FINAL DESIGN



Summary:

Full bus priority provided by taking bus lanes to stop line and separately signalling bus approach from N11 offslip onto bridge, to minimise delay approaching UCD. Toucan crossing provided and shared pedestrian / cycle pavement provided to allow connectivity between all routes.

Pedestrian Infrastructure
Pedestrian crossings implimented on both sides of slip road.

Cycle Infrastructure
Toucan crossings provided over slip road to provide conectivity for all cycle routes. Cycle lanes are provided through offset to main road.

Bus Priority Infrastructure
Full bus priority provided. Southbound buses from bridge and toucan crossing cycles and pedestrians operate at the same time.

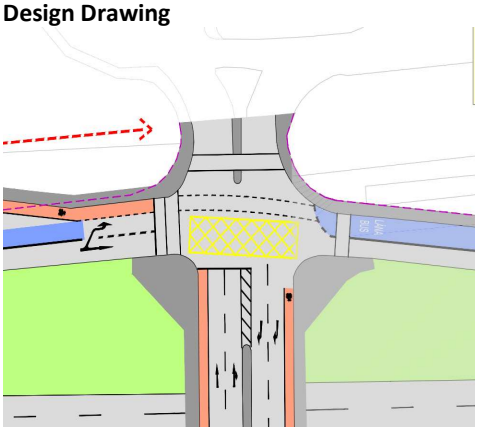
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	18

Design Evolution

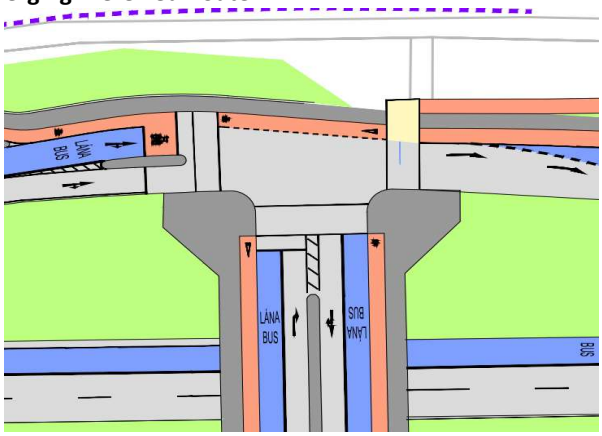
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

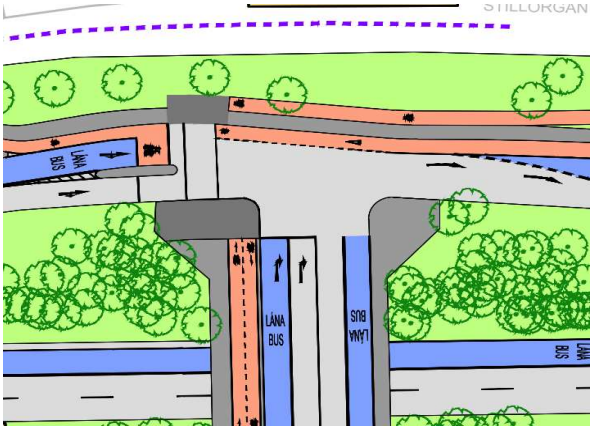
Concept Design Drawing



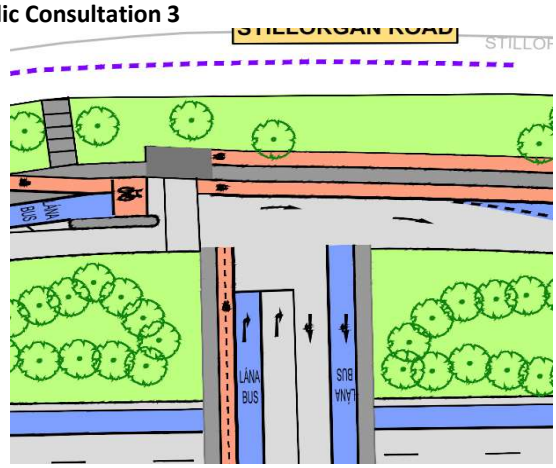
Emerging Preferred Route



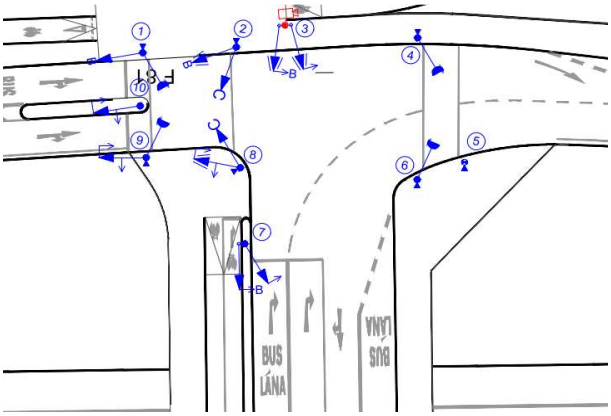
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	18

2028 AM Peak Hours
Fixed Time LinSig Results

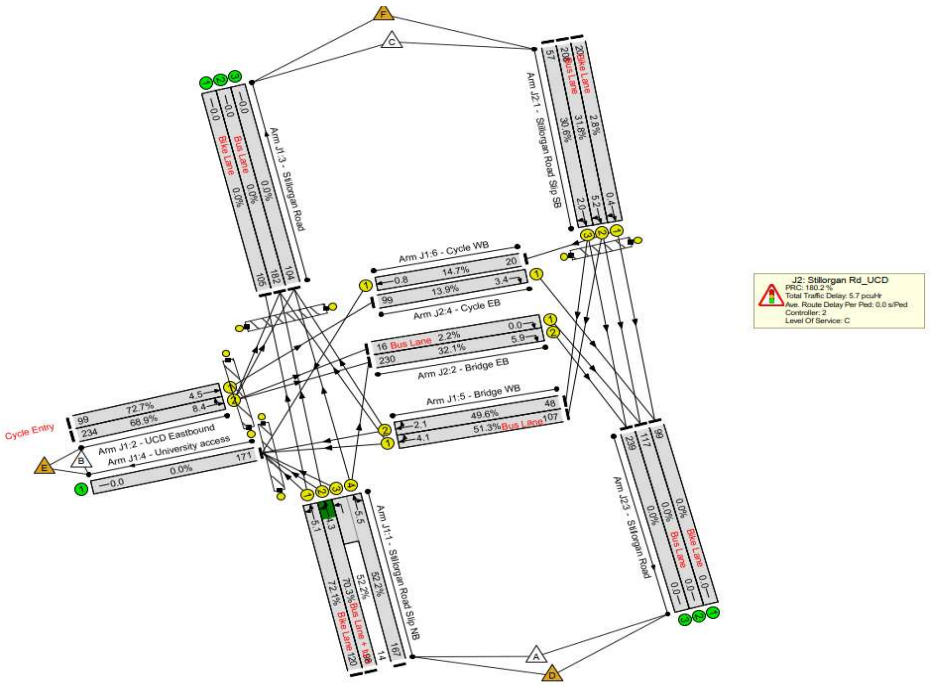
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 147.8%
PM: 180.2%

Junction Delay:
AM: 6.37 pcu/Hr
PM: 5.69 pcu/Hr

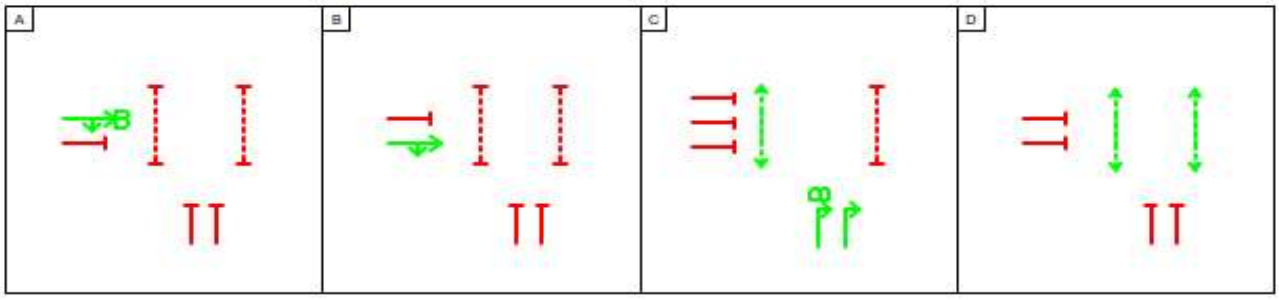
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,081	2%
Bus	65,783	91%
Walk	4,262	6%
Cycle	774	1%
Total	**71900**	**100%**

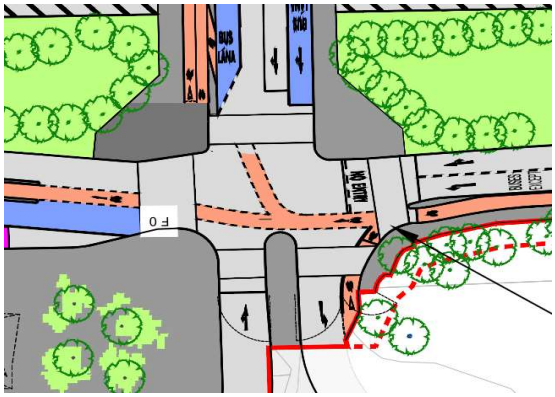
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	18
Junction	**UCD Grade Seperated Northbound Junction**		

EXISTING

FINAL DESIGN



Summary:

Complex movements to be accomodated. Junction requires to be closely linked to pedestrian crossings within UCD bus interchange to maximise bus progression on egress from interchange. Junction Type 3 provided on Northbound slip to minimise number of stages and simplify junction operation, in order to avoid any risk of traffic blocking on slip road. Cycle lanes provided through junction with protected approach into UCD.

Pedestrian Infrastructure

Long pedestrian crossing at UCD is considered preferable to the introduction of stagger. Crossing length is 16m, within the bounds of 19m set out in the Busconnects Design Guide.

Cycle Infrastructure

Cycle lanes taken through junction with updated lanes to reflect desired movements. Tie-in to two way cycle track over bridge provided from Northbound slip road.
Protected approach to UCD side road tie-in from Northbound slip road.

Bus Priority Infrastructure

Full bus priority has been removed from the junction to ensure that traffic exiting the interchange is not delayed to the point that it impacts the operation of the interchange.

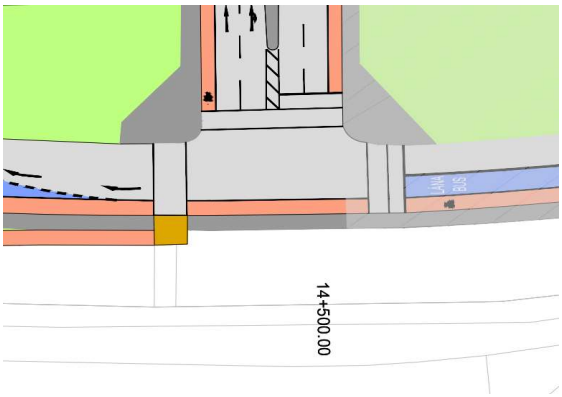
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	18

Design Evolution

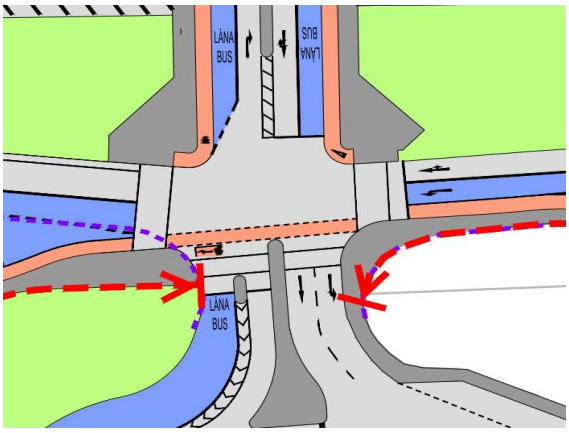
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

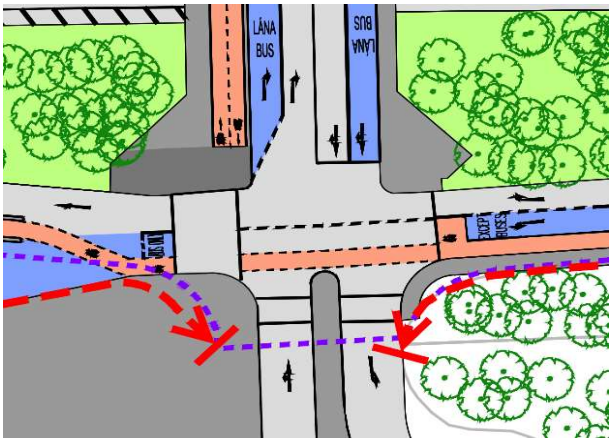
Concept Design Drawing



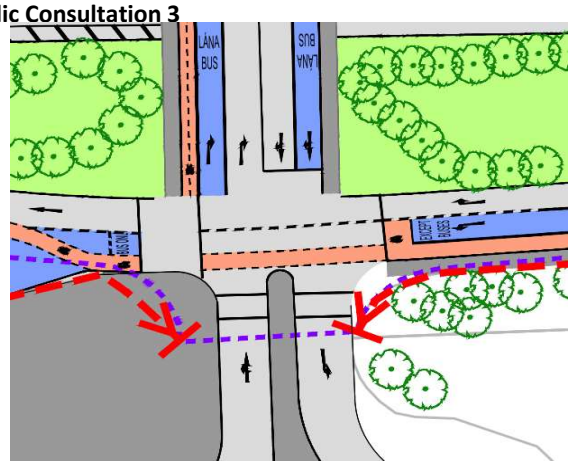
Emerging Preferred Route



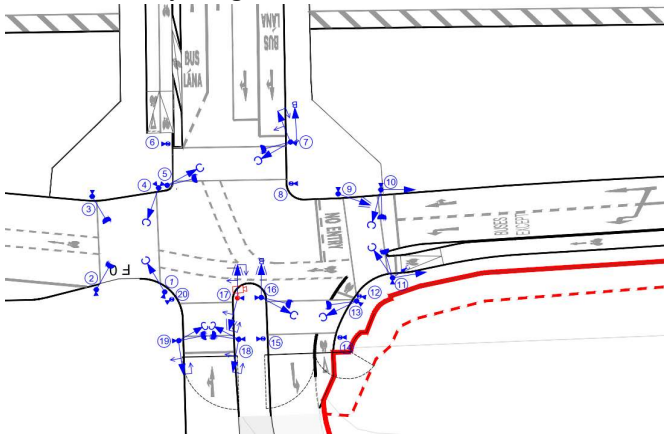
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	18

2028 AM Peak Hours
Fixed Time LinSig Results

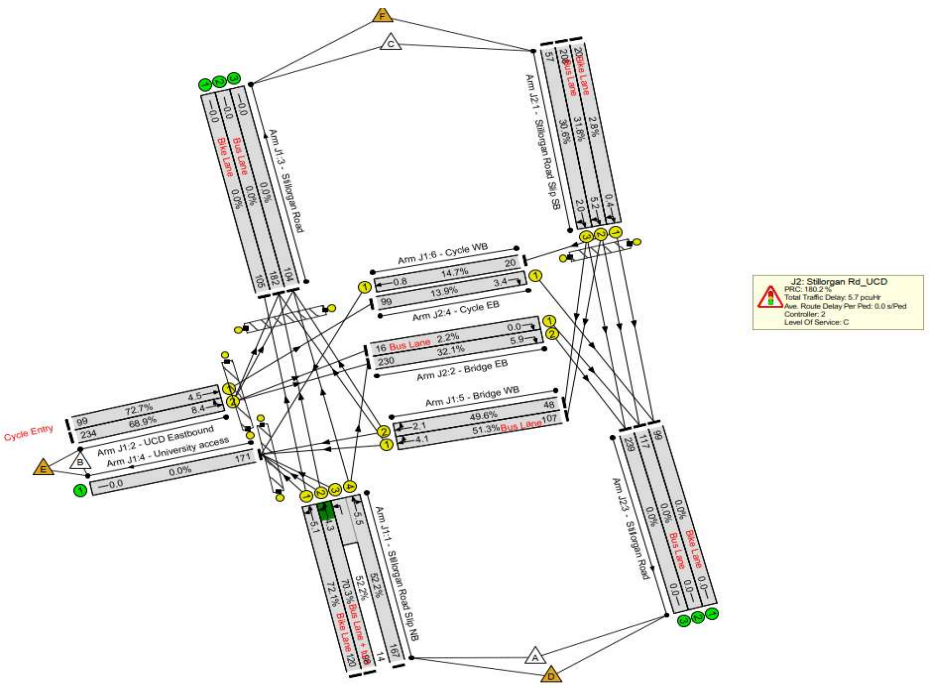
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 4.7%
PM: 23.8%

Junction Delay:
AM: 25.84 pcu/Hr
PM: 18.10 pcu/Hr

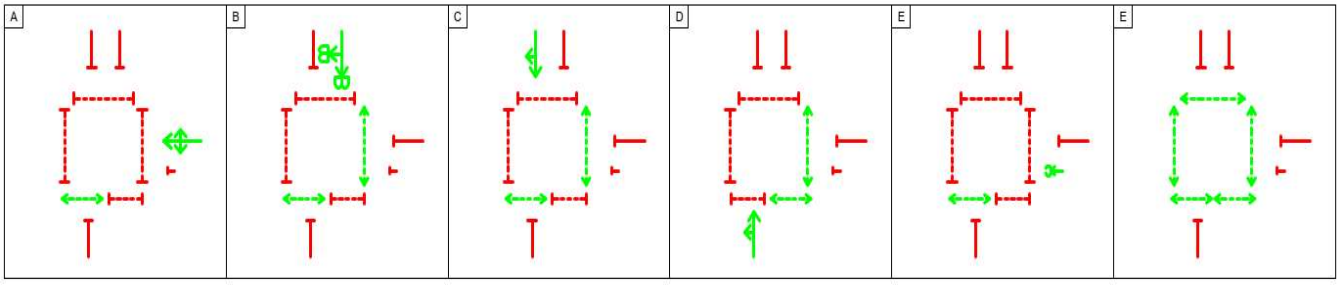
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,081	2%
Bus	65,783	91%
Walk	4,262	6%
Cycle	774	1%
Total	**71900**	**100%**

INDICATIVE METHOD OF CONTROL

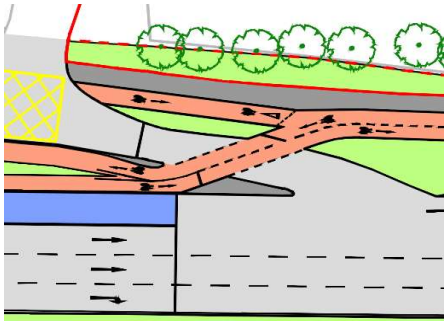


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	19

Junction **Stillorgan Road / Foster Avenue Junction**

EXISTING

FINAL DESIGN



Summary:
The R138 Stillorgan Road / Foster Avenue junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The junction is split into two nodes that are both operated under the same controller. The main three-arm junction that manages traffic between the R138 Stillorgan Road and Foster Avenue will be modified to include improved pedestrian, cycle and bus infrastructure. The two-arm section of the junction to the northwest manages traffic entering the outbound R138 carriageway from the slip road at Fosterbrook. This modification also improves provision for cycles.

Pedestrian Infrastructure
Pedestrian crossing provision improved by providing a crossing over the R138 Stillorgan Road southern arm.

The removal of the left turn slip crossing on Foster Avenue reduces the number of crossings and wait time for pedestrians.

Due to two way cycle crossing facilities at this location, a mini zebra crossing arrangement is provided to manage user interaction.

A dedicated wrap around pedestrian stage is provided for the main junction with 6 seconds of green time and an intergreen of 16 seconds.

Cycle Infrastructure
The Current arrangement has uni-directional cycle facilities on the R138 Stillorgan Road and no dedicated cycle provision on Foster Avenue.

The CBC 13 proposal has improved cycle connectivity at both Foster Avenue and at the crossing point over the slip road near Fosterbrook. Bi-directional cycle lanes are proposed along the eastern side of the carriageway and on the western side of the carriageway heading north from the junction, significantly improving cycle connectivity.

Left turn slip lanes have been removed to reduce cyclist conflict.

A fully protected junction layout is proposed with cyclists receiving dedicated signal indications.

Bus Priority Infrastructure
Junction Type 1 can be physically accomodated in the southbound direction. Junction Type 2 is proposed in northbound direction to manage the high left turn flow.

Bus lanes extend to the stop lines in both directions.

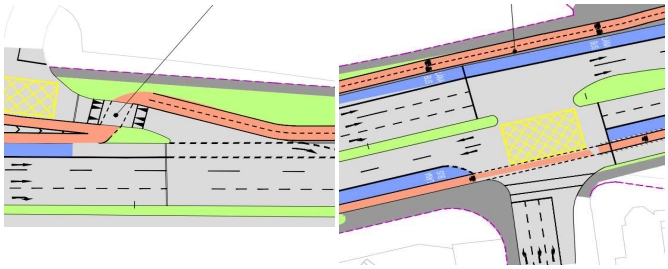
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	19

Design Evolution

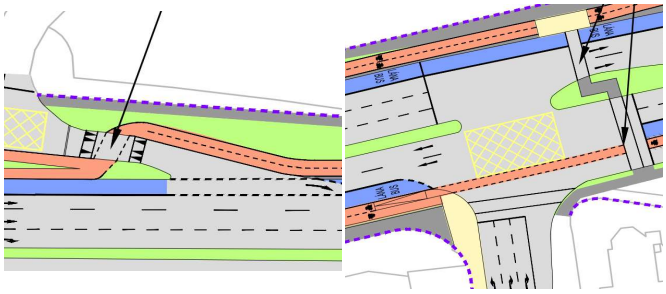
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

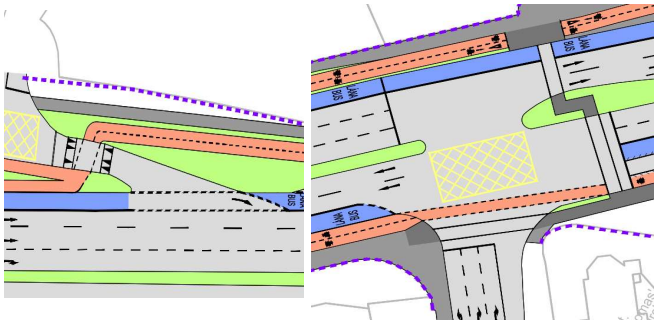
Concept Design Drawing



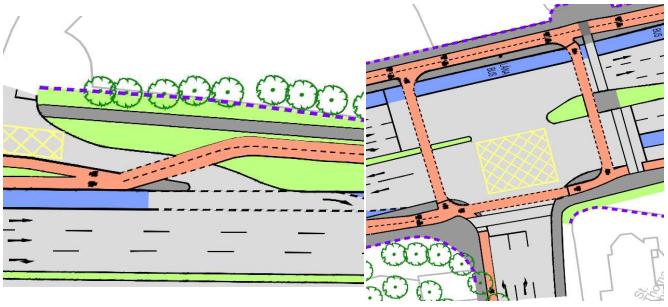
Emerging Preferred Route



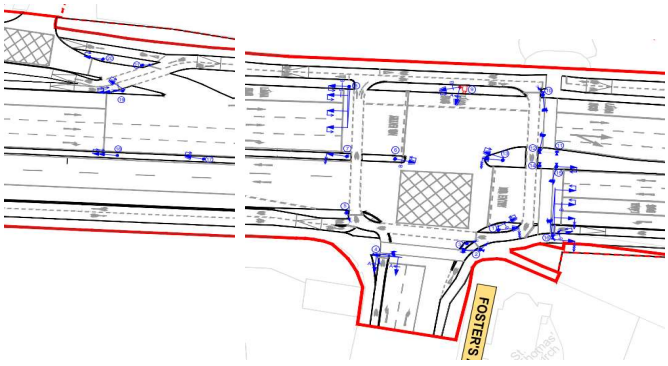
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	19

2028 AM Peak Hours
Fixed Time LinSig Results

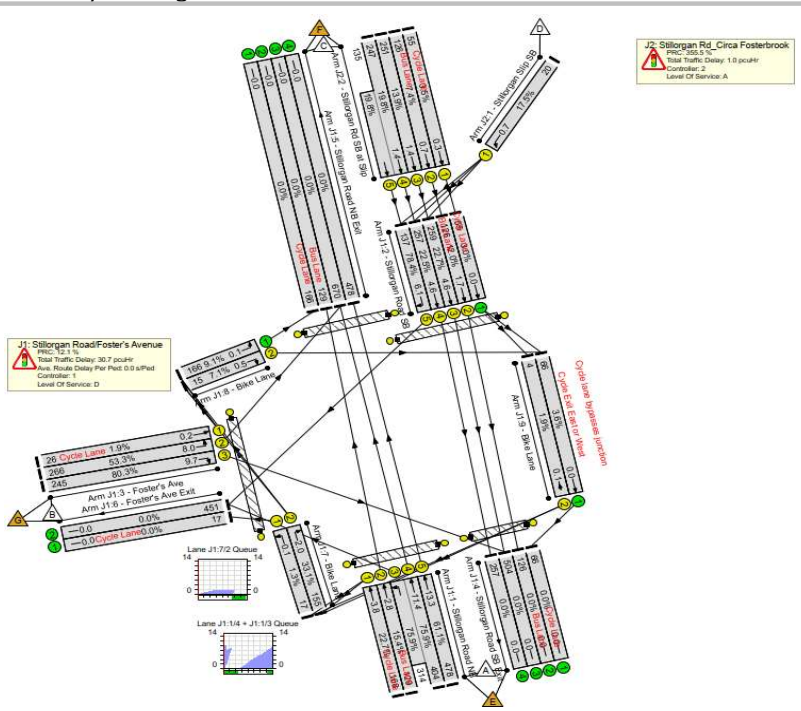
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 12.1%
PM: 19.8%

Junction Delay:
AM: 31.71 pcu/Hr
PM: 28.69 pcu/Hr

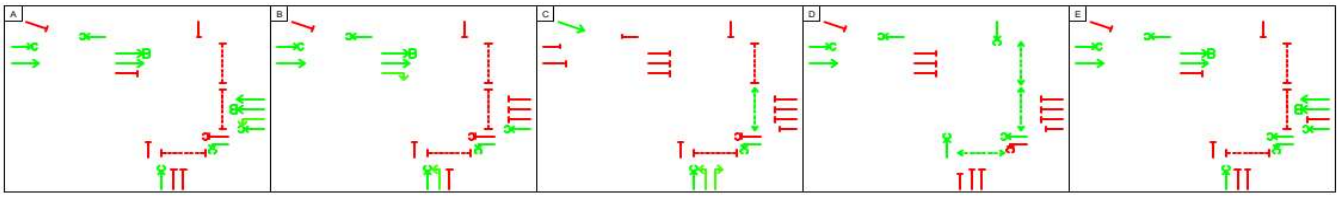
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	5,987	6%
Bus	96,705	91%
Walk	2,074	2%
Cycle	619	1%
Total	**105385**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	20
Junction	**Stillorgan Road / Belfield Park Junction**		

EXISTING

FINAL DESIGN

Summary:
The R138 Stillorgan Road / Belfield Park junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by providing a crossing over the R138 Stillorgan Road northern arm and over The Rise.

The removal of the left turn slip crossing on Merrion Grove also reduces the number of crossings and wait time for pedestrians.

The location of the pedestrian overbridge on the R138 Stillorgan Road southern arm and associated space constraints, limits the opportunity to provide an at-grade crossing at this location, the desire line is still served by the overbridge.

Due to two way cycle crossing facilities at the northeast corner, a mini zebra crossing arrangement is provided to manage user interaction. Shared space provided for pedestrians and cyclists tying in to Colaiste Eoghain / Iosagain.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 13 seconds.

Cycle Infrastructure
The Current arrangement has uni-directional cycle facilities on the R138 Stillorgan Road with no protection through the junction. Merrion Grove and the Rise both have advanced stop lines with short lead in lanes but this is the extent of the provision.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout providing access/egress for all routes and dedicated movements that can proceed without conflict.

Bi-directional cycle lanes are proposed along the eastern side of the carriageway providing a direct connection to Colaiste Eoghain / Iosagain via dedicated lanes on the north side of Merrion Grove and shared space on the south side.

Left turn slip lanes have been removed to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop line on the R138 Stillorgan Road southbound approach with a left turn slip lane provided on the nearside of the carriageway. This requires general motorists to navigate across the bus and cycle lane in order to turn left. The northbound approach has a curtailed bus lane extending for approximately 60m.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line and dedicated traffic signal displays provided to maximise bus priority.

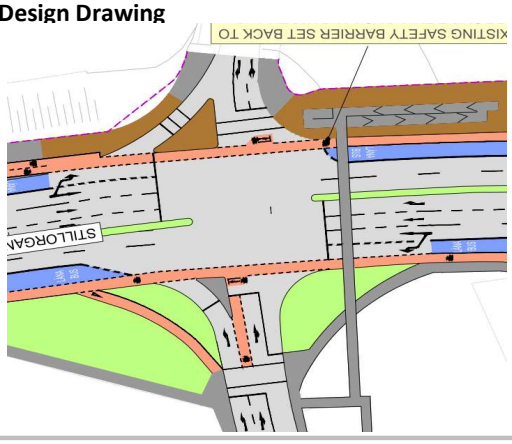
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	20

Design Evolution

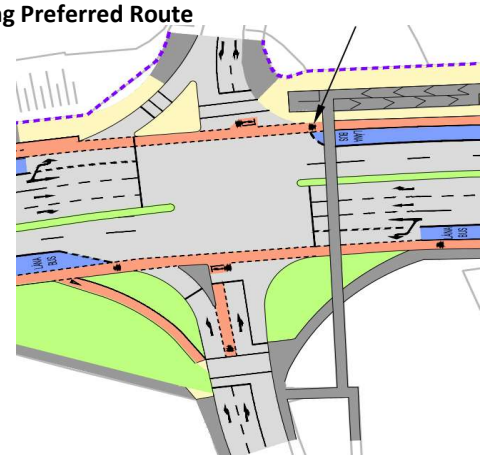
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

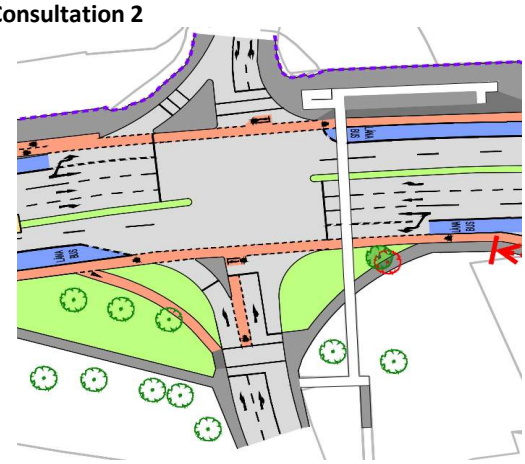
Concept Design Drawing



Emerging Preferred Route

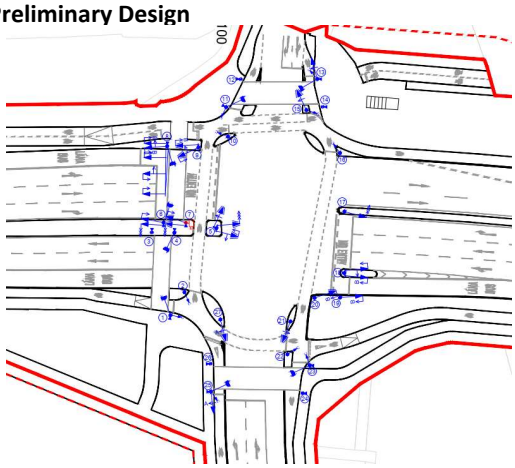


Public Consultation 2



Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	20

2028 AM Peak Hours
Fixed Time LinSig Results

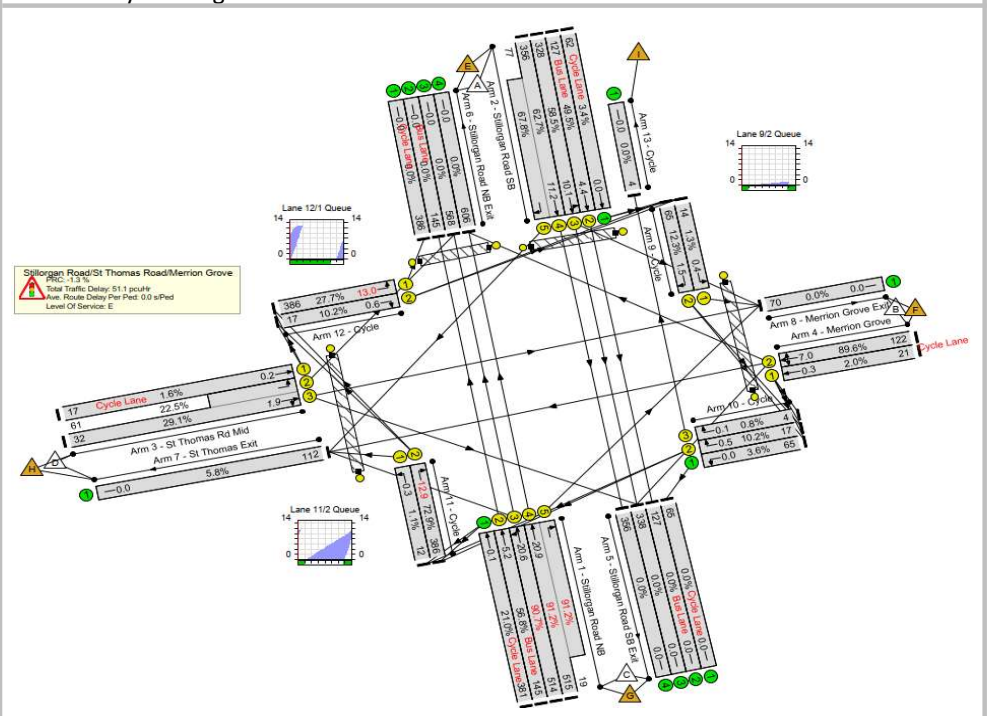
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: **-1.3%**
PM: 12.5%

Junction Delay:
AM: 51.19 pcu/Hr
PM: 44.05 pcu/Hr

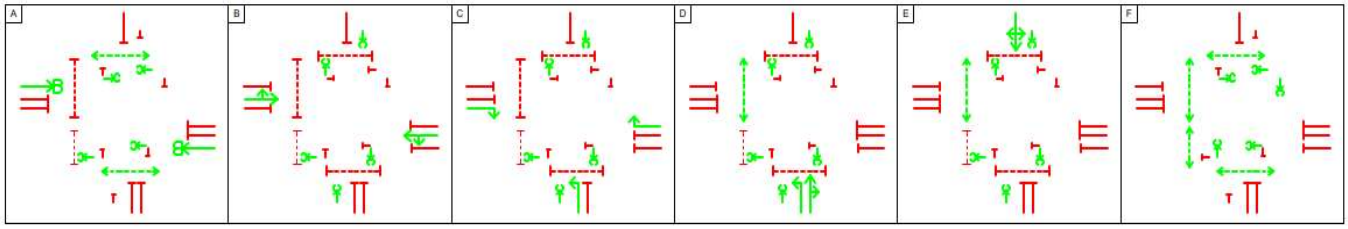
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,496	10%
Bus	26,880	77%
Walk	3,571	10%
Cycle	1,193	3%
Total	**35140**	**100%**

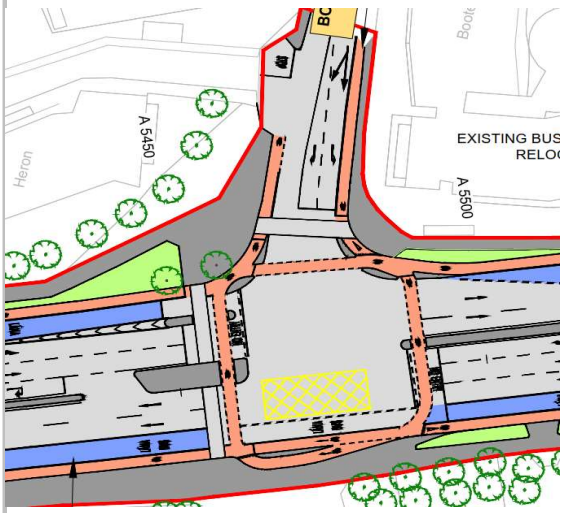
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	21
Junction	**Stillorgan Road / Booterstown Avenue Junction**		

EXISTING

FINAL DESIGN



Summary:
The R138 Stillorgan Road / Booterstown Avenue junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The three-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by providing a straight through split phased crossing over the R138 Stillorgan Road northern arm to better meet pedestrian desire lines, and the removal of the left turn slip crossings on Booterstown Avenue to reduce the number of crossings and wait time for pedestrians.

Pedestrians crossings are able to operate as "walk with traffic" with at least one opportunity for each crossing to run during a single cycle of the signal operation and allowance for some crossings to operate across multiple stages. This provides good opportunity for pedestrian progression.

Cycle Infrastructure
The Current arrangement has uni-directional cycle facilities on the R138 Stillorgan Road with no protection through the junction. Booterstown Avenue has no specific provision for cycles.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout providing access/egress for all routes and dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed to reduce cyclist conflict.

Dedicated northbound right turn jug handle cycle track provided to allow for significant cycle stacking and reduced risk of queuing impacting northbound movements.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on the R138 Stillorgan Road approaches but the southbound approach has a left turn slip lane provided on the nearside of the carriageway. This requires general motorists to navigate across the bus and cycle lane in order to turn left.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line and dedicated traffic signal displays provided to maximise bus priority.

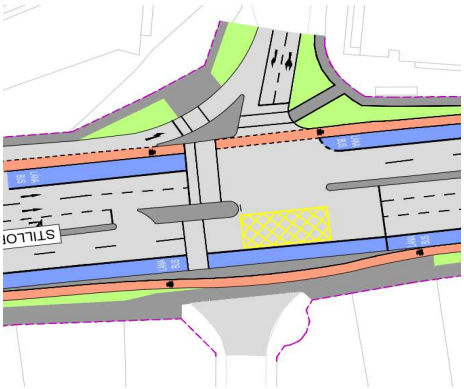
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	21

Design Evolution

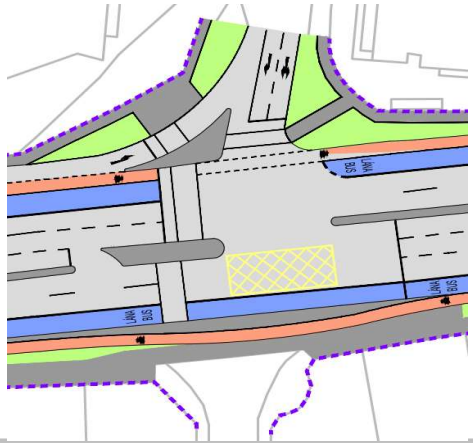
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

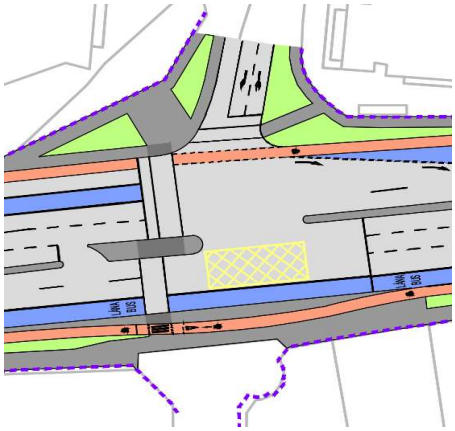
Concept Design Drawing



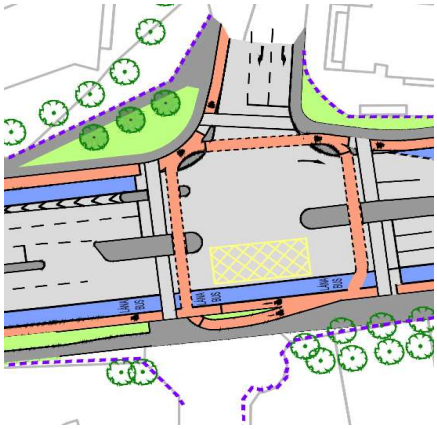
Emerging Preferred Route



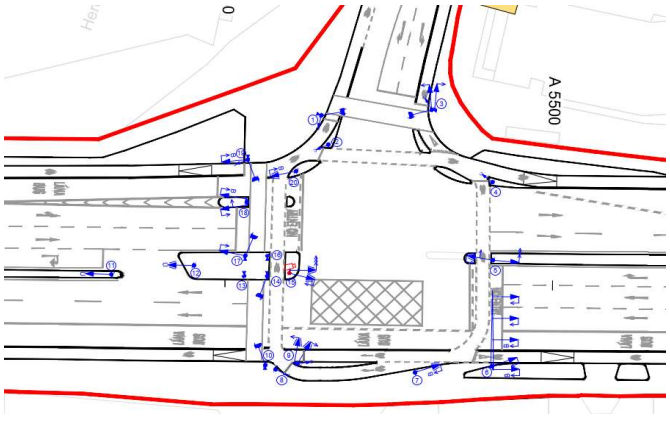
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	21

2028 AM Peak Hours
Fixed Time LinSig Results

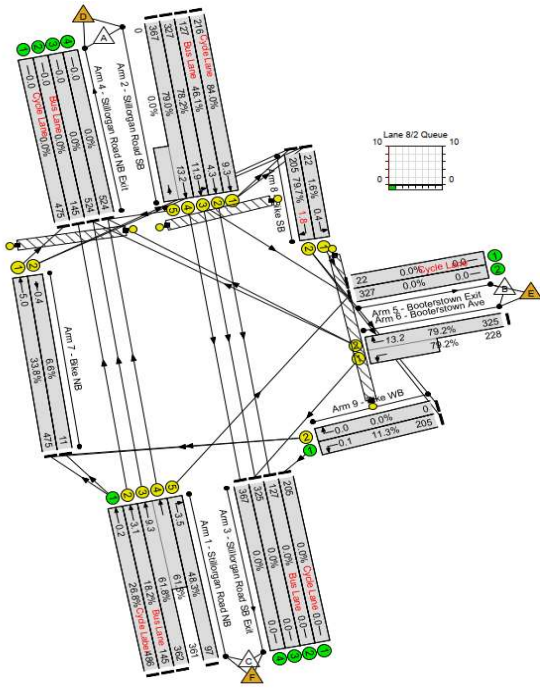
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 7.1%
PM: 6.6%

Junction Delay:
AM: 38.16 pcu/Hr
PM: 35.31 pcu/Hr

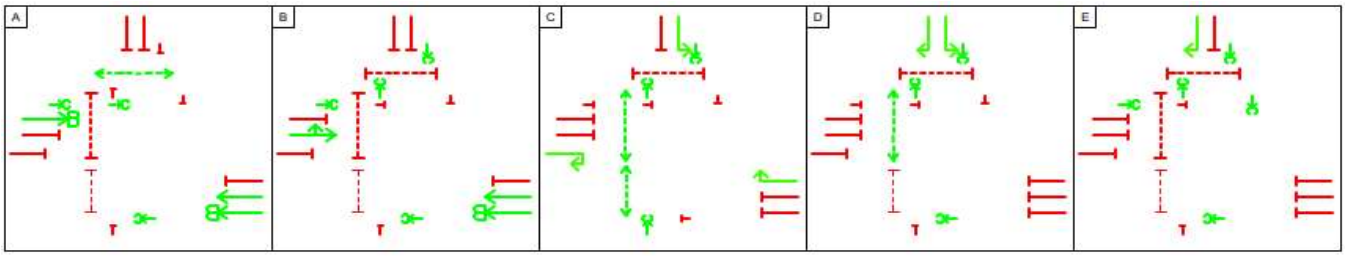
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,542	5%
Bus	68,040	91%
Walk	1,728	2%
Cycle	1,646	2%
Total	**74956**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	22

Junction **N11 Stillorgan Road / Mount Merrion Avenue Junction**

EXISTING

FINAL DESIGN

Summary:
The N11 Stillorgan Road / Mount Merrion Avenue junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The three-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by providing a straight through split phased crossing over the N11 Stillorgan Road northern arm to better meet pedestrian desire lines, and the removal of the left turn slip crossing on Mount Merrion Avenue to reduce the number of crossings and wait time for pedestrians.

Pedestrians crossings are able to operate as "walk with traffic" with at least one opportunity for each crossing to run during a single cycle of the signal operation. This provides good opportunity for pedestrian progression.

Cycle Infrastructure
The Current arrangement has uni-directional cycle facilities on the N11 Stillorgan Road with no protection through the junction. Mount Merrion Avenue has a dedicated offline cycle track on the approach to the junction that connects to shared space at the junction.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout providing access/egress for all routes and dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on the Stillorgan Road approaches but the southbound approach has a left turn slip lane provided on the nearside of the carriageway. This requires general motorists to navigate across the bus and cycle lane in order to turn left.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line and dedicated traffic signal displays provided to maximise bus priority.

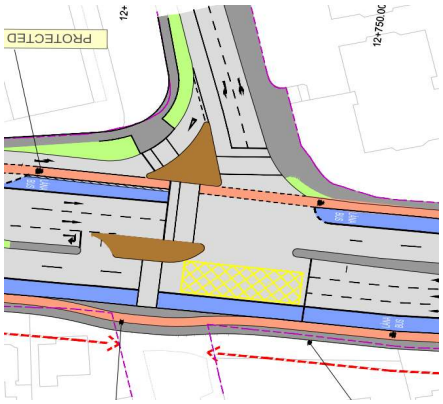
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	22

Design Evolution

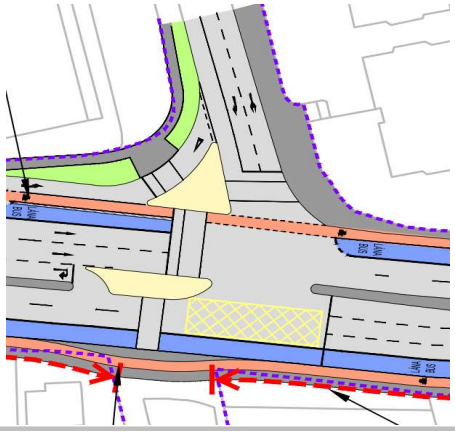
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

Concept Design Drawing



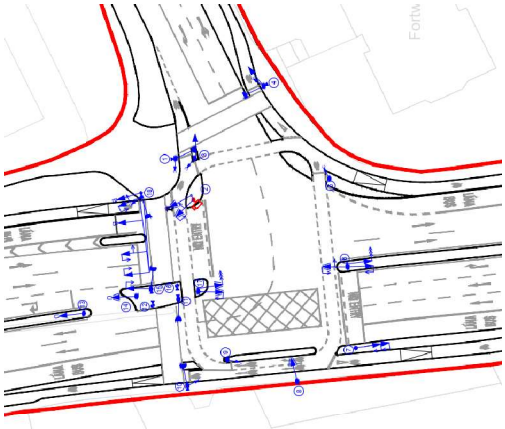
Emerging Preferred Route



Public Consultation 2

Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	22

2028 AM Peak Hours
Fixed Time LinSig Results

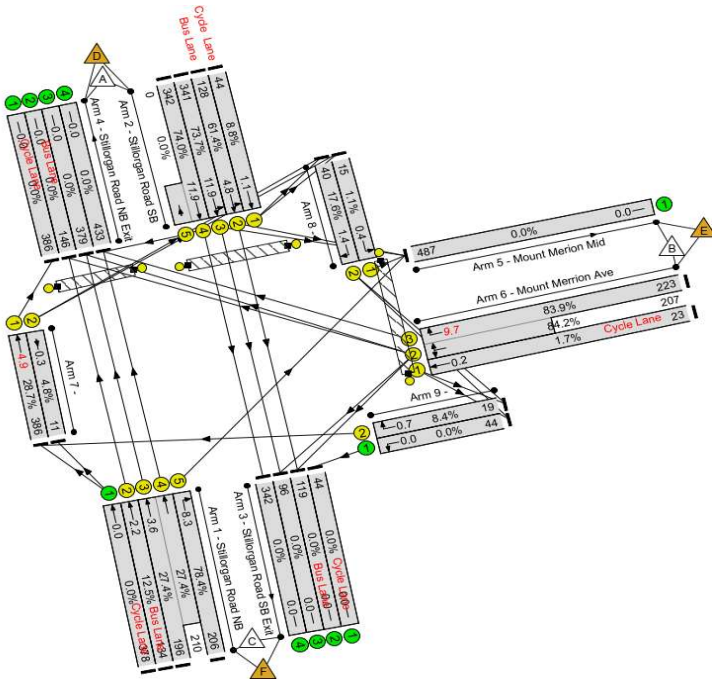
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 6.9%
PM: 4.8%

Junction Delay:
AM: 31.05 pcu/Hr
PM: 38.98 pcu/Hr

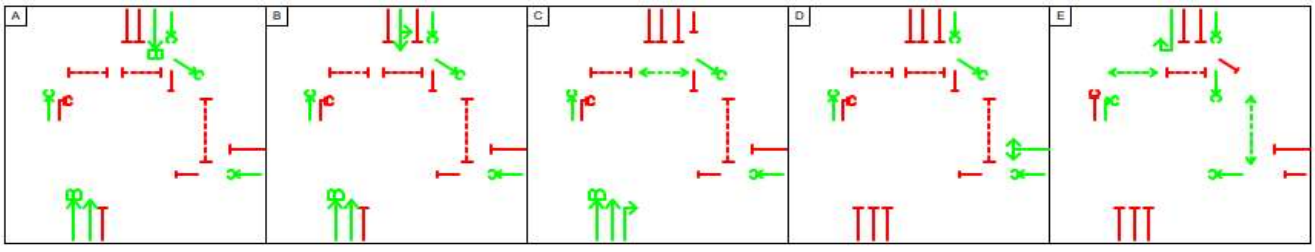
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,816	5%
Bus	65,415	91%
Walk	1,382	2%
Cycle	1,113	2%
Total	**71726**	**100%**

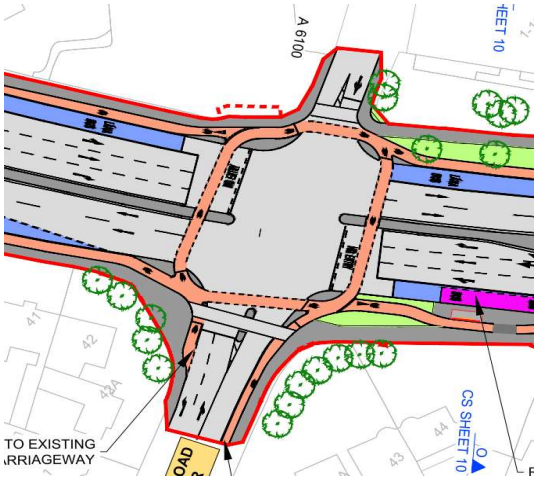
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	23
Junction	**N11 Stillorgan Road / Treesdale Junction**		

EXISTING

FINAL DESIGN



Summary:
The N11 Stillorgan Road / Treesdale junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved on both Trees Road Lower and Treesdale. The existing offset crossing over the N11, a short distance to the south of the junction, has been retained.

The left turn slip crossings on Trees Road Lower have been removed to create a straight through crossing. This reduces the number of crossings pedestrians need to navigate to cross the side road and thus reduces the overall wait time for pedestrians.

Pedestrians crossings are able to operate as "walk with traffic" with at least one opportunity for each crossing to run during a single cycle of the signal operation. This provides good opportunity for pedestrian progression.

Cycle Infrastructure
The Current arrangement has uni-directional cycle facilities on the N11 Stillorgan Road with no protection through the junction. Both Trees Road Lower and Treesdale have no specific provision for cycles.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a protected layout provided on the N11 Stillorgan Road approaches and on Trees Road Lower. No specific provision has been added to Treesdale due to it's quiet street feel. Notwithstanding, dedicated cycle movements have been provided all around, including an option for right turning cycles from Treesdale, so that cycle movements can proceed without conflict.

Left turn slip lanes have been removed from Trees Road Lower to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on the N11 Stillorgan Road approaches but allow left turning traffic to enter at approximately 60m from the stop lines. The northbound approach also has a left turn slip lane provided on the nearside of the carriageway requiring general motorists to navigate across the bus and cycle lane in order to turn left.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line unhindered and dedicated traffic signal displays provided to maximise bus priority.

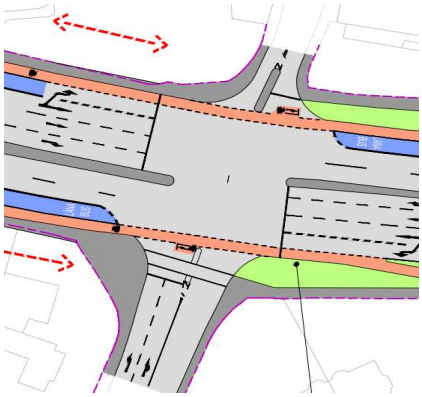
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	23

Design Evolution

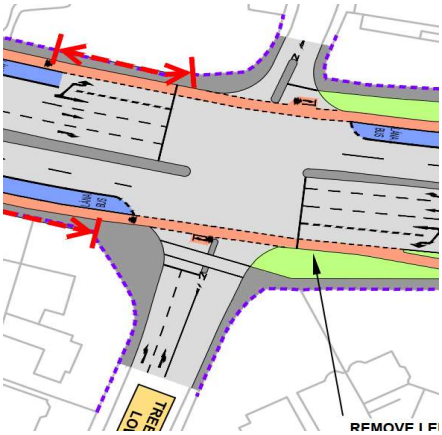
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

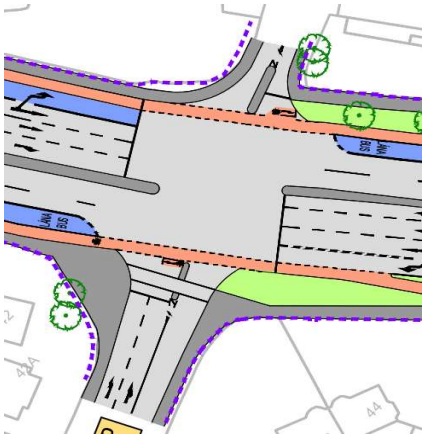
Concept Design Drawing



Emerging Preferred Route

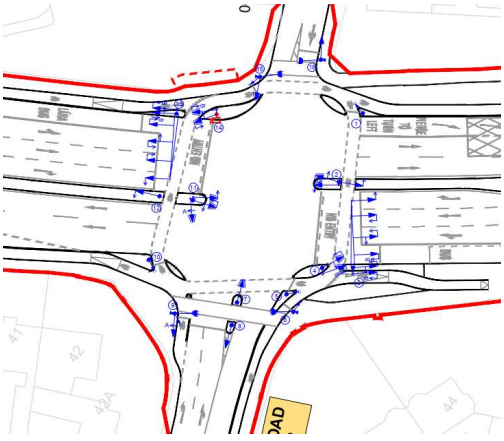


Public Consultation 2



Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	23

2028 AM Peak Hours
Fixed Time LinSig Results

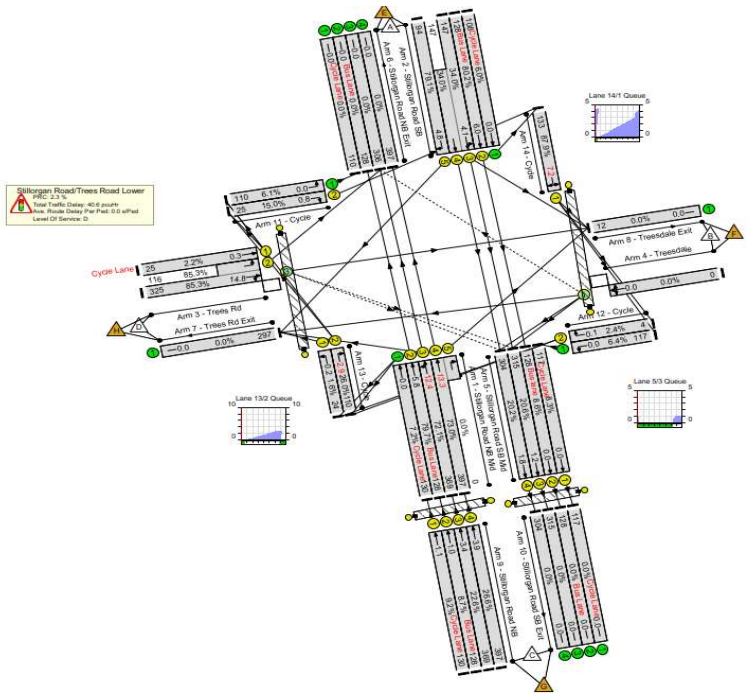
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 5.7%
PM: 2.3%

Junction Delay:
AM: 39.81 pcu/Hr
PM: 40.60 pcu/Hr

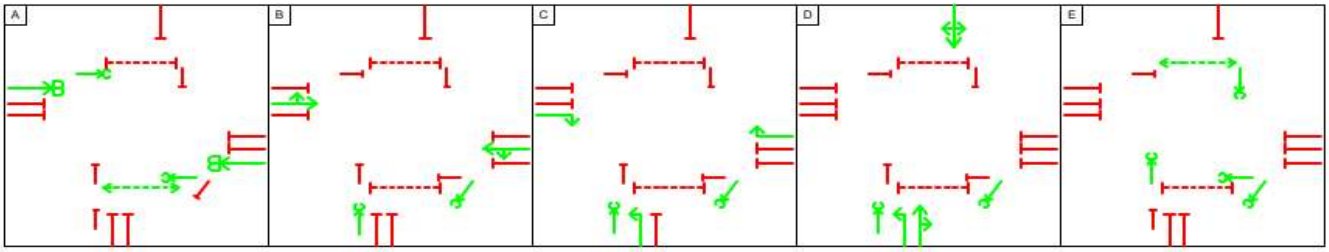
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,487	12%
Bus	21,840	75%
Walk	2,765	9%
Cycle	1,040	4%
Total	**29132**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	24

Junction **N11 Stillorgan Road / Priory Drive Junction**

EXISTING

FINAL DESIGN

Summary:
The N11 Stillorgan Road / Priory Drive junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by providing a new split phased crossing over the N11 southern arm and over Old Dublin Road. The left turn slip crossings on Priory Drive have been removed to create a straight through crossing reducing the number of crossings and wait time for pedestrians.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 12 seconds. Some crossings can also function as "walk with traffic" allowing operation across multiple stages. This increases the opportunities for pedestrian to progress through the junction and reduces pedestrian delay.

Cycle Infrastructure
The Current arrangement has uni-directional cycle facilities on the N11 Stillorgan Road with no protection through the junction. Both Priory Drive and Old Dublin Road have no specific cycle provision.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout providing access/egress for all routes and dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed from both side roads to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on both of the N11 Stillorgan Road approaches with left turn slip lanes provided on the nearside of the carriageway. This requires general motorists to navigate across the bus and cycle lane in order to turn left.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line and dedicated traffic signal displays provided to maximise bus priority.

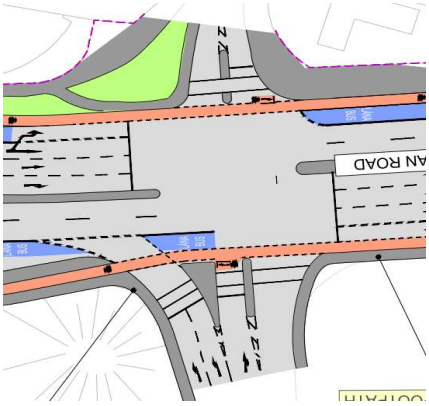
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	24

Design Evolution

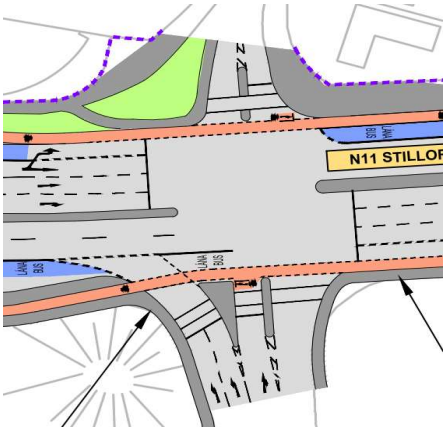
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

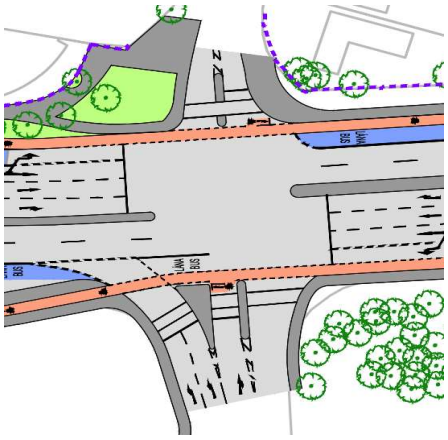
Concept Design Drawing



Emerging Preferred Route

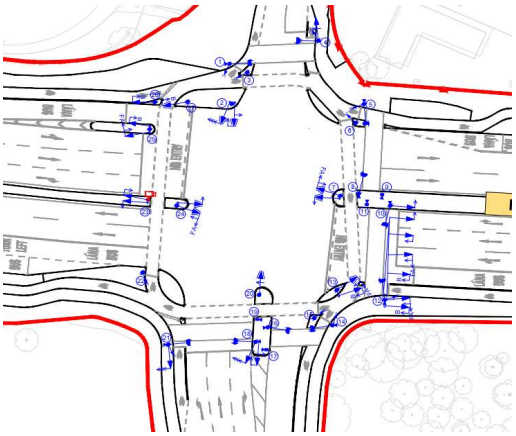


Public Consultation 2



Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	24

2028 AM Peak Hours
Fixed Time LinSig Results

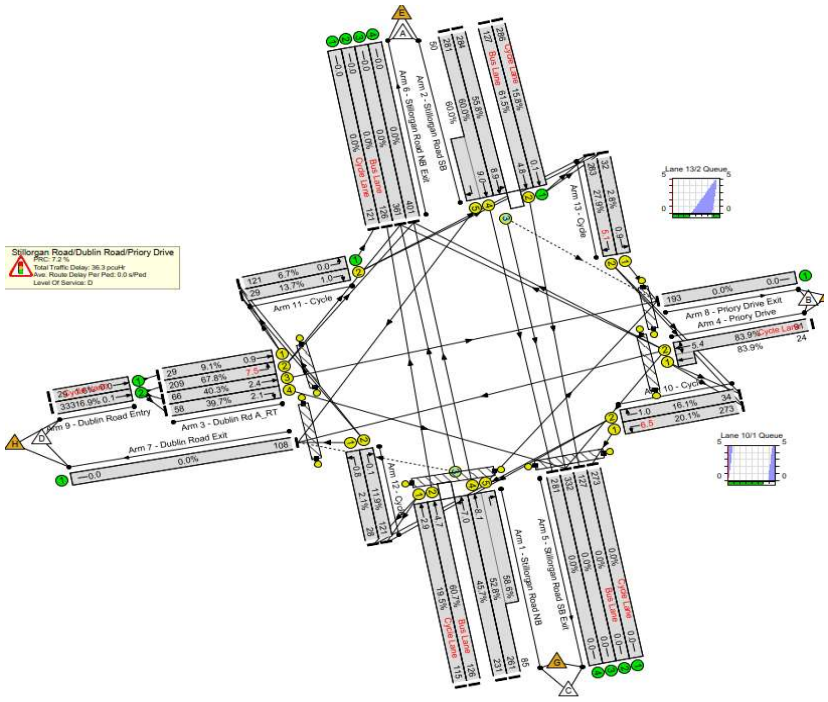
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 4.8%
PM: 7.2%

Junction Delay:
AM: 37.38 pcu/Hr
PM: 36.79 pcu/Hr

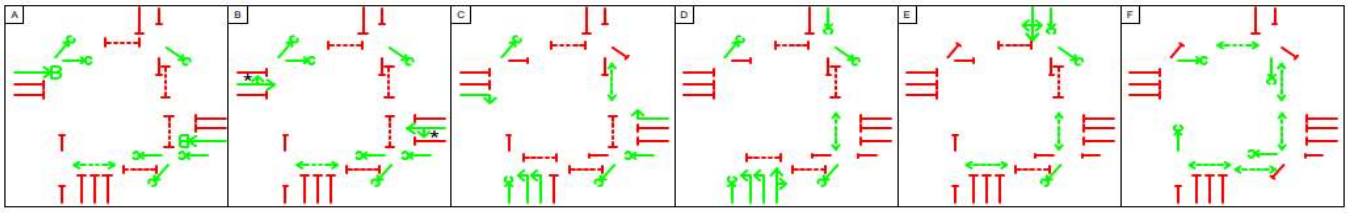
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,361	12%
Bus	21,683	77%
Walk	2,074	7%
Cycle	1,130	4%
Total	**28248**	**100%**

INDICATIVE METHOD OF CONTROL



* DENOTES FLASHING AMBER

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	25

Junction **N11 Stillorgan Road / Lower Kilmacud Road Junction**

EXISTING

FINAL DESIGN

Summary:
The N11 Stillorgan Road / Lower Kilmacud Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by removing left turn slip crossings on Lower Kilmacud Road and Stillorgan Park Road, effectively reducing the number of crossings over each arm of the junction from four to two. This reduces overall delay and wait time for pedestrians.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 15 seconds. Some crossings can also function as "walk with traffic" allowing operation across multiple stages. This increases the opportunities for pedestrian to progress through the junction and further reduces pedestrian delay.

Cycle Infrastructure
The current arrangement has a uni-directional cycle lane on the N11 Stillorgan Road southbound. The N11 northbound route has no specific cycle facilities on the approach but does have some space allocated through the junction and upon exit from the junction heading northbound. Stillorgan Park Road has dedicated entry and exit cycle lanes connected to the junction via shared space. Lower Kilmacud Road has no specific cycle provision.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout providing access/egress for all routes and dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed from both side roads to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on the N11 Stillorgan Road approaches but allow left turning traffic to enter at approximately 60m from the stop line southbound and 100m northbound. Both approaches also have short left turn slip lanes provided on the nearside of the carriageway requiring general motorists to navigate across the bus and cycle lane in order to turn left.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line unhindered and dedicated traffic signal displays provided to maximise bus priority.

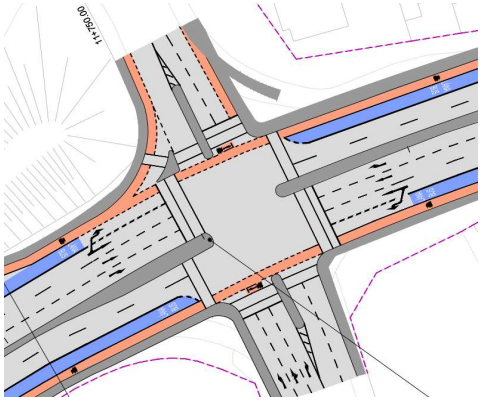
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	25

Design Evolution

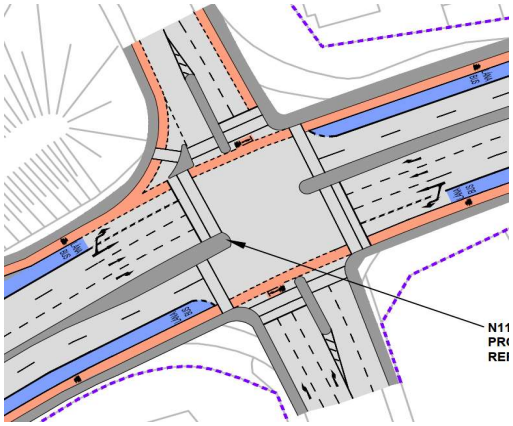
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

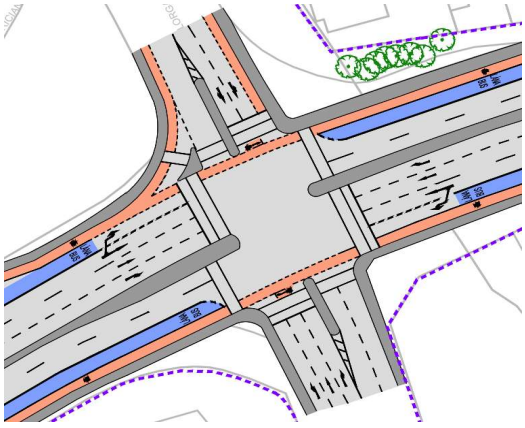
Concept Design Drawing



Emerging Preferred Route

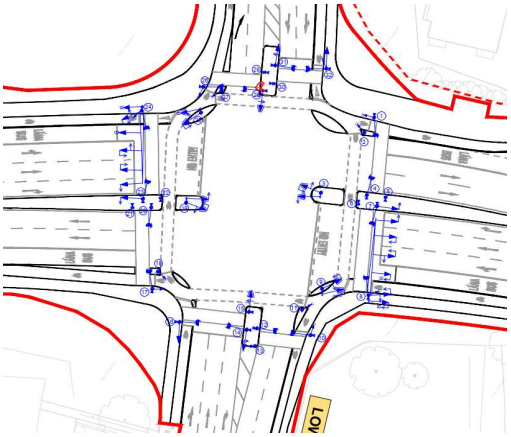


Public Consultation 2



Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	25

2028 AM Peak Hours
Fixed Time LinSig Results

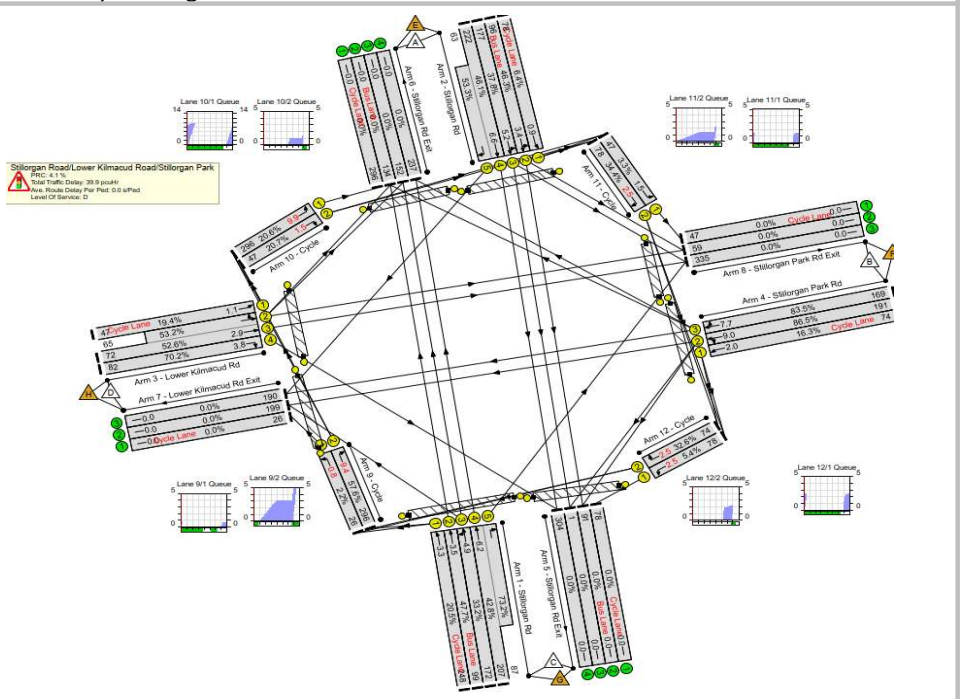
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 4.6%
PM: 4.1%

Junction Delay:
AM: 39.00 pcu/Hr
PM: 40.57 pcu/Hr

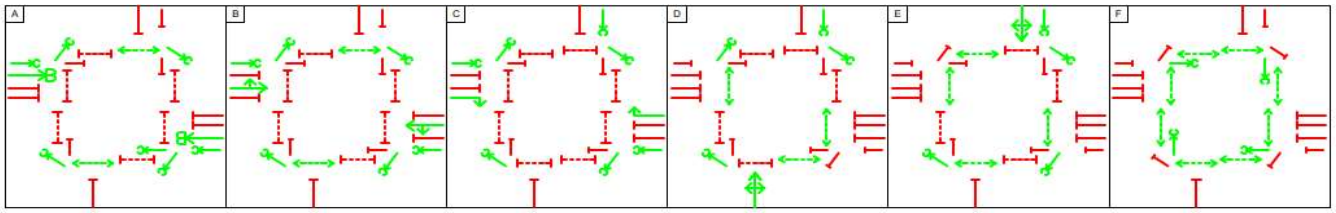
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,012	11%
Bus	21,788	76%
Walk	2,765	10%
Cycle	769	3%
Total	**28334**	**100%**

INDICATIVE METHOD OF CONTROL

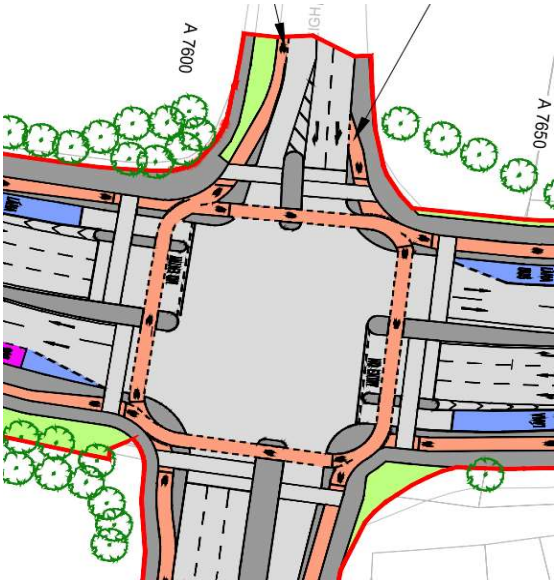


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	26

Junction **N11 Stillorgan Road / Farmleigh Avenue Junction**

EXISTING

FINAL DESIGN



Summary:

The N11 Stillorgan Road / Farmleigh Avenue junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure

Pedestrian crossing provision is improved by providing a new crossing over the N11 Stillorgan Road northern arm creating controlled crossing opportunities over all arms and improving desire lines. Left turn slip crossings on Farmleigh Avenue and Brewery Road have been removed, effectively reducing the number of crossings over each arm of the junction from four to two. This reduces overall delay and wait time for pedestrians.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 11 seconds. Some crossings can also function as "walk with traffic" allowing operation across multiple stages. This increases the opportunities for pedestrian to progress through the junction and further reduces pedestrian delay.

Cycle Infrastructure

The current arrangement has a uni-directional cycle lanes on the N11 Stillorgan Road. Brewery Road has a dedicated left turn lane for cycles and an ASL with lead in strip to accommodate ahead and right turn movements. Similarly Farmleigh also has the on-carriageway ASL and associated lead in strip for cycle ahead and turning movements.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout providing access/egress for all routes and dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed from both side roads to reduce cyclist conflict.

Bus Priority Infrastructure

The current arrangement has bus lanes extending to the stop lines on the N11 Stillorgan Road approaches but allow left turning traffic to enter at approximately 60m from the stop line southbound and 80m northbound. Both approaches also have short left turn slip lanes provided on the nearside of the carriageway requiring general motorists to navigate across the bus and cycle lane in order to turn left.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line unhindered and dedicated traffic signal displays provided to maximise bus priority.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	26

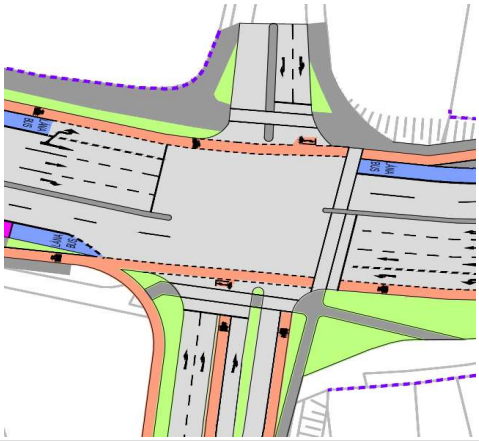
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

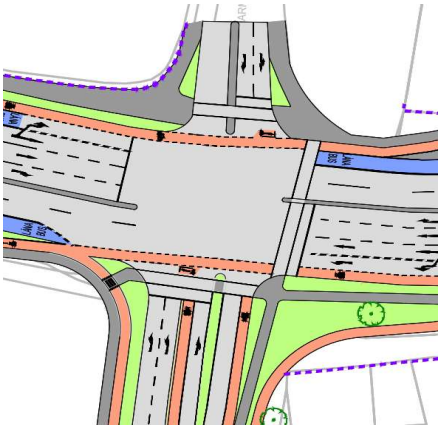
Existing

Concept Design Drawing

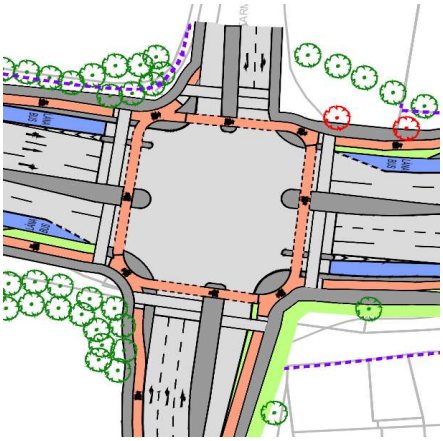
Emerging Preferred Route



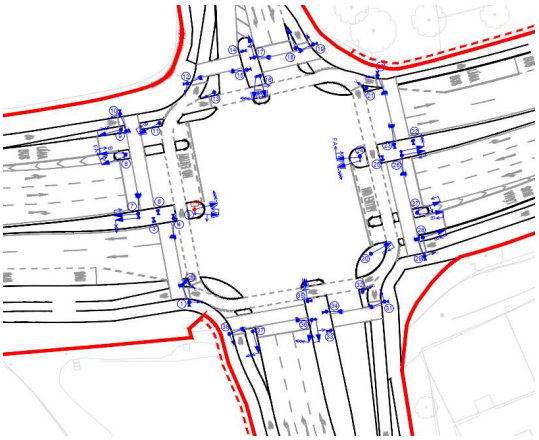
Public Consultation 2



Public Consultation 3



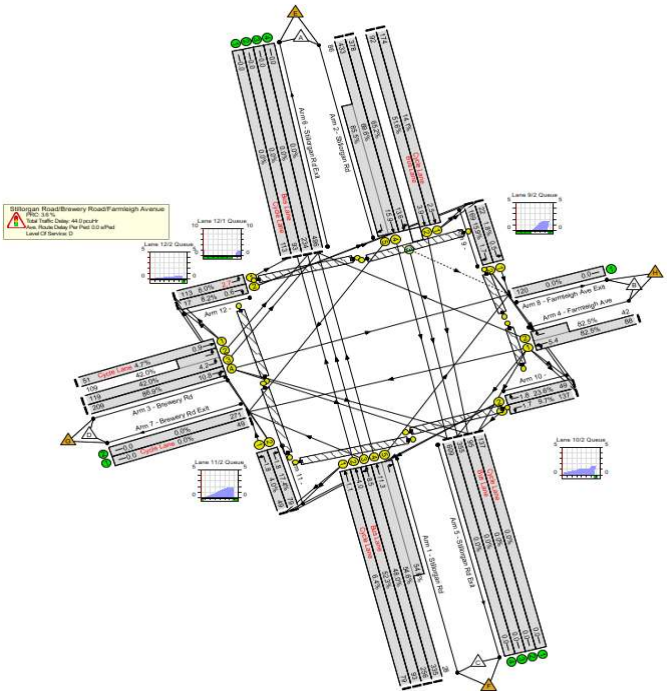
Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	26

2028 AM Peak Hours
Fixed Time LinSig Results

Network Layout Diagram



2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

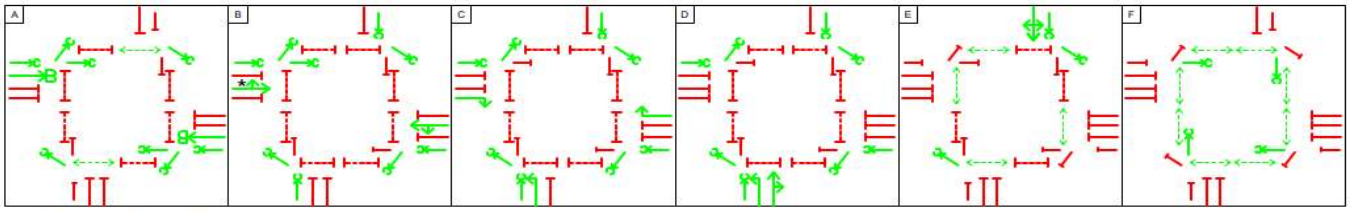
Junction PRC:
AM: 1.1%
PM: 3.6%

Junction Delay:
AM: 38.93 pcu/Hr
PM: 44.00 pcu/Hr

People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,948	16%
Bus	18,480	73%
Walk	2,370	9%
Cycle	615	2%
Total	**25413**	**100%**

INDICATIVE METHOD OF CONTROL

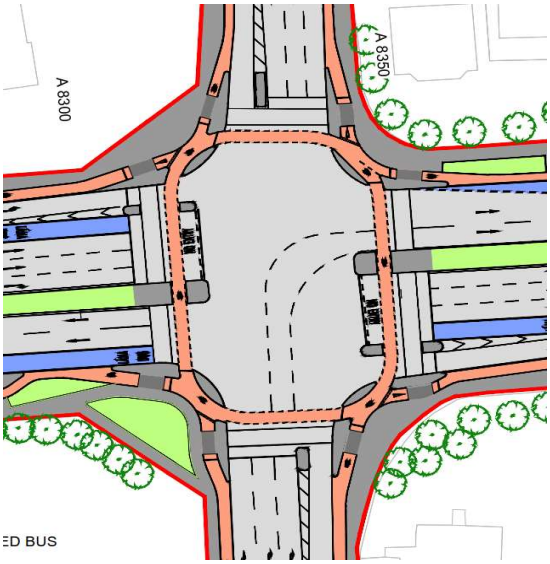


DENOTES FLASHING AMBER

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	27
Junction	**N11 Stillorgan Road / Leopardstown Road Junction**		

EXISTING

FINAL DESIGN



Summary:
The N11 Stillorgan Road / Leopardstown Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include full pedestrian, cycle and bus infrastructure. The large footprint of the junction has led to fully segregated cycle lanes on the immediate approaches with pedestrian/cycle crossing managed by mini zebra facilities. This keeps the pedestrian crossings over the carriageway as short as possible.

Pedestrian Infrastructure
Pedestrian crossing provision is improved by providing a new crossing over the N11 Stillorgan Road southern arm creating controlled crossing opportunities over all arms and improving desire lines. Left turn slip crossings on Newtownpark Avenue and Leopardstown Road have been removed, reducing the number of crossings required over each arm of the junction. This reduces overall delay and wait time for pedestrians.

Pedestrian crossing lengths have been kept less than 19m to reduce the time pedestrians are required to be within a live carriageway and keep lost time within the junction operation to a minimum. To achieve this segregated cycle lanes have been provided creating a minimum 2m pedestrian landing area between the carriageway and cycle track at pedestrian crossing locations. The crossing interfaces between pedestrians and cycles are proposed to be controlled by mini zebra crossings.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 19 seconds.

Cycle Infrastructure
The current arrangement has a uni-directional cycle lane infrastructure on all approaches through a combination of dedicated cycle tracks and on-street advisory cycle lanes. This creates some significant conflict points between cycles and motorists, particularly where left turn slip lanes require motorists to cross over the cycle lanes.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout that provides dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed from both side roads to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on the N11 Stillorgan Road with left turn slip lanes provided on the nearside of the carriageway. This requires general motorists to navigate across the bus and cycle lane in order to turn left.

The CBC proposal is to deliver a Junction Type 2 arrangement in both directions to cater for the significant left turn movements whilst removing the cycle conflict from the layout. Bus lanes are extended to the stop line and run alongside ahead and left general motorists with relevant green extensions provided to ensure buses will clear if any left turn queuing extends to the crossover point.

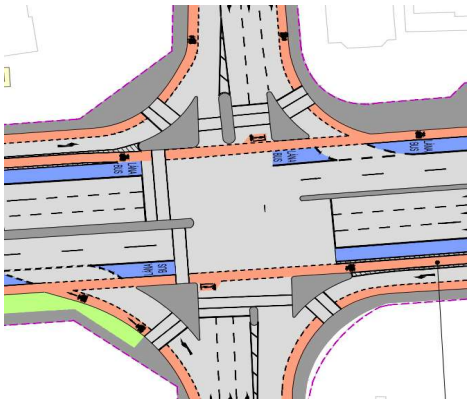
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	27

Design Evolution

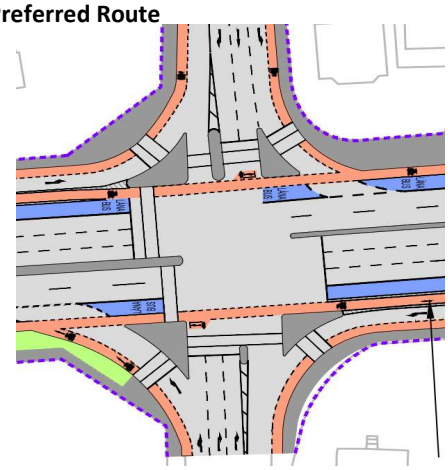
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

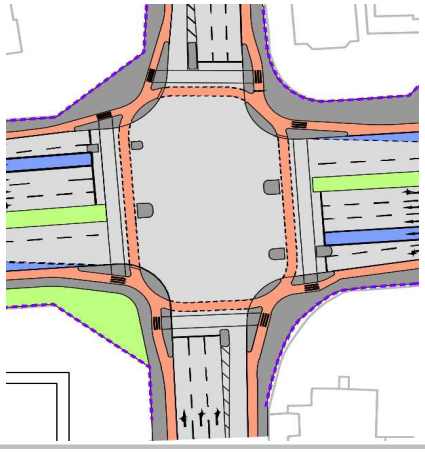
Concept Design Drawing



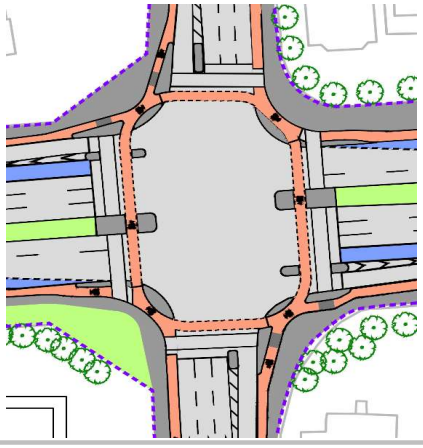
Emerging Preferred Route



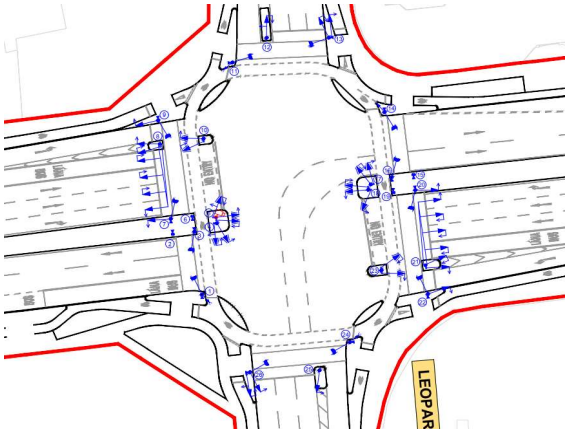
Public Consultation 2



Public Consultation 3



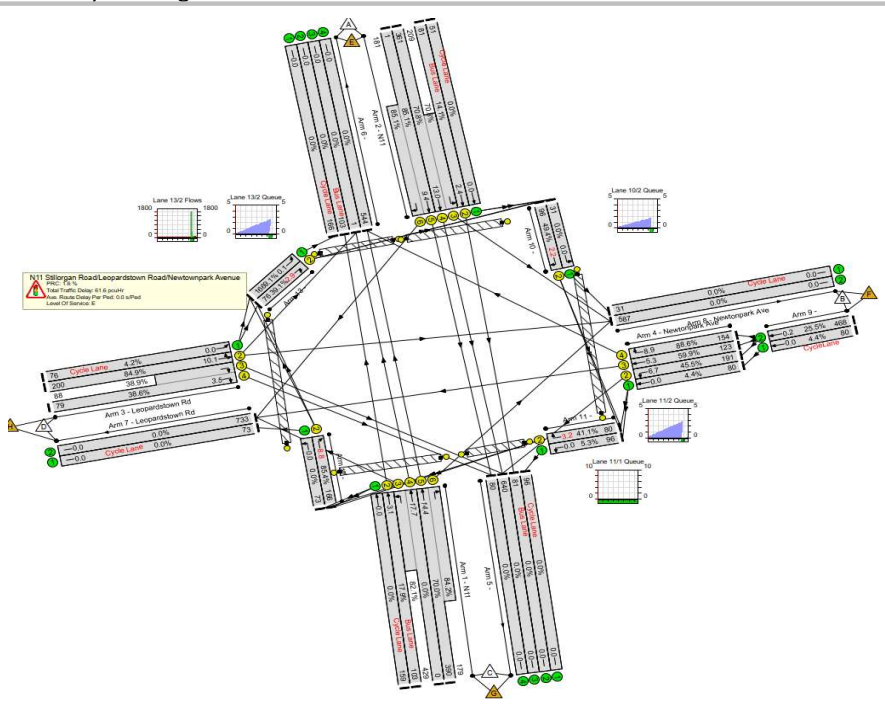
Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	27

2028 AM Peak Hours
Fixed Time LinSig Results

Network Layout Diagram



2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

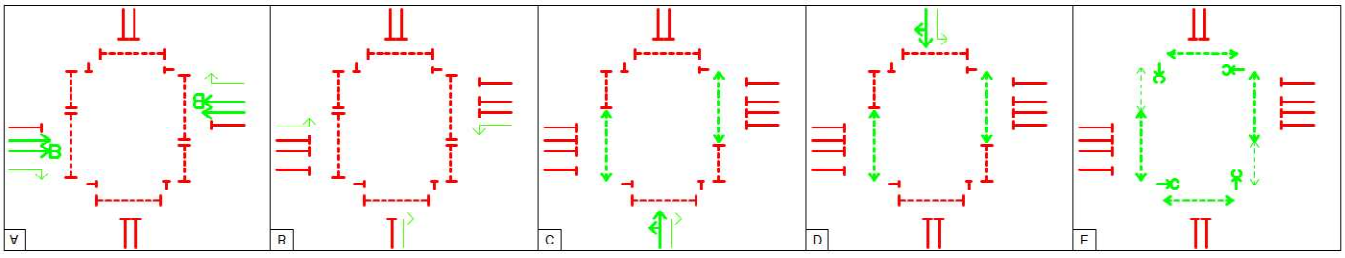
Junction PRC:
AM: 1.6%
PM: 4.1%

Junction Delay:
AM: 61.58 pcu/Hr
PM: 58.38 pcu/Hr

People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	4,532	7%
Bus	53,655	87%
Walk	2,370	4%
Cycle	917	2%
Total	**61474**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	28
Junction	**N11 Stillorgan Road / Springfield Park Junction**		

EXISTING

FINAL DESIGN

Summary:
The N11 Stillorgan Road / Springfield Park junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The three-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by providing a staggered crossing over the N11 Stillorgan Road northern arm where there is no current provision. A straight through crossing was considered to further improve pedestrian desire lines but due to driveway positions on the southbound side of the carriageway this was not possible without creating conflicts between motorists and pedestrians.

Pedestrians crossings are able to operate as "walk with traffic" with at least one opportunity for each crossing to run during a single cycle of the signal operation. This provides good opportunity for pedestrian progression

Cycle Infrastructure
The current arrangement has a uni-directional cycle lanes on the N11 Stillorgan Road. There is no specific cycle lane provision on the Springfield Park approach.

The CBC 13 proposal has improved cycle connectivity throughout the junction. A fully protected layout is proposed providing safe right turn access/egress for Springfiled Park and provides dedicated movements for all cycle approaches to proceed without conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop line on the N11 Stillorgan Road southbound approach but the northbound approach has a curtailed bus lane approximately 35m from the stop line to allow for left turning traffic.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop lines and dedicated traffic signal displays provided to maximise bus priority.

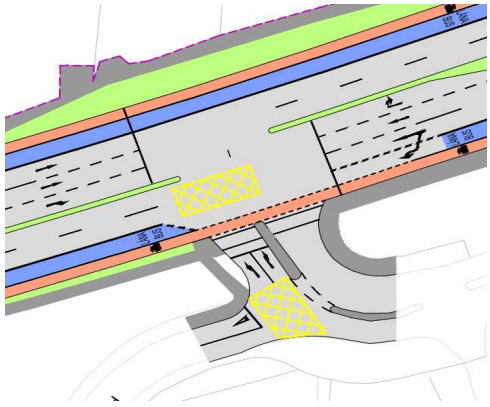
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	28

Design Evolution

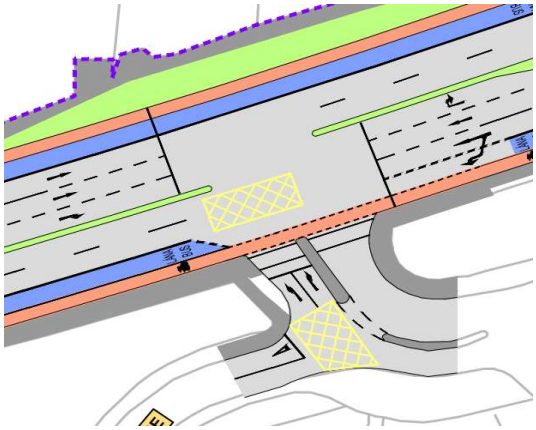
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

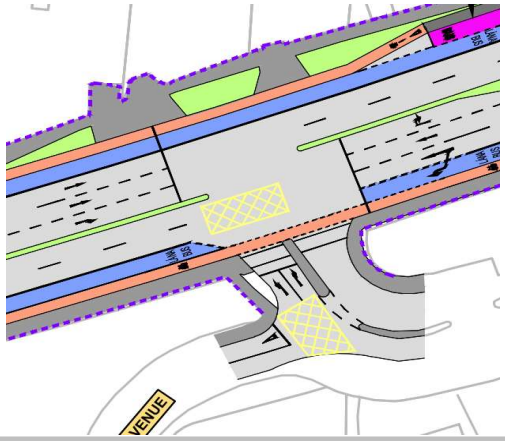
Concept Design Drawing



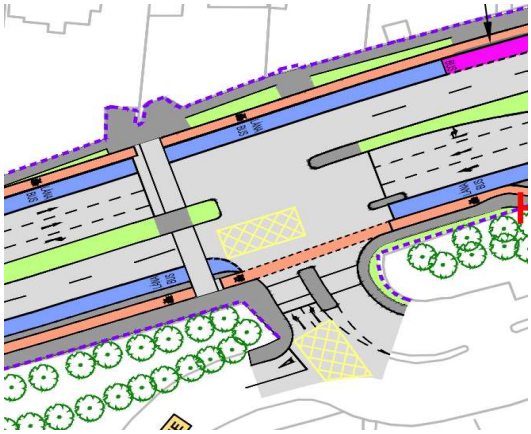
Emerging Preferred Route



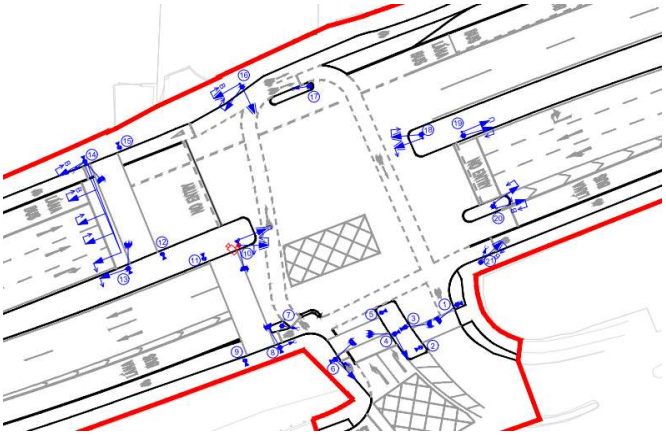
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	28

2028 AM Peak Hours
Fixed Time LinSig Results

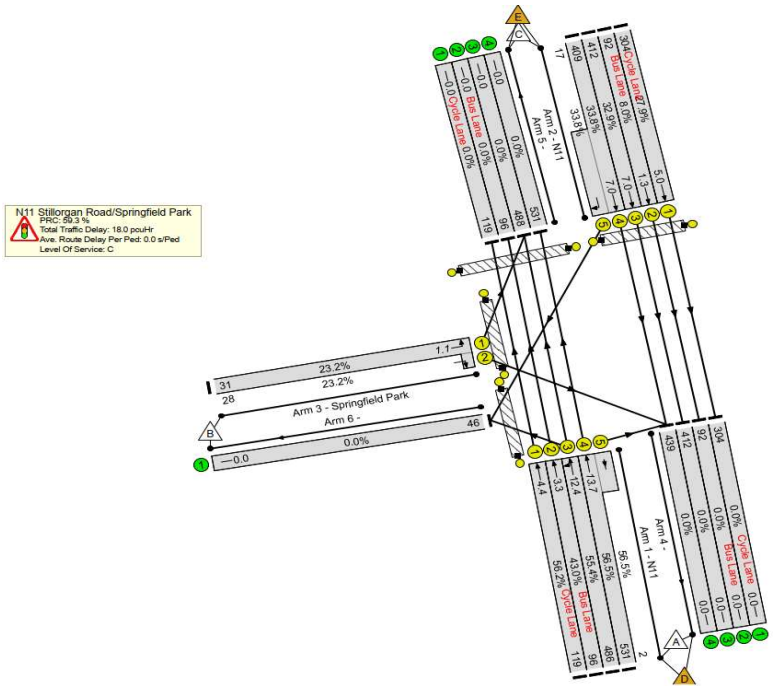
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 9.9 %
PM: 59.3 %

Junction Delay:
AM: 23.30 pcu/Hr
PM: 17.97 pcu/Hr

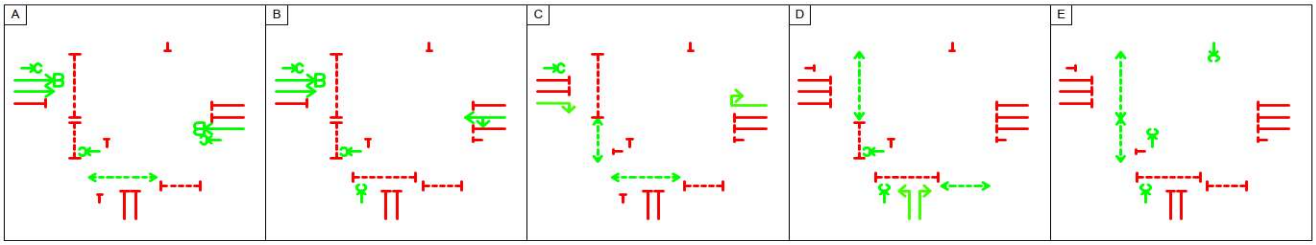
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	5,188	6%
Bus	83,790	91%
Walk	1,382	2%
Cycle	887	1%
Total	**91247**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	29
Junction	**N11 Stillorgan Road / Kill Lane Junction**		

EXISTING

FINAL DESIGN

Summary:
The N11 Stillorgan Road / Kill Lane junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The three-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by the removal of the left turn slip crossings on Kill Lane reducing the number of crossings and wait time for pedestrians.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 12 seconds. Some crossings can also function as "walk with traffic" allowing operation across multiple stages. This increases the opportunities for pedestrian to progress through the junction and reduces pedestrian delay.

Cycle Infrastructure
The current arrangement has a uni-directional cycle lane infrastructure on all approaches through a combination of dedicated cycle tracks and on-street advisory cycle lanes. This creates some significant conflict points between cycles and motorists, particularly where left turn slip lanes require motorists to cross over the cycle lanes.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout providing access/egress for all routes and dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on the Stillorgan Road approaches but the southbound approach has a left turn slip lane provided on the nearside of the carriageway. This requires general motorists to navigate into the bus approximately 90m from the stop line and cross over the cycle lane at the slip entry in order to turn left.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop lines and dedicated traffic signal displays provided to maximise bus priority.

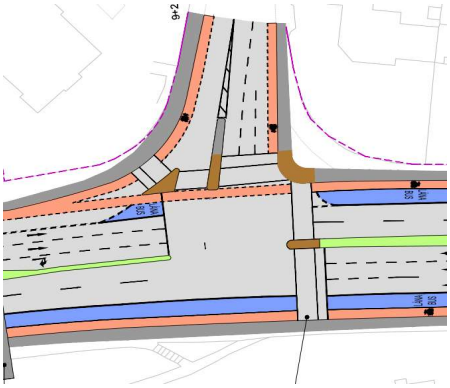
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	29

Design Evolution

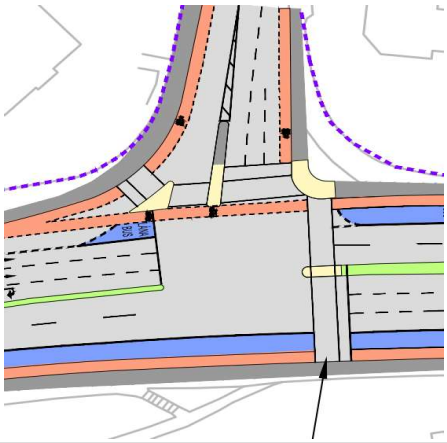
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

Concept Design Drawing



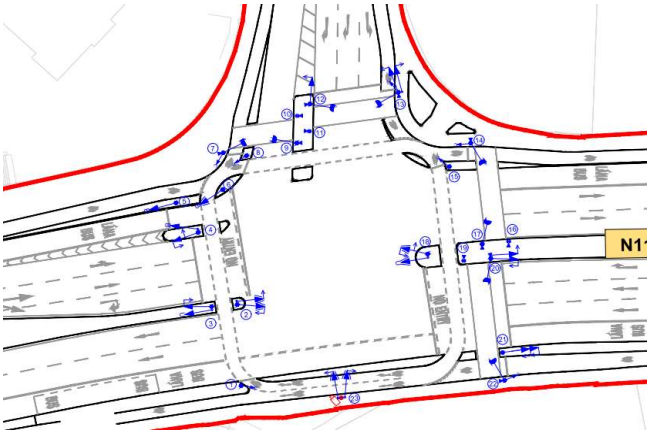
Emerging Preferred Route



Public Consultation 2

Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	29

2028 AM Peak Hours
Fixed Time LinSig Results

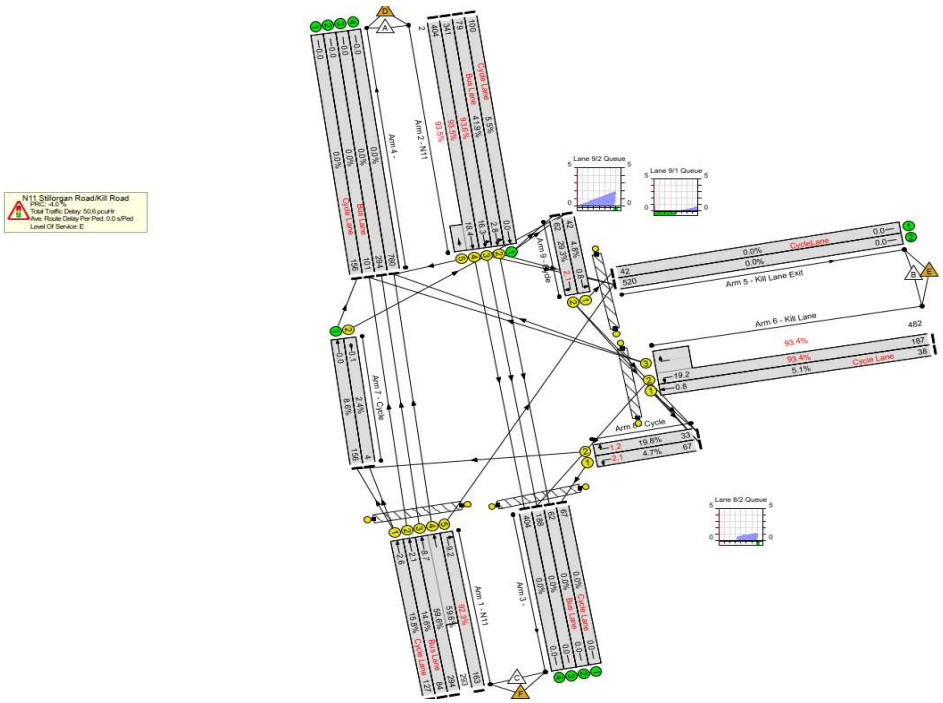
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: **-4%**
PM: **-8.3%**

Junction Delay:
AM: 50.58 pcu/Hr
PM: 62.21 pcu/Hr

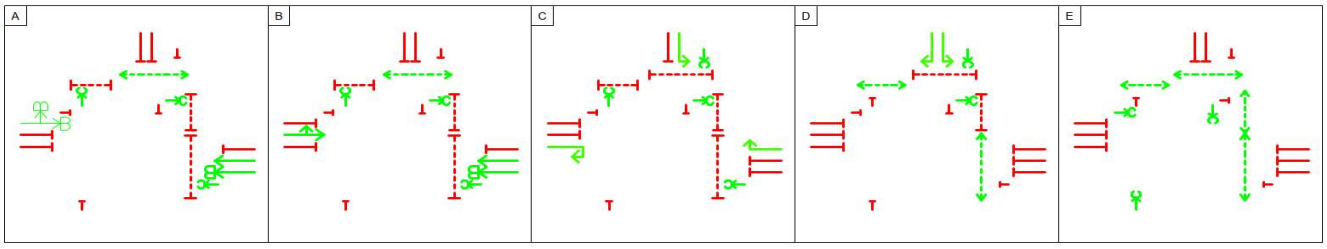
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,211	7%
Bus	40,005	82%
Walk	4,608	10%
Cycle	661	1%
Total	**48485**	**100%**

INDICATIVE METHOD OF CONTROL

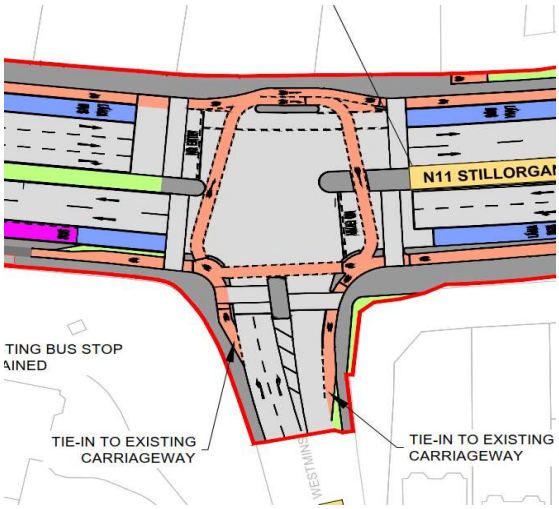


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	30

Junction **N11 Stillorgan Road / Westminster Road Junction**

EXISTING

FINAL DESIGN



Summary:
The N11 Stillorgan Road / Westminster Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The three-arm traffic signal junction will be modified to include full pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by providing a staggered crossing over the N11 Stillorgan Road southern arm where there is no current provision. This significantly improves pedestrian desire lines through the junction.

Pedestrians crossings are able to operate as "walk with traffic" with at least one opportunity for each crossing to run during a single cycle of the signal operation. In addition, if there is a right turn demand for cyclists coming from Westminster Road there will be increased opportunities for pedestrians to cross over the N11 Stillorgan Road. This provides good opportunity for pedestrian progression.

Cycle Infrastructure
The current arrangement has a uni-directional cycle lanes on the N11 Stillorgan Road. There is no specific cycle lane provision on the Westminster Road approach.

The CBC 13 proposal has improved cycle connectivity throughout the junction. A fully protected layout is proposed providing safe right turn access/egress for Westminster Road and provides dedicated movements for all cycle approaches to proceed without conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop line on the N11 Stillorgan Road southbound approach but the northbound approach has a curtailed bus lane approximately 40m from the stop line to allow for left turning traffic.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop lines and dedicated traffic signal displays provided to maximise bus priority.

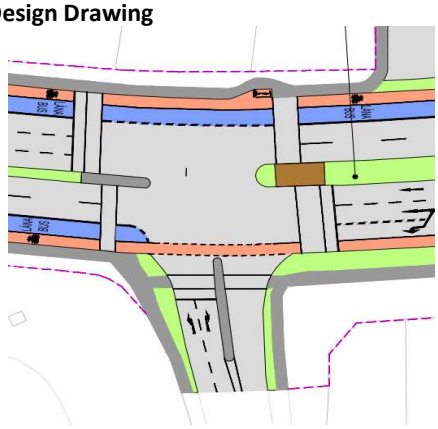
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	30

Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

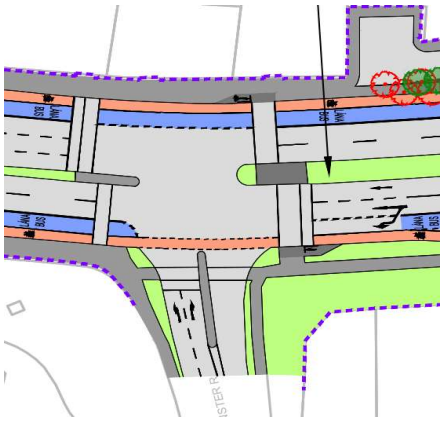
Existing

Concept Design Drawing



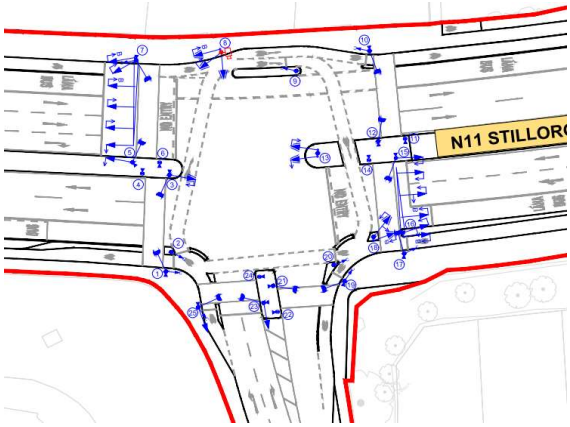
Emerging Preferred Route

Public Consultation 2



Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	30

2028 AM Peak Hours
Fixed Time LinSig Results

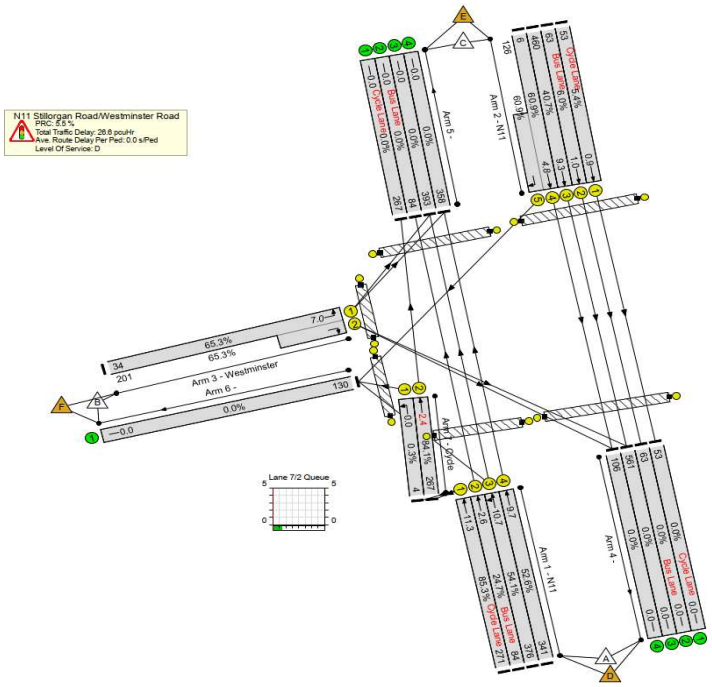
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 5.5%
PM: 31.3 %

Junction Delay:
AM: 26.64 pcu/Hr
PM: 21.59 pcu/Hr

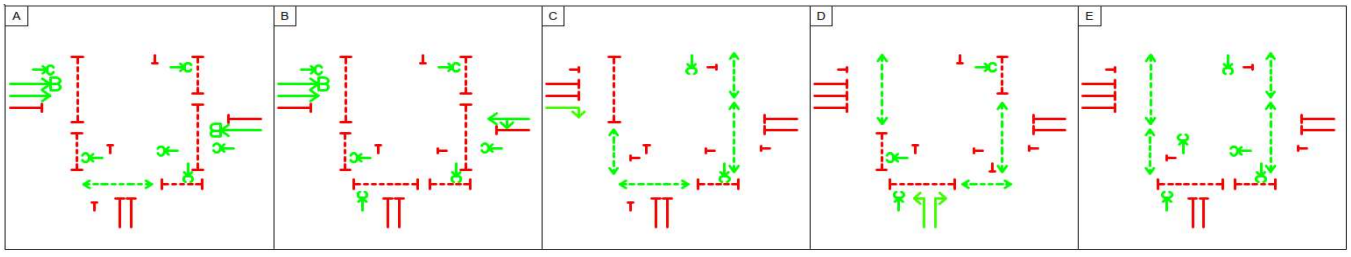
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,659	5%
Bus	73,185	90%
Walk	2,880	4%
Cycle	820	1%
Total	**80544**	**100%**

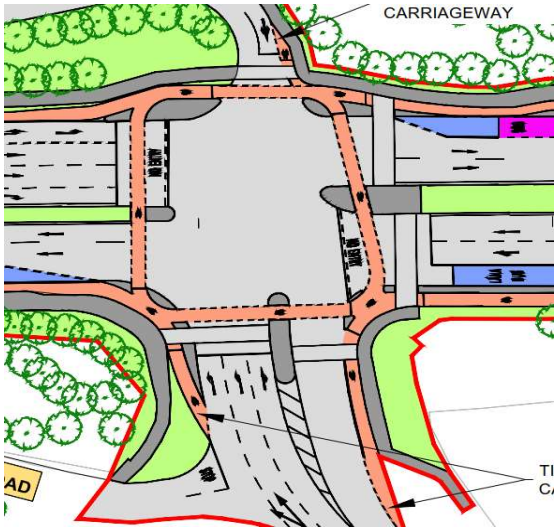
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	31
Junction	**N11 Stillorgan Road / Bray Road Junction**		

EXISTING

FINAL DESIGN



Summary:
The N11 Stillorgan Road / Bray Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by the removal of the left turn slip crossings on Bray Road reducing the number of crossings over both Bray Road and the south side of the N11 Stillorgan Road. This will reduce delay and wait time for pedestrians. A controlled crossing is also proposed over the minor access road on the east side of the junction whereby currently uncontrolled crossings are required.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 12 seconds. Some crossings can also function as "walk with traffic" allowing operation across multiple stages. This increases the opportunities for pedestrian to progress through the junction and reduces pedestrian delay.

Cycle Infrastructure
The current arrangement has a uni-directional cycle lane infrastructure on all approaches except the minor side road on the east side of the junction. This cycle provision is through a combination of dedicated cycle tracks and on-street advisory cycle lanes including ASLs on Bray Road. This creates some significant conflict points between cycles and motorists, particularly where left turn slip lanes require motorists to cross over the cycle lanes and right turn lanes require cyclists to crossover traffic lanes.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout that provides dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed from both side roads to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on the N11 Stillorgan Road approaches but allow left turning traffic to enter at approximately 65m from the stop line southbound and 45m northbound. The northbound approach also has a short left turn slip lanes provided on the nearside of the carriageway requiring general motorists to navigate across the bus and cycle lane in order to turn left.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line unhindered and dedicated traffic signal displays provided to maximise bus priority. Junction type 2 is provided in the southbound direction due to the significantly low traffic volumes into the minor access side road. The length of the curtailed bus lane is, however, significantly reduced on this approach to approximately 20m to ensure buses can proceed with minimal impact.

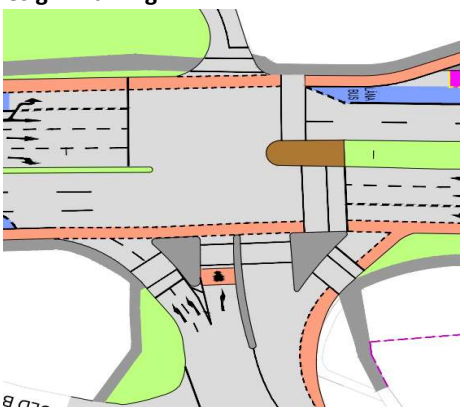
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	31

Design Evolution

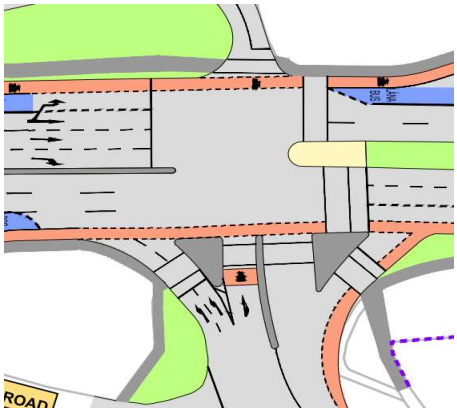
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

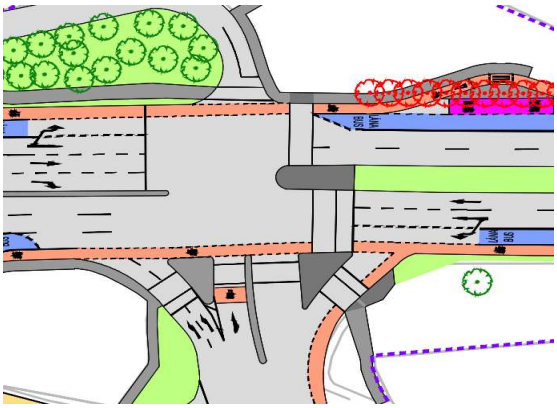
Concept Design Drawing



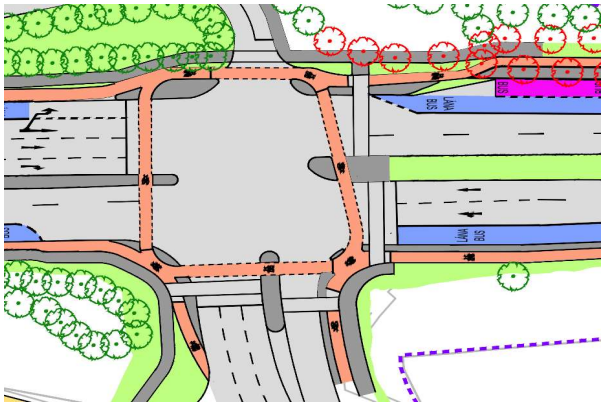
Emerging Preferred Route



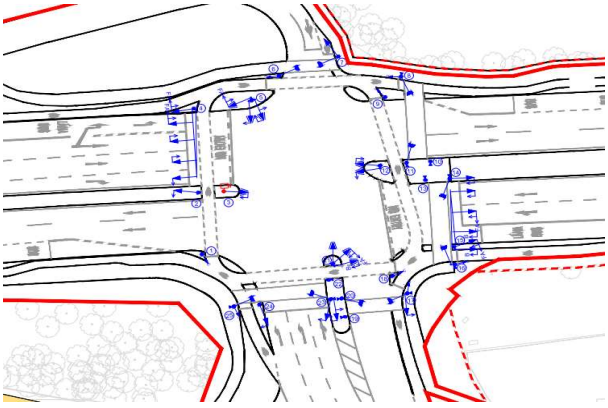
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	31

2028 AM Peak Hours
Fixed Time LinSig Results

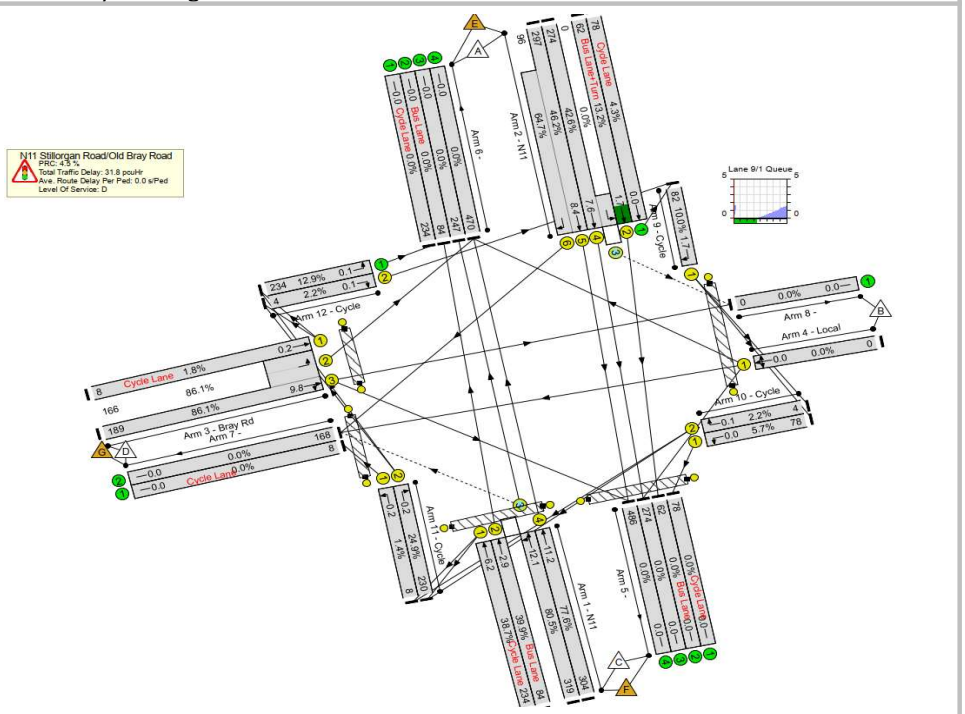
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 4.5%
PM: 11.5%

Junction Delay:
AM: 31.80 pcu/Hr
PM: 25.27 pcu/Hr

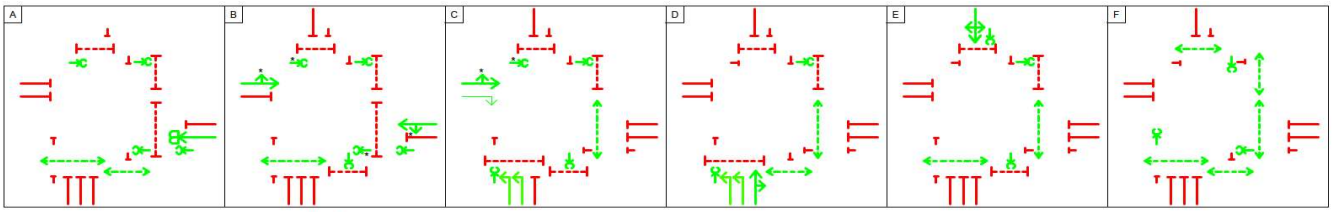
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,293	8%
Bus	35,753	85%
Walk	2,074	5%
Cycle	830	2%
Total	**41950**	**100%**

INDICATIVE METHOD OF CONTROL



* = FLASHING AMBER

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	32
Junction	**N11 Bray Road / Clonkeen Road Junction**		

EXISTING

FINAL DESIGN

Summary:
The N11 Bray Road / Clonkeen Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by providing a crossing over the N11 Bray Road southern arm.

The removal of the left turn slip crossing on the southwestern side arm also reduces the number of crossings and wait time for pedestrians.

The pedestrian overbridge on the N11 Bray Road northern arm and associated tie in crossing location over Clonkeen Road have been retained to provide a complete route for pedestrians around the junction.

Pedestrians crossings are able to operate as "walk with traffic" with at least one opportunity for each crossing to run during a single cycle of the signal operation. This provides good opportunity for pedestrian progression.

Cycle Infrastructure
The current arrangement has a uni-directional cycle lane infrastructure on all approaches. This cycle provision is through a combination of dedicated cycle tracks and on-street advisory cycle lanes including ASLs on Clonkeen Road. This creates some significant conflict points between cycles and motorists, particularly where left turn slip lanes require motorists to cross over the cycle lanes.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout that provides dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed from both side roads to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on the N11 Bray Road approaches but allow left turning traffic to enter at approximately 70m from the stop lines. Both approaches also have short left turn slip lanes provided on the nearside of the carriageway requiring general motorists to navigate across the bus and cycle lane in order to turn left.

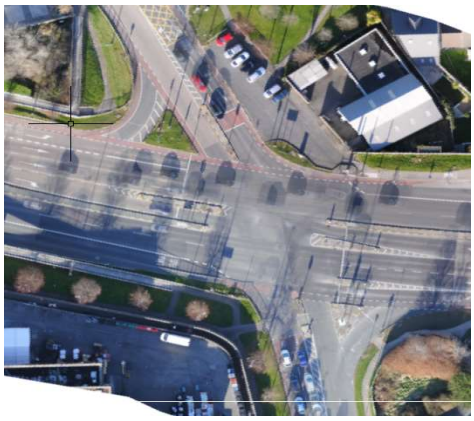
The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line unhindered and dedicated traffic signal displays provided to maximise bus priority.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	32

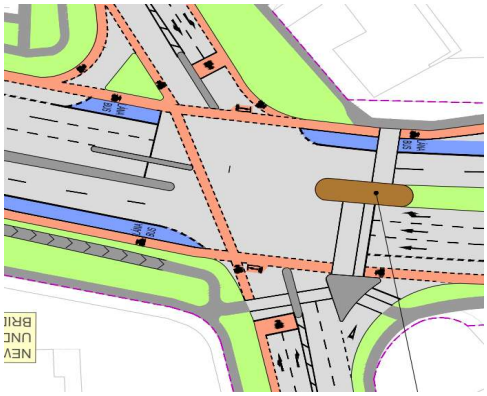
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

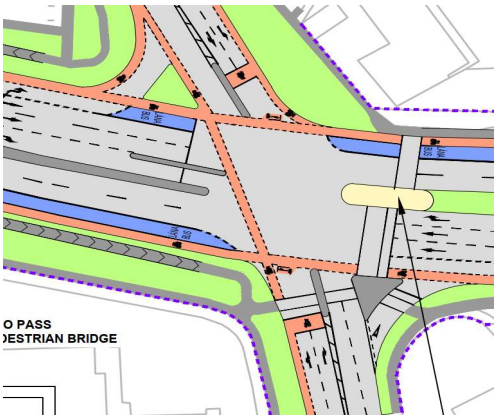
Existing



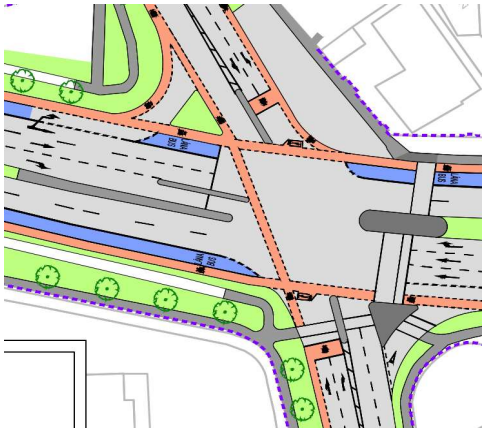
Concept Design Drawing



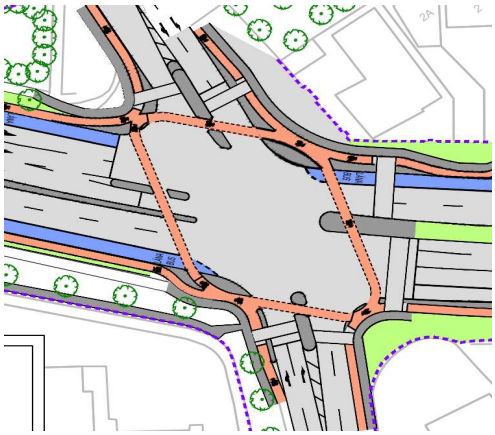
Emerging Preferred Route



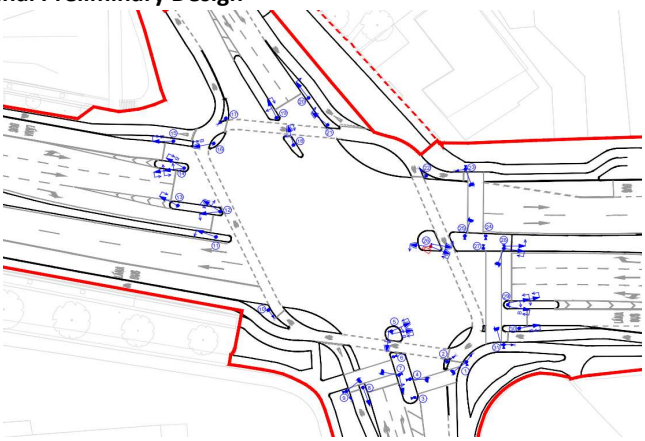
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	32

2028 AM Peak Hours
Fixed Time LinSig Results

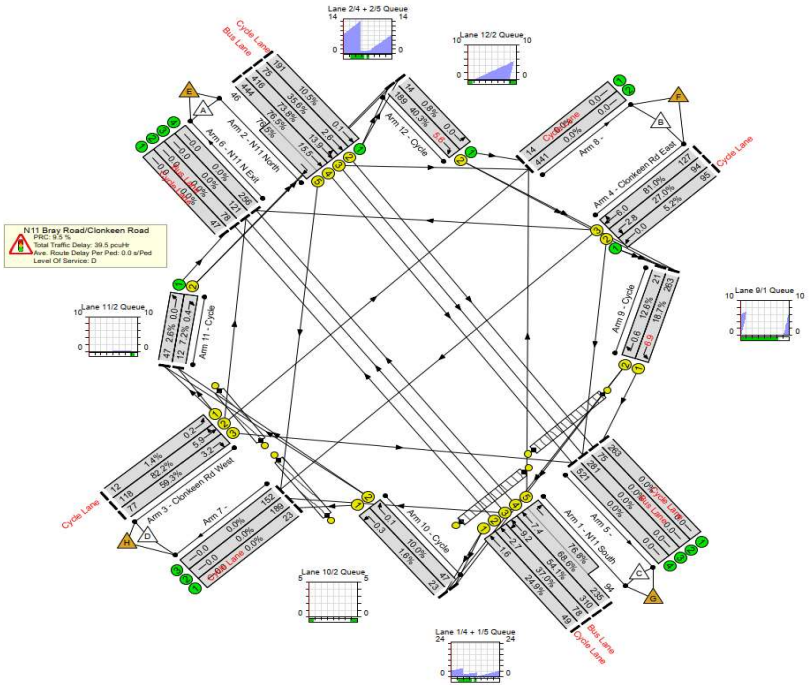
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 7.1%
PM: 9.5%

Junction Delay:
AM: 44.51 pcu/Hr
PM: 39.48 pcu/Hr

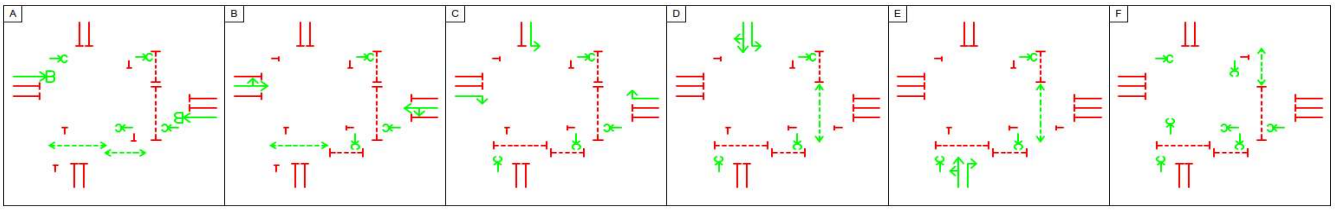
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,764	13%
Bus	23,835	79%
Walk	1,613	5%
Cycle	819	3%
Total	**30031**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	33
Junction	**N11 Bray Road / Johnstown Road Junction**		

EXISTING

FINAL DESIGN

Summary:
The N11 Bray Road / Johnstown Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by providing a crossing over the N11 Bray Road southern arm, giving at grade crossing opportunities all around the junction.

Left turn slip crossings have been removed from both side arms, and replaced with split phased staggered crossings to keep crossing lengths low. The maximum number of crossings per arm has been reduced from three to two reducing wait time for pedestrians.

The pedestrian overbridge on the N11 Bray Road southern arm has been retained.

Pedestrians crossings are able to operate as "walk with traffic" with at least one opportunity for each crossing to run during a single cycle of the signal operation. This provides good opportunity for pedestrian progression.

Cycle Infrastructure
The current arrangement has a uni-directional cycle lane infrastructure on all approaches. This cycle provision is through a combination of dedicated cycle tracks and on-street advisory cycle lanes including an ASL on Johnstown Road northeastern arm. This creates some significant conflict points between cycles and motorists, particularly where left turn slip lanes require motorists to cross over the cycle lanes.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout that provides dedicated movements that can proceed without conflict.

Left turn slip lanes have been removed from both side roads to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has bus lanes extending to the stop lines on the N11 Bray Road approaches but allow left turning traffic to enter at approximately 60m from the stop lines southbound and 80m northbound Both approaches also have short left turn slip lanes provided on the nearside of the carriageway requiring general motorists to navigate across the bus and cycle lane in order to turn left.

The CBC proposal allows for Junction Type 1 to be phyically accomodated in both directions, with bus lanes extended to the stop line unhindered and dedicated traffic signal displays provided to maximise bus priority.

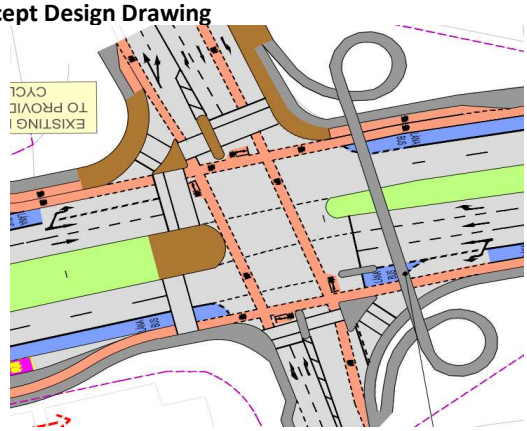
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	33

Design Evolution

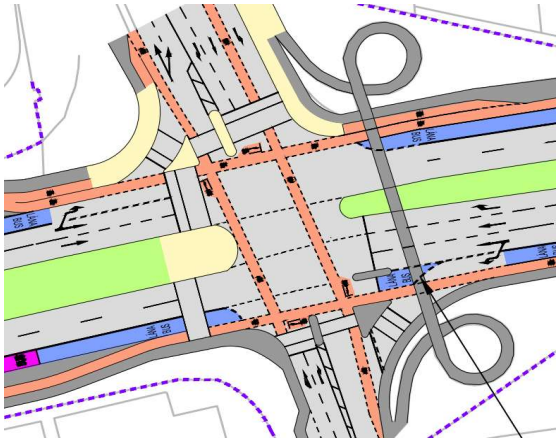
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

Concept Design Drawing



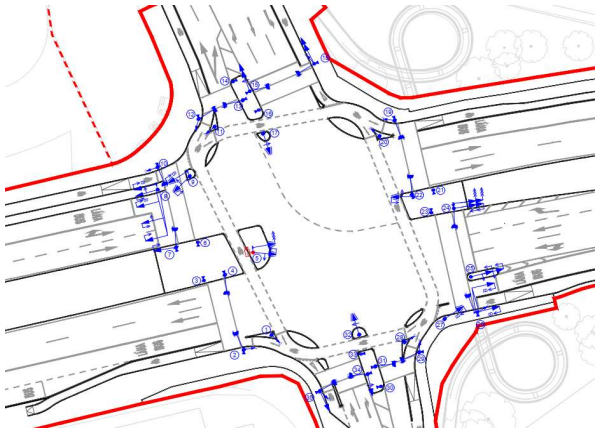
Emerging Preferred Route



Public Consultation 2

Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	33

2028 AM Peak Hours
Fixed Time LinSig Results

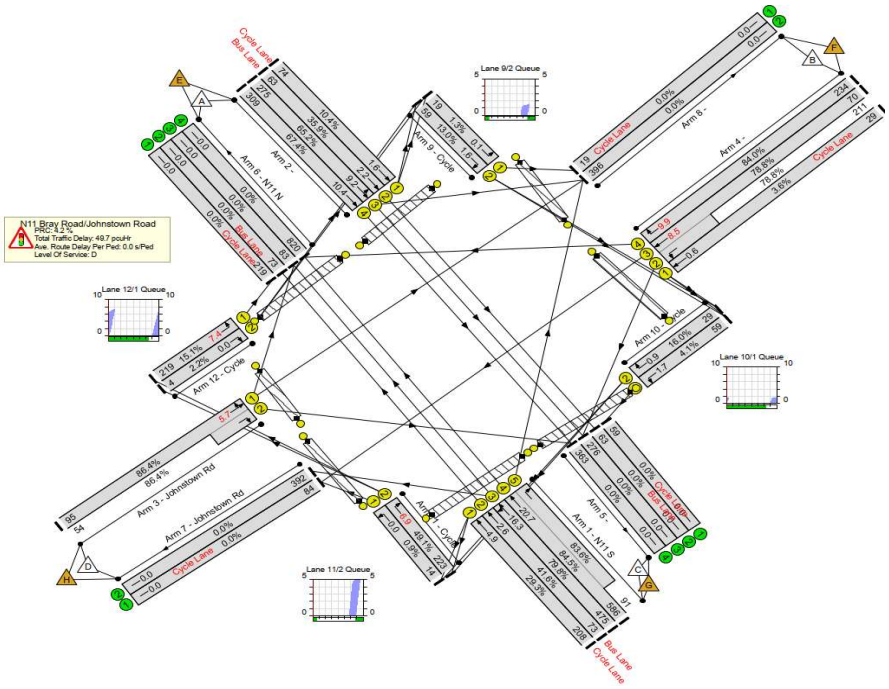
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 4.2%
PM: 1.4%

Junction Delay:
AM: 49.66 pcu/Hr
PM: 49.27 pcu/Hr

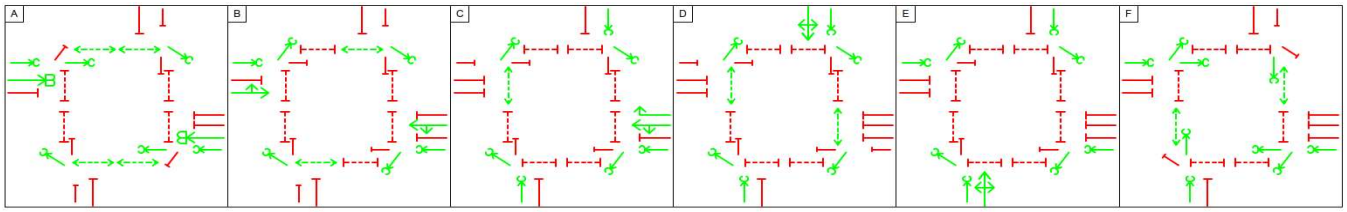
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

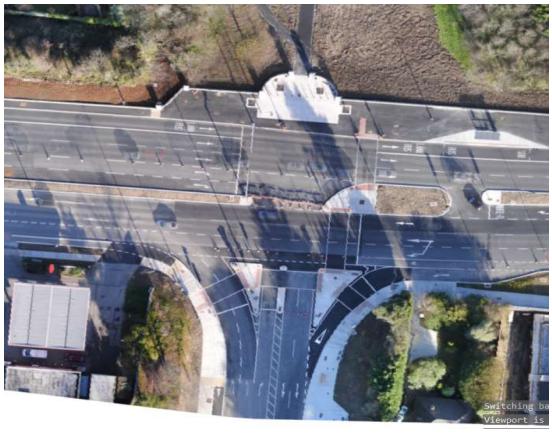
Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,704	14%
Bus	18,480	71%
Walk	2,995	12%
Cycle	777	3%
Total	**25956**	**100%**

INDICATIVE METHOD OF CONTROL

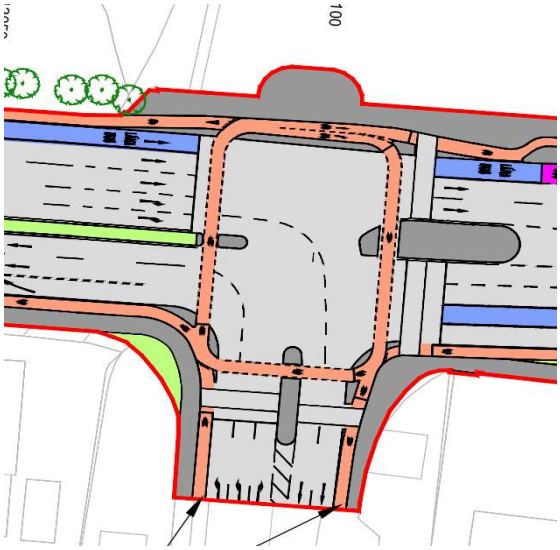


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	34
Junction	**N11 Bray Road / Cherrywood Junction**		

EXISTING



FINAL DESIGN



Summary:
The N11 Bray Road / Cherrywood junction was originally designed by a developer and will be upgraded as part of the NTA Dublin Bus Connects scheme to provide improved connectivity for buses, cyclists and pedestrians on the route from Bray to Dublin City Centre.

The three-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provision improved by the removal of the left turn slip crossings on Orchard Square reducing the number of crossings and wait time for pedestrians.

Dedicated cycle provision has also allowed previous shared space between pedetsrians and cycles to be re-allocated solely to pedestrians, including at controlled crossing points.

Pedestrians crossings are able to operate as "walk with traffic" with at least one opportunity for each crossing to run during a single cycle of the signal operation. In addition, the split phased crossings on each arm are able to appear in the same stage providing the opportunity to cross the entire arm in one movement without the need to stop and wait. This provides good pedestrian progression through the junction.

Cycle Infrastructure
The current arrangement has no dedicated cycle provision on the N11 southbound approach or on Orchard Square. The N11 northbound approach has a uni-directional cycle lane that transitions from a dedicated cycle track to an on-street cycle lane through the junction. This creates a significant conflict point between cycles and motorists at the left turn slip lane into Orchard Square whereby motorists have to cross over the cycle lane. All controlled crossing points are shared between pedestrians and cyclists.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout that provides dedicated movements that can proceed without conflict. Cycles can navigate through the junction without the need to share space with pedestrians.

Left turn slip lanes have been removed Orchard Square to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has a dedicated bus lane on the N11 southbound approach. On the northbound N11 approach the bus lane extends to the stop line but allows left turning traffic to crossover at approximately 40m from the stop line. This layout requires general motorists to navigate across the bus and cycle lane in order to turn left in a short dedicated slip lane.

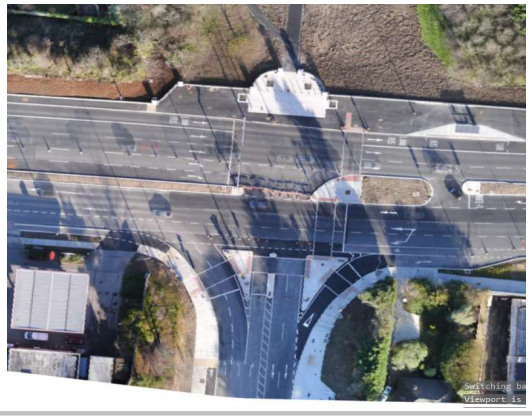
The CBC proposal retains similar provision for buses on both approaches, but with the cycle confllict removed on the northbound approach by providing a dedicated separately controlled cycle lane on the nearside of the carriageway.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	34

Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

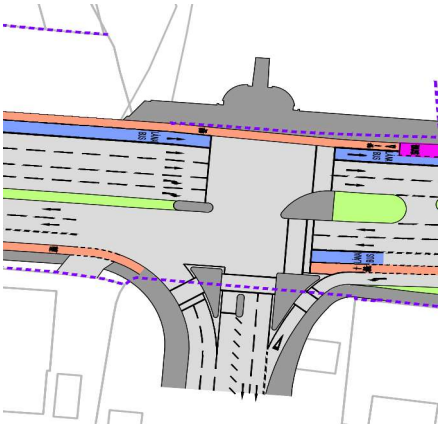
Existing



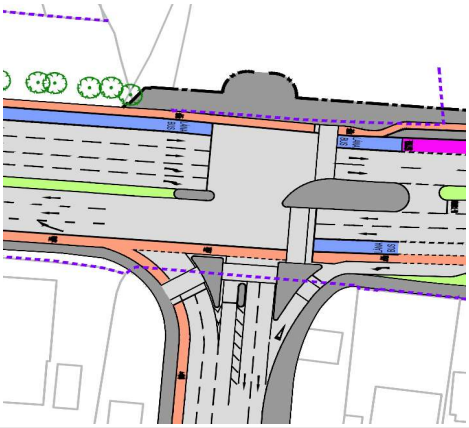
Concept Design Drawing

Emerging Preferred Route

Public Consultation 2



Public Consultation 3



Final Preliminary Design

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	34

2028 AM Peak Hours
Fixed Time LinSig Results

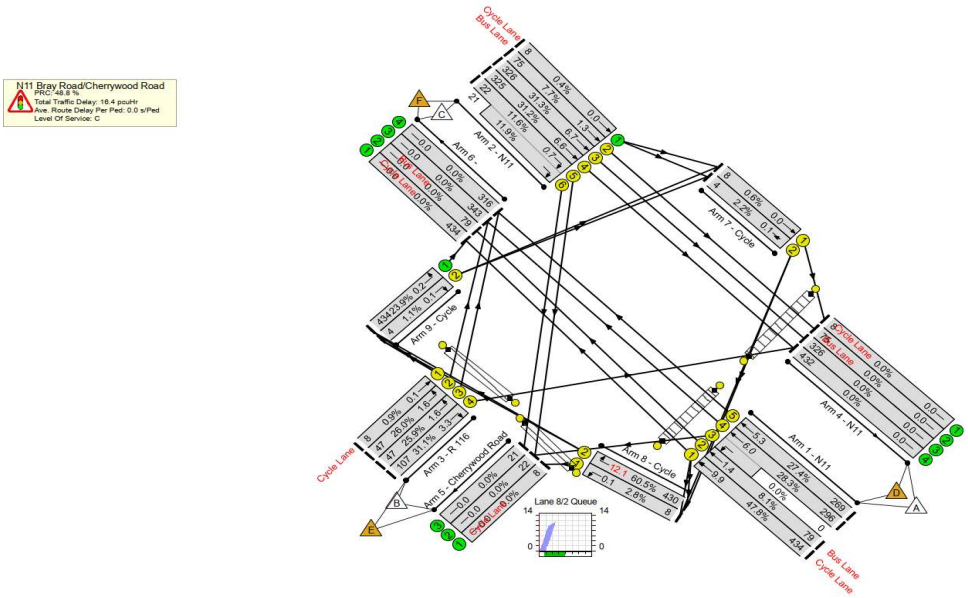
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 65.2%
PM: 48.8%

Junction Delay:
AM: 21.36 pcu/Hr
PM: 16.39 pcu/Hr

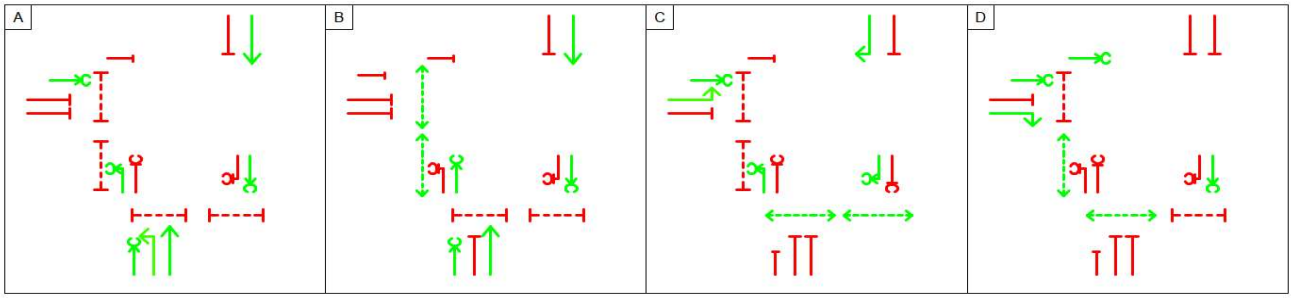
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

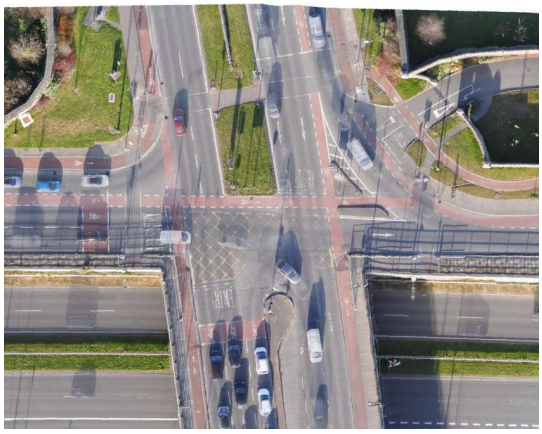
Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	6,523	5%
Bus	107,205	88%
Walk	6,106	5%
Cycle	2,106	2%
Total	**121940**	**100%**

INDICATIVE METHOD OF CONTROL

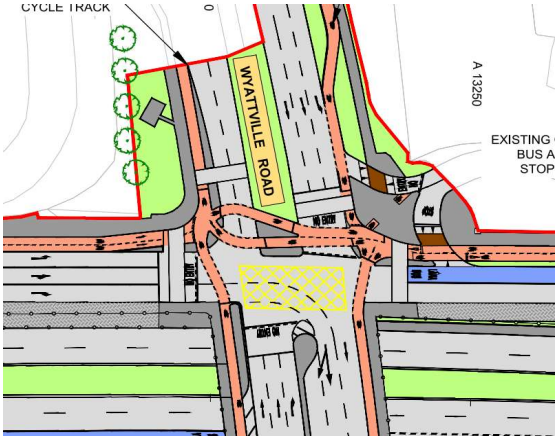


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	35
Junction	**N11 Bray Road Southbound Slip / Wyattville Road Junction**		

EXISTING



FINAL DESIGN



Summary:
The N11 Bray Road southbound slip/ Wyattville Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure, noting the southern slip road is a one way exit merge slip back onto the N11.

Pedestrian Infrastructure
The current layout has shared space with controlled crossings utilised by both pedestrians and cycles.

The application of dedicated cycle provision has allowed the previous shared space between pedestrians and cycles to be re-allocated solely to pedestrians, including at controlled crossing points.

Pedestrians crossings are able to operate as "walk with traffic" with at least one opportunity for each crossing to run during a single cycle of the signal operation and allowance for some crossings to operate across multiple stages. This provides good opportunity for pedestrian progression.

Cycle Infrastructure
The current arrangement has a uni-directional cycle lane infrastructure on all approaches. This cycle provision is through a combination of dedicated cycle tracks and on-street advisory cycle lanes including ASL provision. This creates some significant conflict points between cycles and motorists, particularly where left turn slip lanes require motorists to cross over the cycle lanes and right turn lanes require cyclists to crossover traffic lanes.

The CBC 13 proposal has improved cycle connectivity throughout the junction with a fully protected layout that provides dedicated movements to all routes that can proceed without conflict with traffic or pedestrians. This also includes for two way segregated cycle provision along the slip roads.

Left turn slip lane crossovers for cycles have been removed from the junction to reduce cyclist conflict.

Bus Priority Infrastructure
The current arrangement has the bus lane on the slip road curtailed on the approach to the junction at approximately 85m from the stop line. This is to allow both left and right turn provision for motorists from this lane (noting that a dedicated left turn slip lane also commences approximately 35m from the stop line). Motorists also have to navigate across the cycle lane to enter the left turn slip.

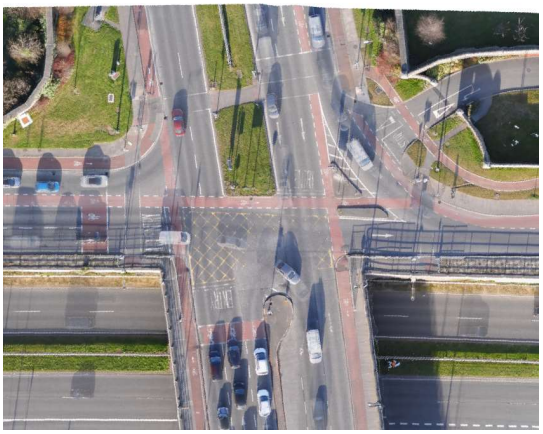
The CBC proposal retains similar provision for buses, but with the cycle confllict removed through the provision of a dedicated segregated cycle track offset from the carriageway edge. Extentions to green times shall be utilised for the Slip Road approach to ensure buses can clear the stop line in one movement.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	35

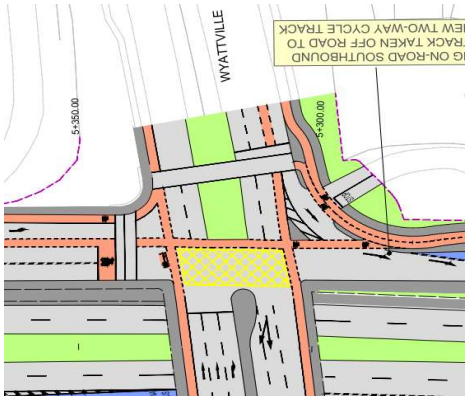
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

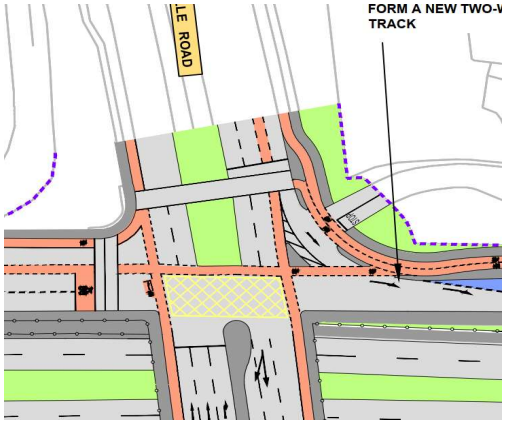
Existing



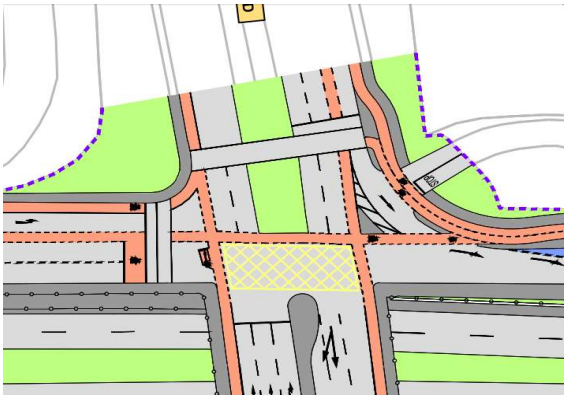
Concept Design Drawing



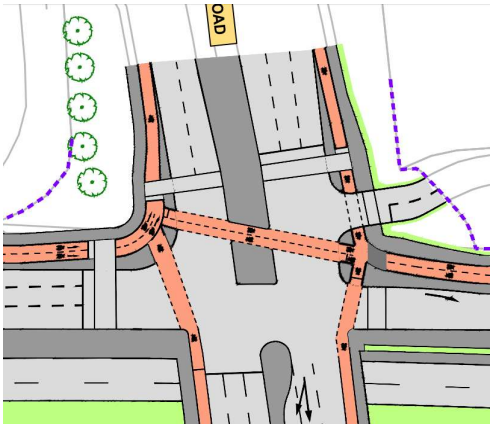
Emerging Preferred Route



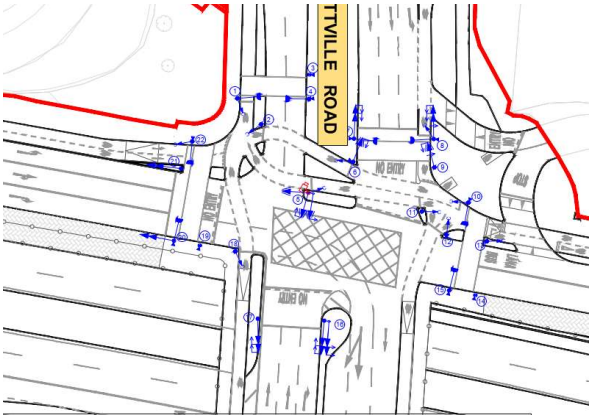
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	35

2028 AM Peak Hours
Fixed Time LinSig Results

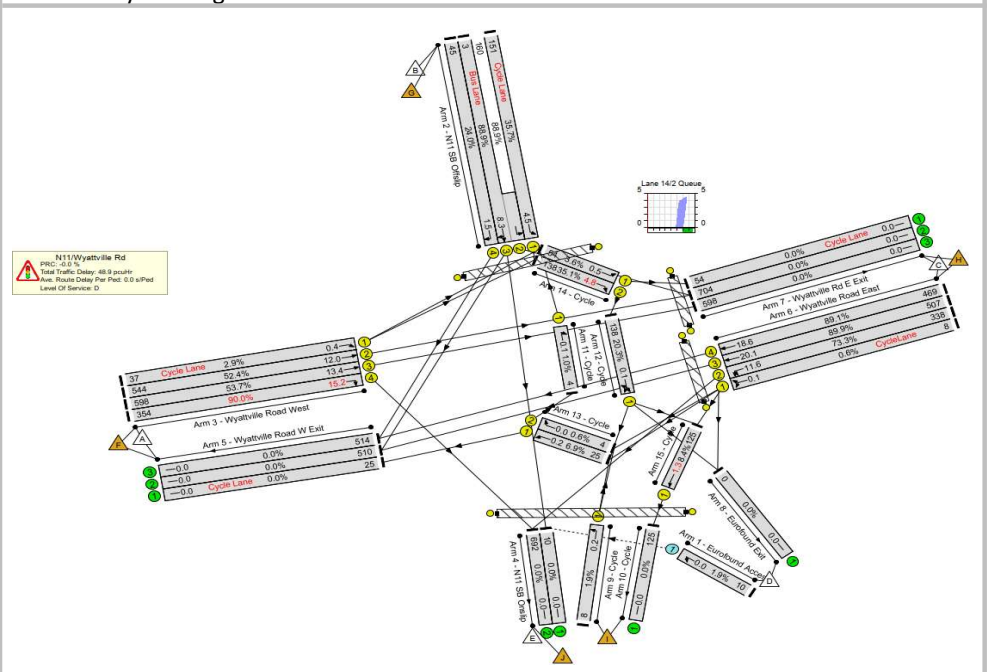
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 0%
PM: **-11.9%**

Junction Delay:
AM: 48.89 pcu/Hr
PM: 75.91 pcu/Hr

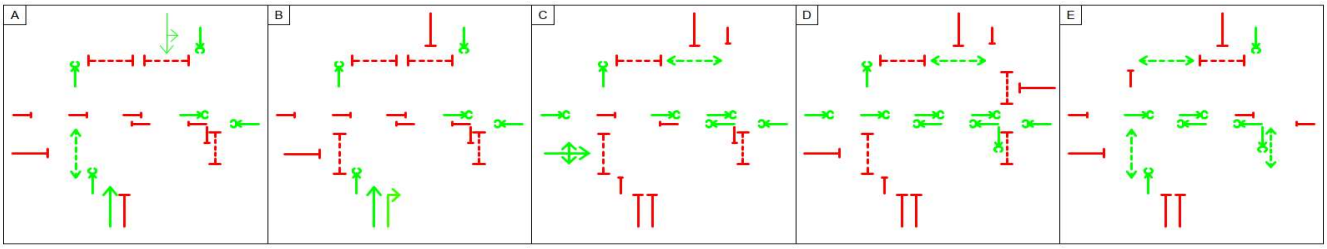
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

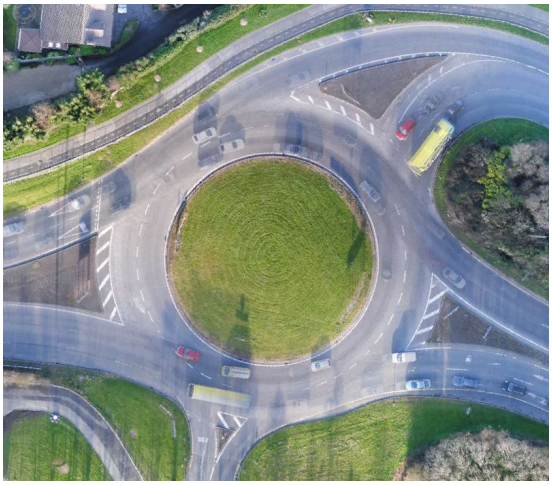
Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,635	7%
Bus	45,150	85%
Walk	2,765	5%
Cycle	1,300	3%
Total	**52850**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	36
Junction	**Loughlinstown Roundabout**		

EXISTING



FINAL DESIGN

Summary:
The M11/N11 Loughlinstown roundabout is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The roundabout is to be signalised and modified to include improved bus infrastructure.

Pedestrian Infrastructure
The existing pedestrian infrastructure is to be retained. This includes a footway on the eastern side that is separated from the carriageway by a verge and dedicated two-way cycle track, and an NMU overpass to the north of the roundabout for access to St Columcille's Hospital. An at grade crossing was considered but discounted through traffic modelling as it was found to negatively impact northbound bus progression and safety.

There are no specific pedestrian crossing facilities located at the roundabout in the existing layout or proposed.

Cycle Infrastructure
The current arrangement has a two-way cycle track running along the east side of roundabout between the carriageway and the footway. The CBC proposal is to retain this provision ensuring the appropriate width is maintained throughout for two-way cycle movements.

The existing cycle crossing over Dublin Road, a short distance to the southeast of the roundabout is also to be retained as part of the CBC proposals to link northbound cycle movements along Dublin Road with the dedicated off-street cycle track to the east of the roundabout.

Bus Priority Infrastructure
No specific bus infrastructure is provided through the roundabout under the existing arrangement, there is, however, a curtailed bus lane on the Dublin Road approach.

The CBC proposal is to retain the Dublin Road northbound bus lane similar to the existing layout, but with the introduction of signal control at the roundabout, extentions to green times can be utilised to ensure buses can clear the stop line in one movement.

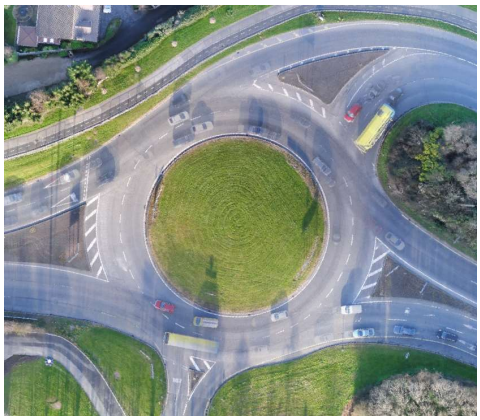
A dedicated bus lane/bypass is proposed for the N11 southbound movement providing a direct route on the approach and through the roundabout to Dublin Road, giving the maximum possible bus priority provision available.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	36

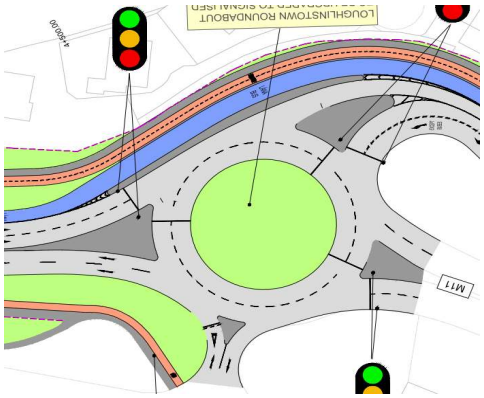
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

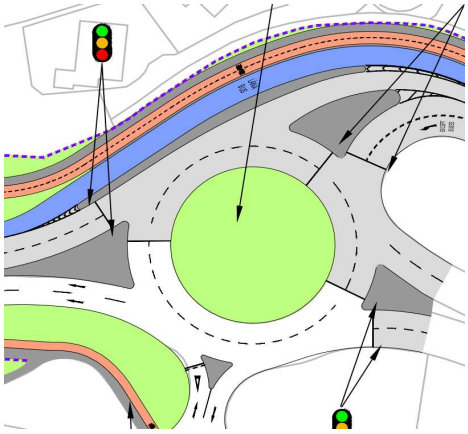
Existing



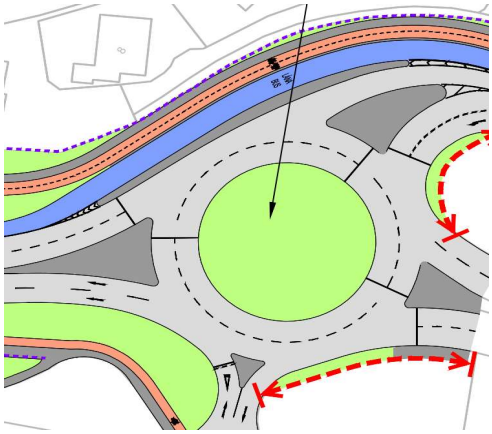
Concept Design Drawing



Emerging Preferred Route

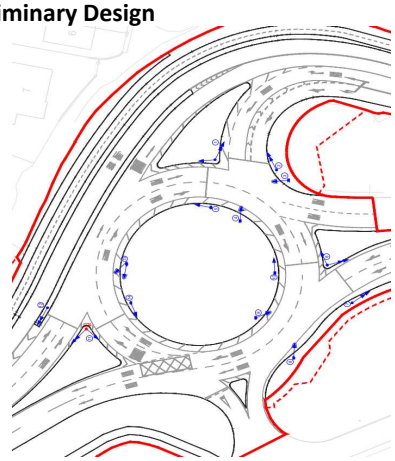


Public Consultation 2



Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	36

2028 AM Peak Hours
Fixed Time LinSig Results

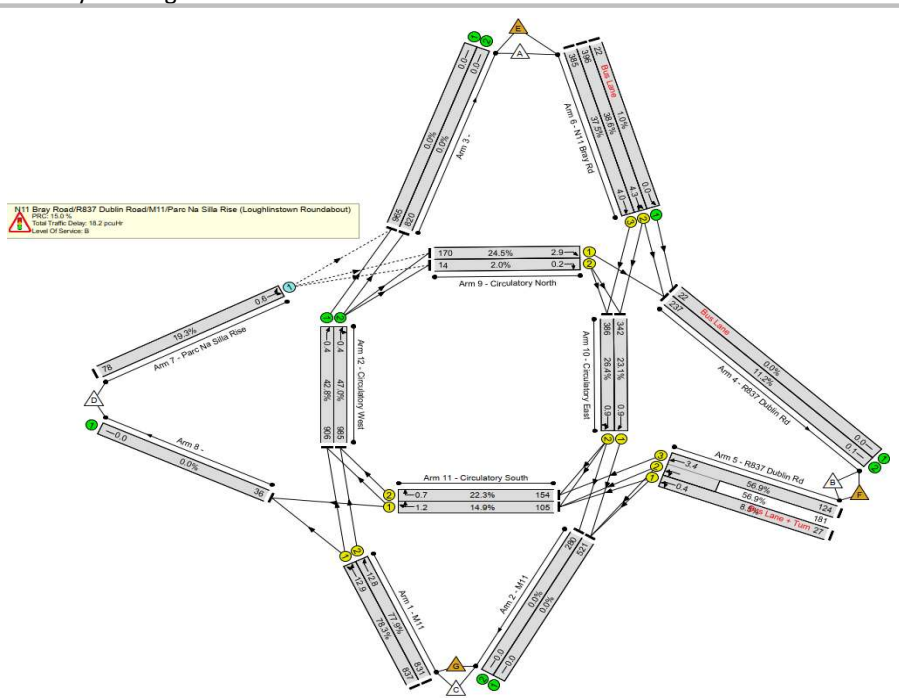
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 60 seconds

Junction PRC:
AM: 15.0%
PM: 21.4%

Junction Delay:
AM: 18.15 pcu/Hr
PM: 17.35 pcu/Hr

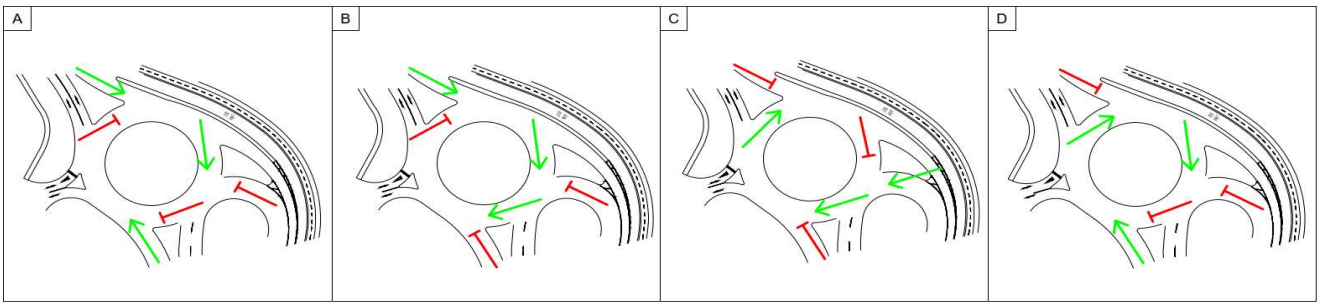
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	6,152	5%
Bus	127,733	94%
Walk	0	0%
Cycle	801	1%
Total	**134686**	**100%**

INDICATIVE METHOD OF CONTROL

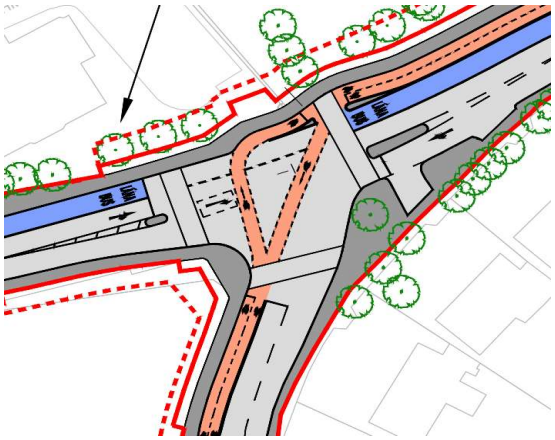


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	37

Junction **Dublin Road / Stonebridge Road Junction**

EXISTING

FINAL DESIGN



Summary:
The Dublin Road / Stonebridge Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The three-arm traffic signal junction will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
Pedestrian crossings are proposed over all three arms of the junction as per the current arrangement. The crossings are for pedestrian use only with dedicated facilities for cycles also provided.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 16 seconds.

Cycle Infrastructure
The current arrangement has a uni-directional advisory cycle lane infrastructure on the Dublin Road approaches with an ASL on the southbound approach.

The CBC 13 proposal has provided a two-way segregated cycle facility that extends from the Corbawn Lane junction through to Stonebridge Road and onwards in both directions. This two-way cycle track is linked through this junction via a dedicated cycle stage in the signal operation providing a protected route where cyclists can proceed without conflict with traffic or pedestrians.

Bus Priority Infrastructure
The CBC proposal has full bus priority provided in the southbound direction with the bus lane extending to the stop line.

Bus priority in the northbound direction will be provided via bus detection demands and extensions on the immediate approach to the junction.

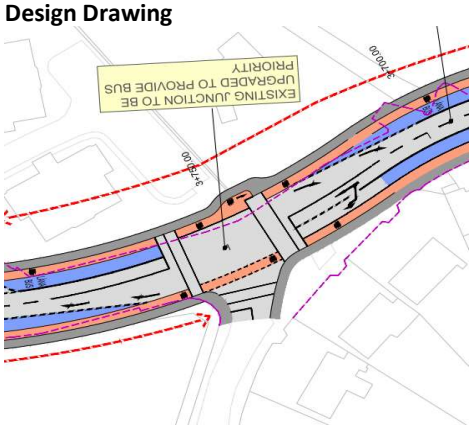
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	37

Design Evolution

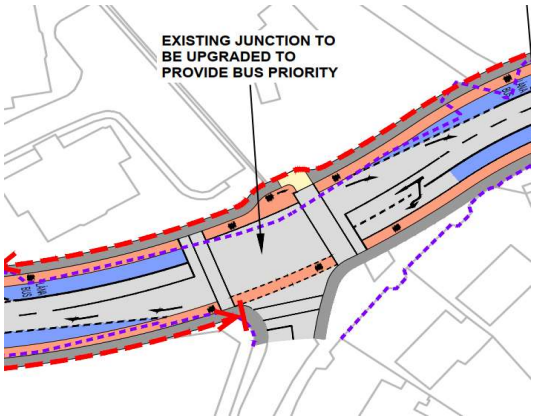
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

Concept Design Drawing



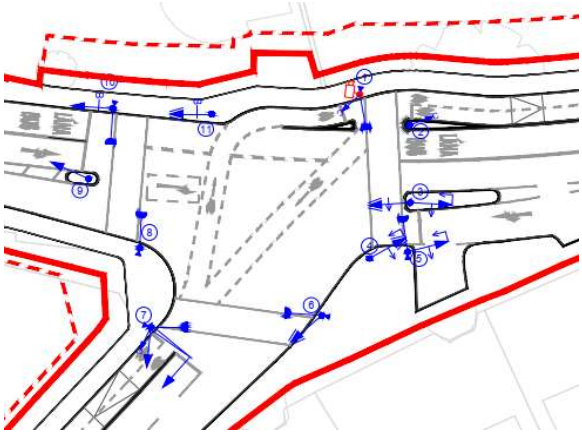
Emerging Preferred Route



Public Consultation 2

Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	37

2028 AM Peak Hours
Fixed Time LinSig Results

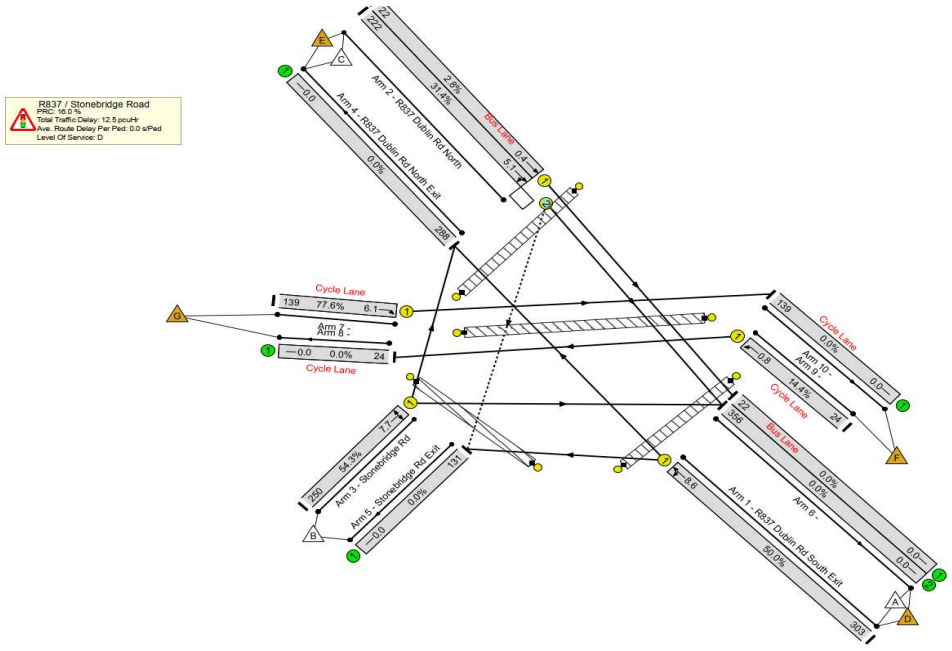
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 16%
PM: 18.8%

Junction Delay:
AM: 12.52 pcu/Hr
PM: 11.24 pcu/Hr

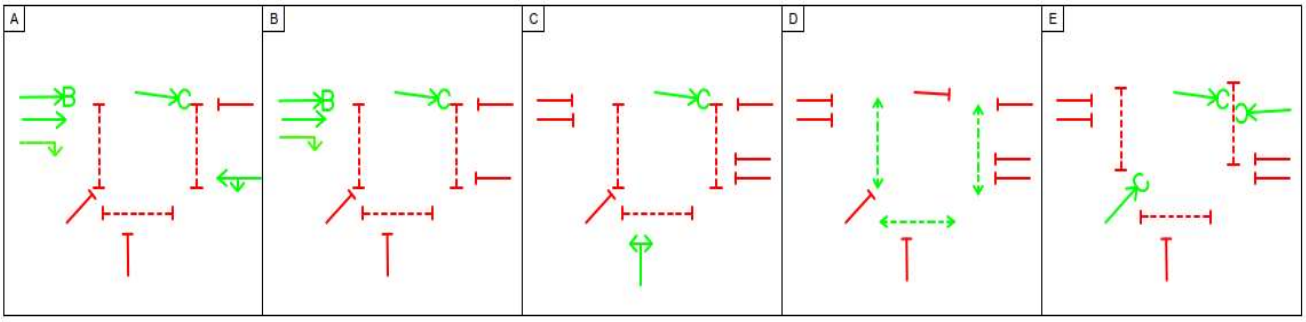
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,129	12%
Bus	11,760	66%
Walk	3,456	20%
Cycle	388	2%
Total	**17733**	**100%**

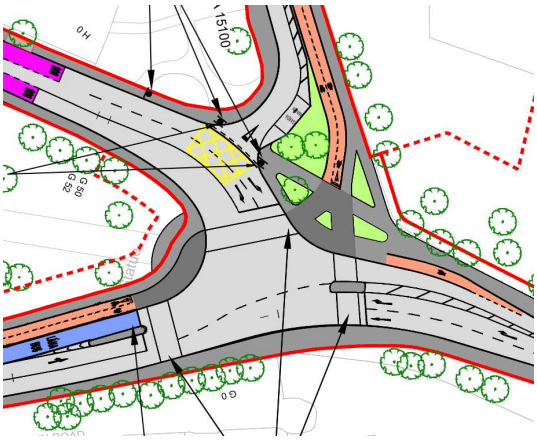
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	38
Junction	**Dublin Road / Shanganagh Road / Corbawn Lane Junction**		

EXISTING

FINAL DESIGN



Summary:

he Dublin Road / Stonebridge Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The roundabout has been converted to a signal controledl junction to improve bus progression and safe crossing for pedestrain and cyclists. Junction Type 1 can be physically accommodated in the southbound direction only. with northbound traffic sharing the approach lane with general traffic due to width constraints through the village. An offline cycleway at Corbawn Lane is linked to Dublin Road with controlled pedestrian crossing facilities improved.

Pedestrian Infrastructure

Improved pedestrian crossing provision developed with signal controlled crossing across all junction arms and desire lines.

Cycle Infrastructure

Segregated two way cycletrack developed on Corbawn Lane and linked to Dublin Road two way cycle track through Toucan crossings. Cycle lane developed on southbound arm of Dublin Road to provide guidance onto shared general traffic lane. Cycle tracks realigned to match desire lines more closely.

Bus Priority Infrastructure

The CBC proposal has full bus priority provided in the southbound direction with the bus lane extending to the stop line. The bus lane is split from general traffic movements in the junction staging allowing a downstream virtual bus lane to be created through Shankill village. This will grant buses priority by getting them ahead of general traffic.

Northbound bus lane not accommodated in the final design to improve overall junction performance, with bus priority provided via bus detection demands and extensions on the approach (a very short section of bus lane was considered in this direction but reduced overall junction performance, resulting in buses being blocked from accessing the short bus lane). A virtual bus lane through Shankill village will provide an extra level of bus priority. This will be achieved by granting buses priority at the upstream Dublin Road/ Olcovar traffic signal junction allowing them to get ahead of general traffic.

Reduced speed limit to 30kph proposed on junction approach.

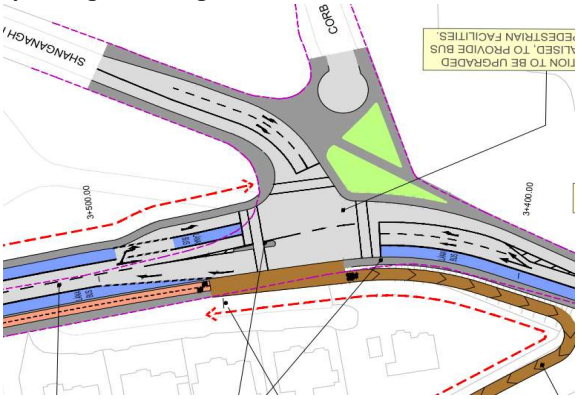
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	38

Design Evolution

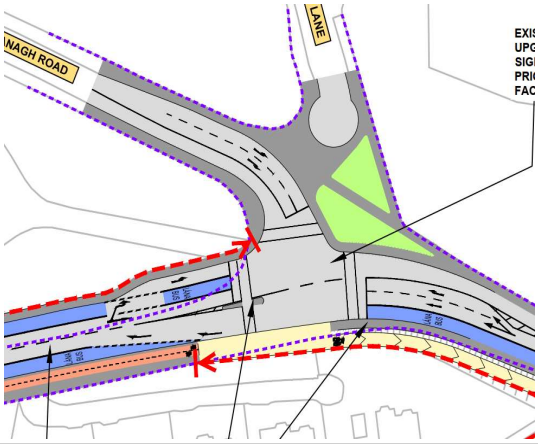
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

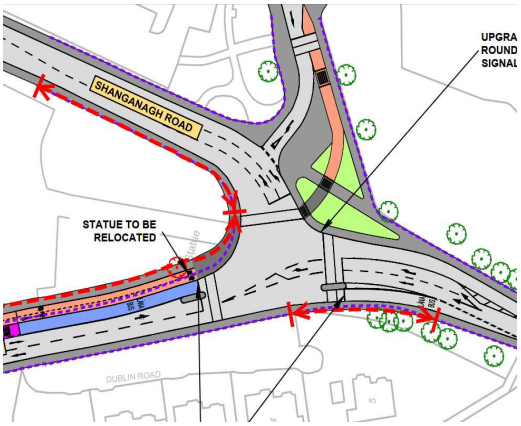
Concept Design Drawing



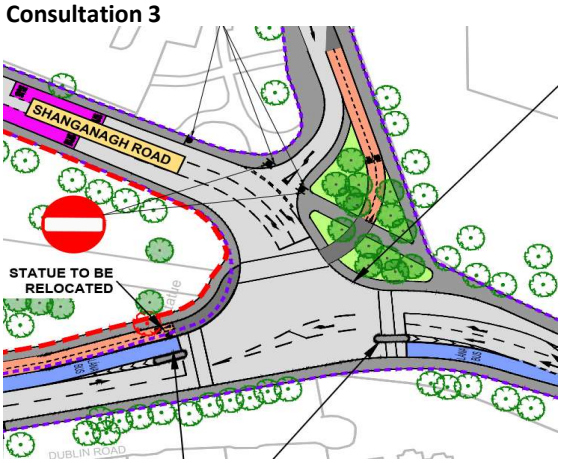
Emerging Preferred Route



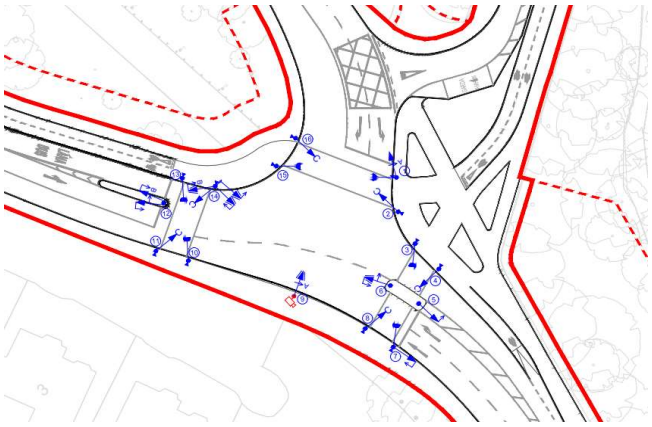
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	38

2028 AM Peak Hours
Fixed Time LinSig Results

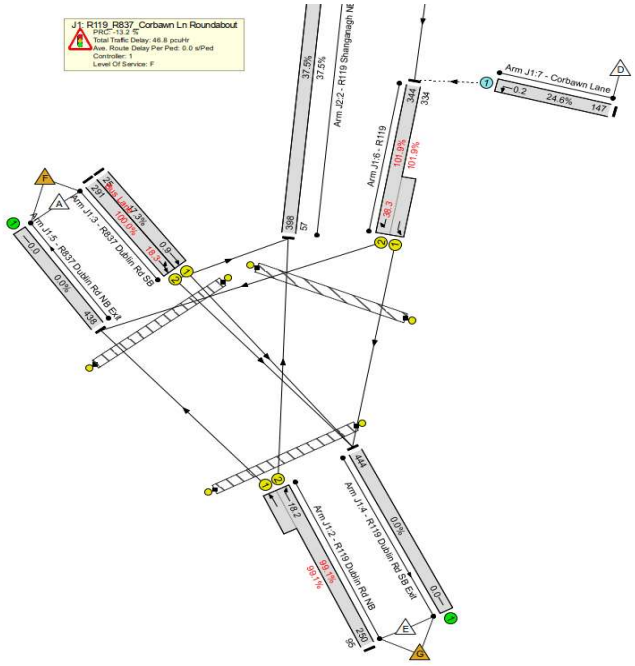
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: **-4.3%**
PM: **-2.7%**

Junction Delay:
AM: 27.64 pcu/Hr
PM: 23.63 pcu/Hr

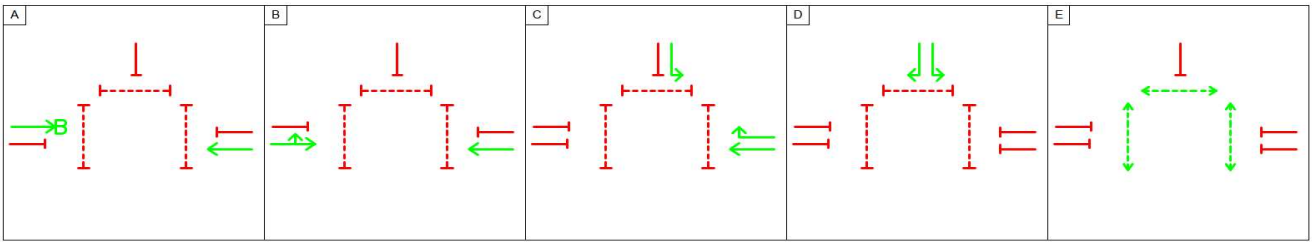
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,541	14%
Bus	7,613	68%
Walk	2,074	18%
Cycle	0	0%
Total	**11228**	**100%**

INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	39
Junction	**Shanganagh Road / Beechfield Manor Junction**		

EXISTING

FINAL DESIGN

Summary:
The junction is not on the CBC route but is closely associated with the operation of the Dublin Road/ Corbawn Lane junction and therefore has potential to impact bus progression. The proposal is to implement a gyratory system incorporating this junction, the Corbawn Lane junction and the roundabout at Dorney Court so that Corbawn Lane can become an entry only one way street into Shanganagh Road.

The CBC 13 proposal is to modify the junction to include a dedicated right turn flare lane into Beechfield Manor, reducing the risk of queuing back to the upstream CBC Dublin Road/ Corbawn Lane junction. A short left tuen flare lane is also proposed to further improve overall junction efficiency.

The three-arm traffic signal junction will also include improved pedestrian infrastructure.

Pedestrian Infrastructure
Pedestrian crossing provided on the northern side of Shanganagh Road providing crossings over all arms of the junction and improving desire lines for pedestrians.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 18 seconds.

Cycle Infrastructure
There is no dedicated cycle infrastructure in the existing arrangement and no dedicated cycle infrastructure is currently proposed as part of the CBC works. Cycles will be encouraged to move along Clonkeen Road to link with Dublin Road by implementation of the dedicated two-way cycle track provision on this route.

Bus Priority Infrastructure
No specific infrastructure in exiting or proposed layout for CBC 13.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	39

Design Evolution

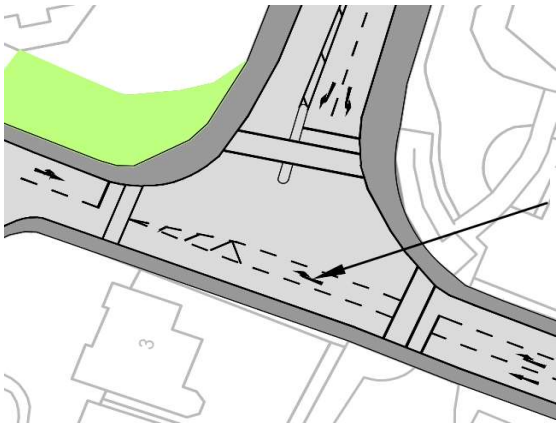
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

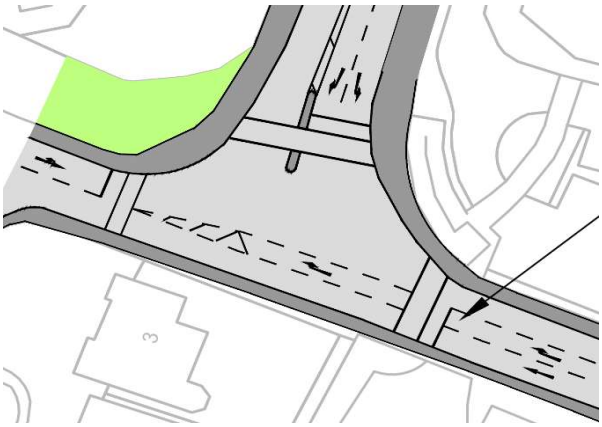
Concept Design Drawing

Emerging Preferred Route

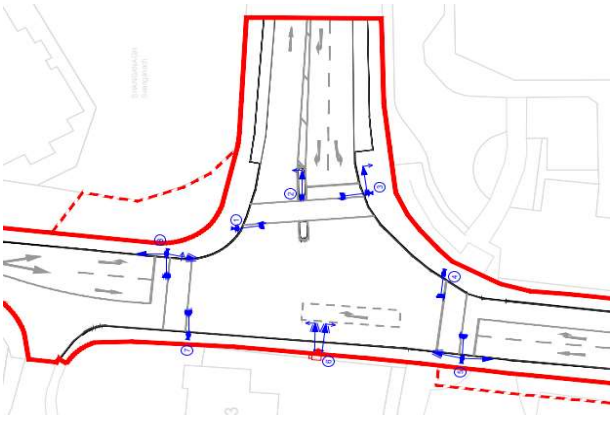
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	39

2028 AM Peak Hours
Fixed Time LinSig Results

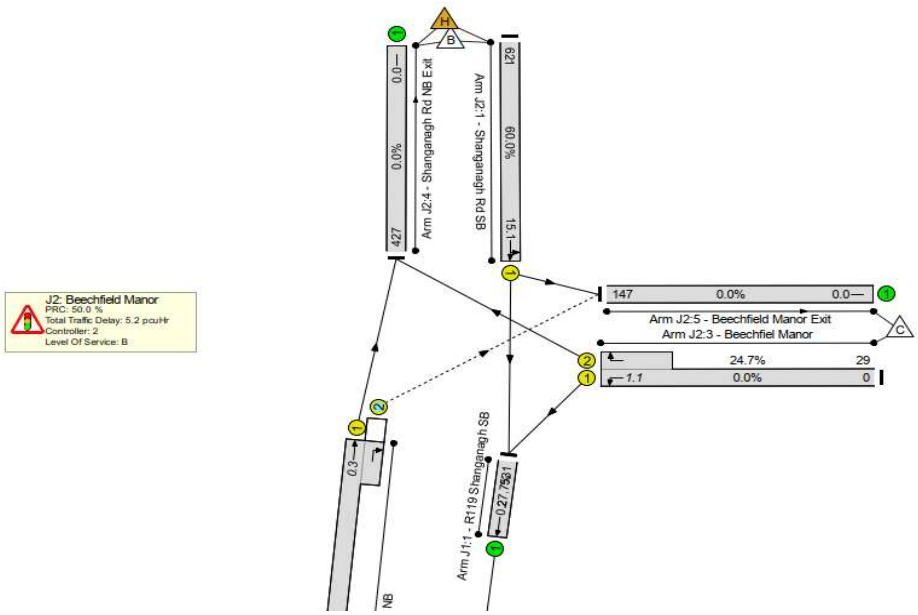
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 91.1%
PM: 65.2%

Junction Delay:
AM: 3.77 pcu/Hr
PM: 4.42 pcu/Hr

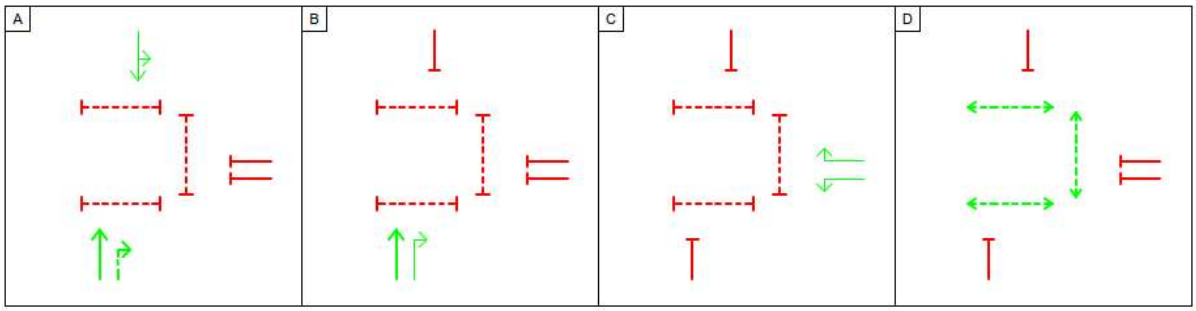
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,959	59%
Bus	0	0%
Walk	2,074	41%
Cycle	0	0%
Total	**5033**	**100%**

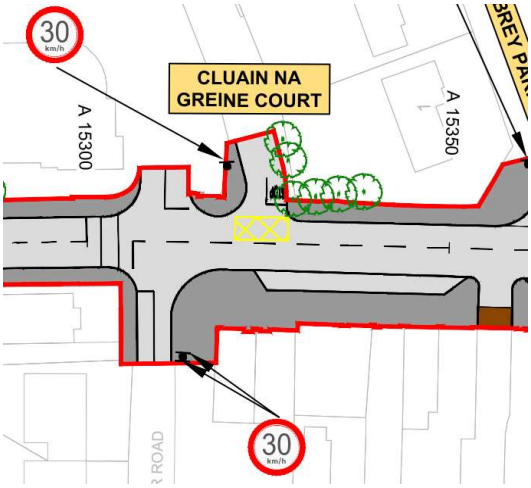
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	40
Junction	**Dublin Road / Lower Road Junction**		

EXISTING

FINAL DESIGN



Summary:

The Dublin Road / Lower Road priority junction has been considered for a possible upgrade as part of the NTA Dublin Bus Connects scheme to primarily improve facilities for pedestrian and help manage bus progression through Shankill village.

The four-arm priority junction is a site that features significant pedestrian crossing movements with no strictly defined desire line at present. Therefore, the CBC 13 proposal considered full signalisation to allow controlled crossing facilities across all arms. However, following public / stakeholder consultation and significant traffic modelling analysis, the option to develop a fully signalised junction was not considered the most desirable solution for all users. The preferable solution was to take forward a mid-block crossing facility to create a safer route for pedestrians across the busier Dublin Road carriageway.

Pedestrian Infrastructure

The CBC 13 proposal will include for a new pedestrian crossing to the north of Lower Road to providea safe route for pedestrians and improved access to services.

Cycle Infrastructure

No significant change from existing arrangement.

Bus Priority Infrastructure

The new mid-block crossing is not expected to impact bus progression, but technology can be implemented to ensure buses get appropriate progression under specific circumstances, such as late running.

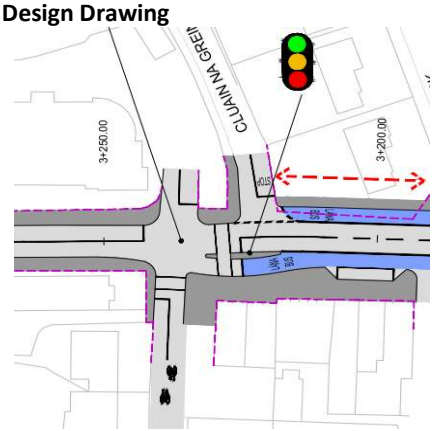
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	40

Design Evolution

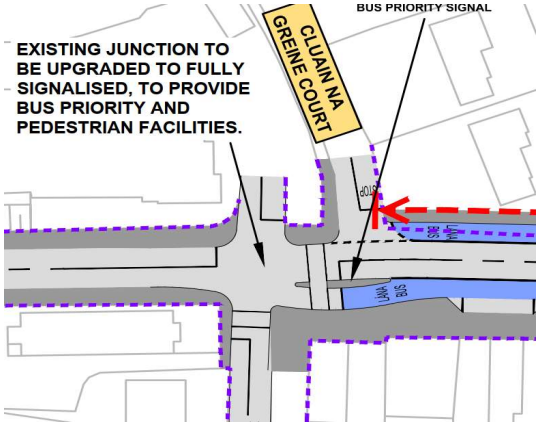
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

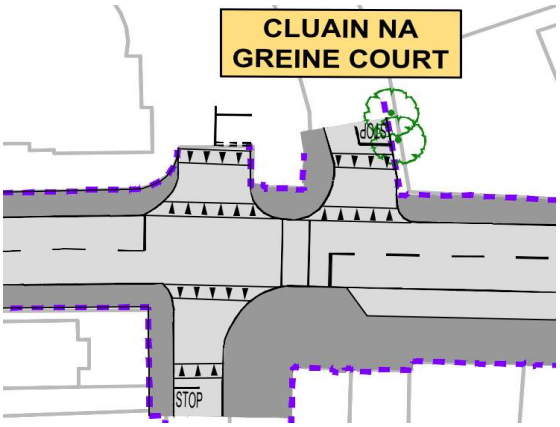
Concept Design Drawing



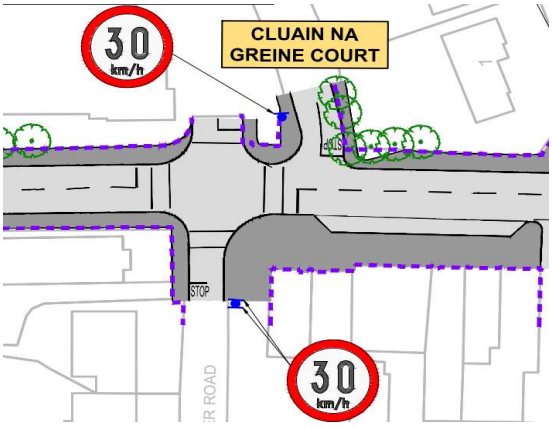
Emerging Preferred Route



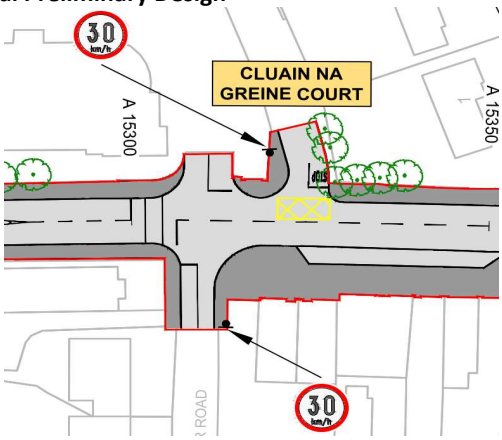
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	40

2028 AM Peak Hours
Fixed Time LinSig Results

Network Layout Diagram

Standard Mid-block Crossing Operation

2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: NA

Junction PRC:
AM: NA
PM: NA

Junction Delay:
AM: NA
PM: NA

People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	N/A	
Bus		
Walk		
Cycle		
Total	**0**	**0%**

INDICATIVE METHOD OF CONTROL

Standard Mid-block Crossing Operation

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	41

Junction **Dublin Road / Quinns Road / Cherrington Road Junction**

EXISTING

FINAL DESIGN

Summary:
The Dublin Road / Quinns Road / Cherrington Road junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The four-arm roundabout is being modified to a four-arm traffic signal junction to include improved pedestrian and bus infrastructure.

General traffic flows were found to be relatively low in the traffic modelling analysis suggesting northbound and southbound bus movements can share with general traffic movements with minimal impact.

Pedestrian Infrastructure
There are no controlled crossing facilities under the current roundabout arrangement.

The CBC 13 proposal allows for pedestrian crossing to be implemented across all arms of the junction significantly improving pedestrian safety and desire lines.

A dedicated wrap around pedestrian stage is provided with 6 seconds of green time and an intergreen of 18 seconds.

Cycle Infrastructure
No new dedicated provision for cycles is proposed for the junction as an alternative quiet route is being promoted. However, the removal of the roundabout and application of traffic signals may improve overall safety and ease of access to all routes for cycles progressing through the junctiion.

Bus Priority Infrastructure
Bus priority in both directions will be provided via bus detection demands and extensions on the immediate approaches to the junction. Additional priority is achieved via virtual bus lanes through Shankill village. The junctions at Corbawn Lane to the north and Olcovar to the south have bus pre-signal facilities granting buses the opportunity to get ahead of general traffic.

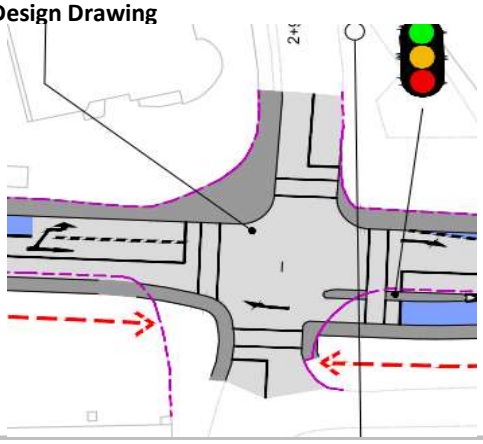
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	41

Design Evolution

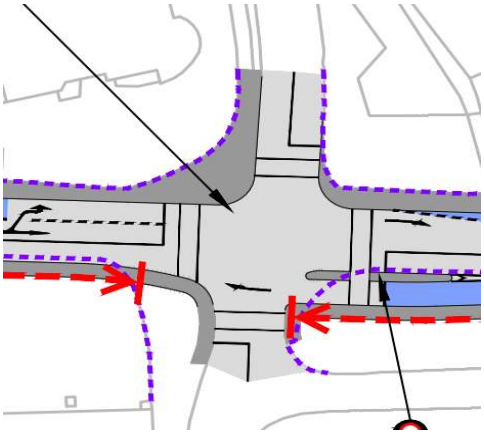
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

Concept Design Drawing



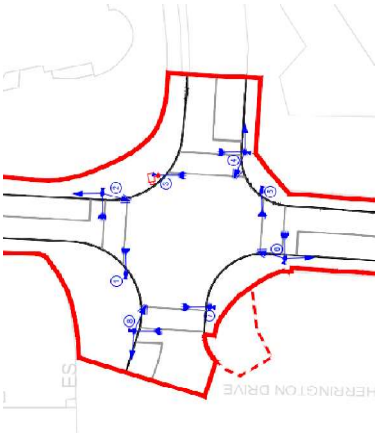
Emerging Preferred Route



Public Consultation 2

Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	41

2028 AM Peak Hours
Fixed Time LinSig Results

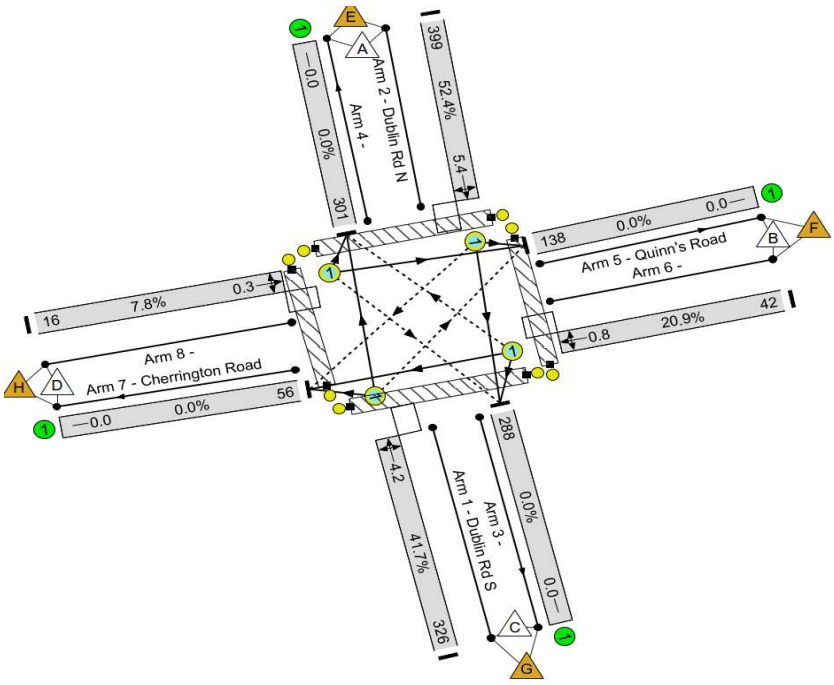
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 60 seconds

Junction PRC:
AM: 86.1%
PM: 71.8%

Junction Delay:
AM: 3.94 pcu/Hr
PM: 4.13 pcu/Hr

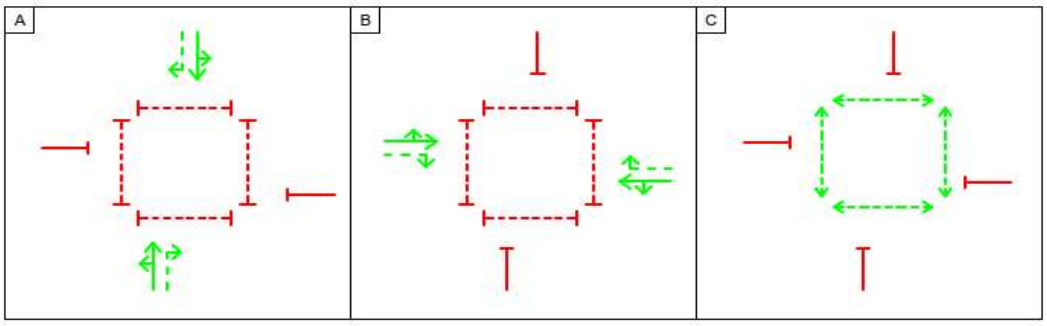
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,381	30%
Bus	0	0%
Walk	5,530	70%
Cycle	0	0%
Total	**7911**	**100%**

INDICATIVE METHOD OF CONTROL

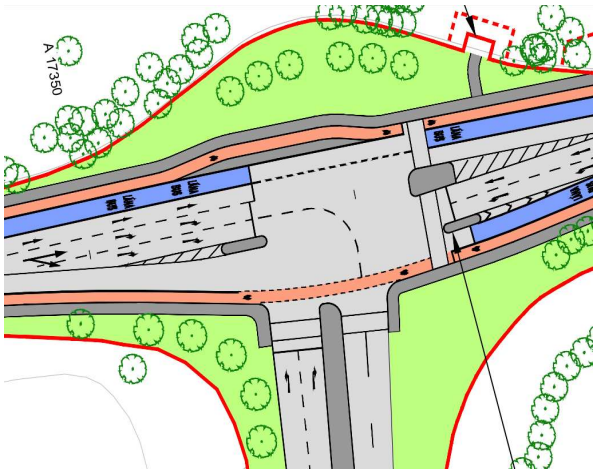


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	42

Junction **Dublin Road / M11 Junction**

EXISTING

FINAL DESIGN



Summary:
Roundabout has been converted to signal controlled junction to improve bus progression and provide safe crossing facilities for pedestrians and cyclists. Signal control will also facilitate linkage to a potential future access to new residential developemnt to the south of the junction. Junction Type 1 can be physically accommodated in southbound and northbound directions. Cycle lanes have been improved and have been taken through the junction. Pedestrian crossings have been improved.

Pedestrian Infrastructure
Signal controlled pedestrian crossings added along desire lines on side road and southern arm. Southbound pedestrian crossing runs alongside cycletrack and mainline refuge island added to allow straight through crossings and improve pedestrian desire lines. Split phasing for pedestrian movements retained to minimise the impact on traffic.

Cycle Infrastructure
Cycle protection has been improved with protected approaches. Southbound cycle tracks run independantly of the traffic cycles and are only stopped at the conflicting pedestrian movement. Northbound cycles move with buses. No right or left turn cycle movements provided for M11 side road.

Bus Priority Infrastructure
Full bus priority provided. Northbound and Southbound buses and cycle movements run together.

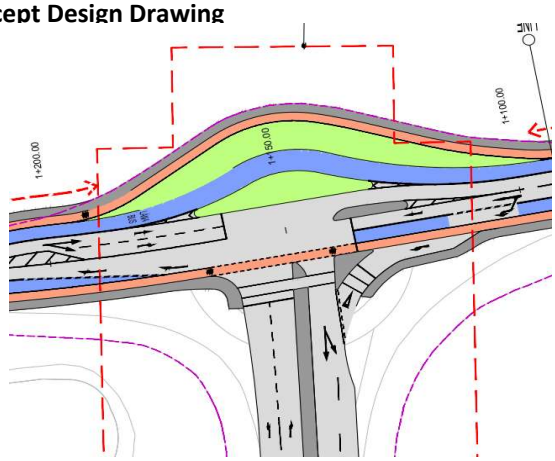
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	42

Design Evolution

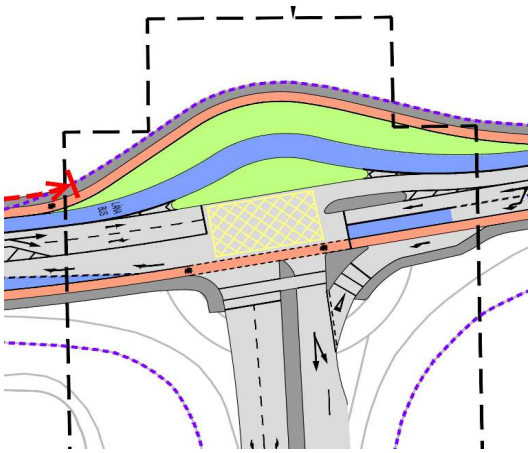
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

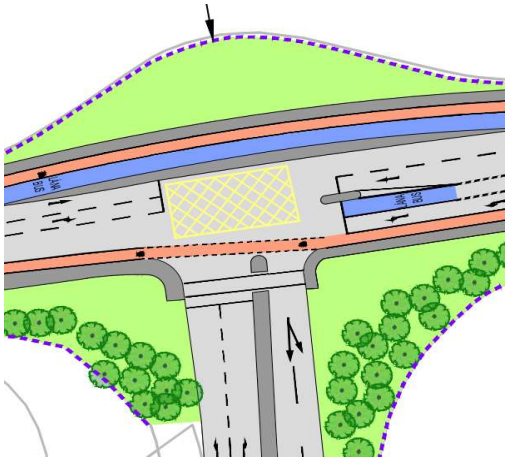
Concept Design Drawing



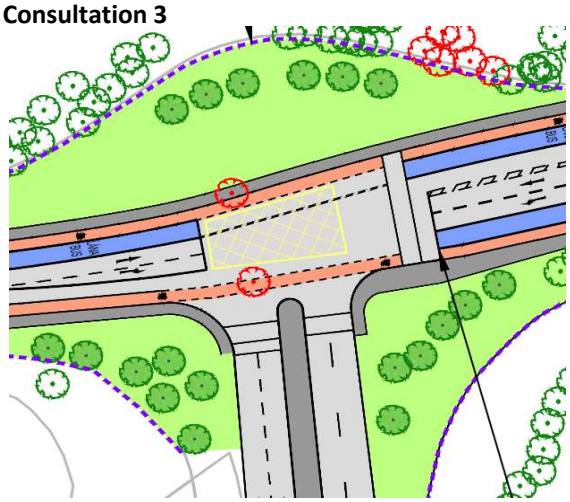
Emerging Preferred Route



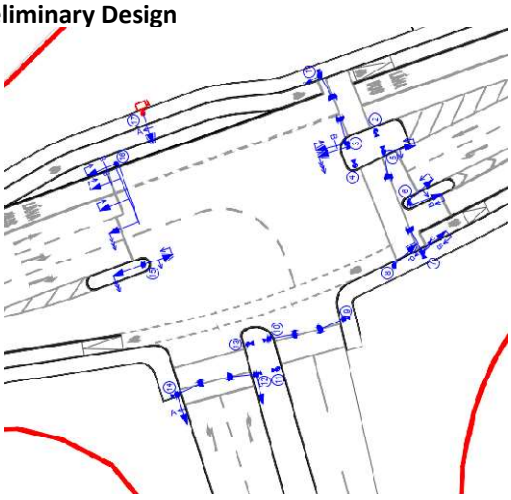
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	42

2028 AM Peak Hours
Fixed Time LinSig Results

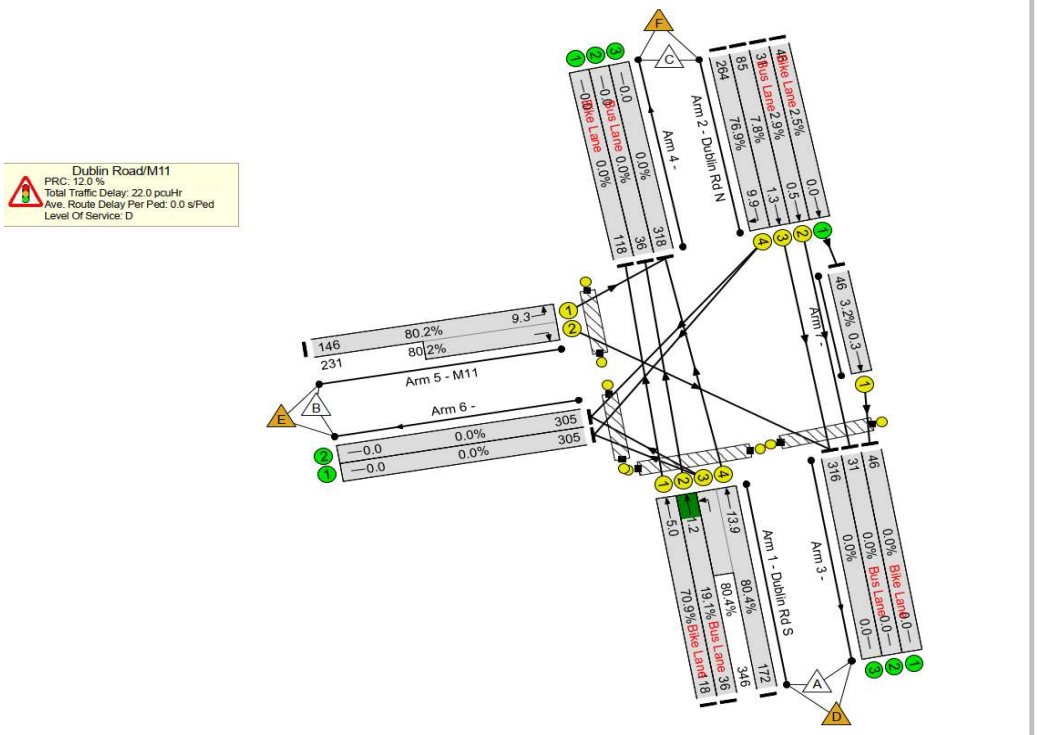
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 12.0%
PM: 27.7%

Junction Delay:
AM: 22.02 pcu/Hr
PM: 16.33 pcu/Hr

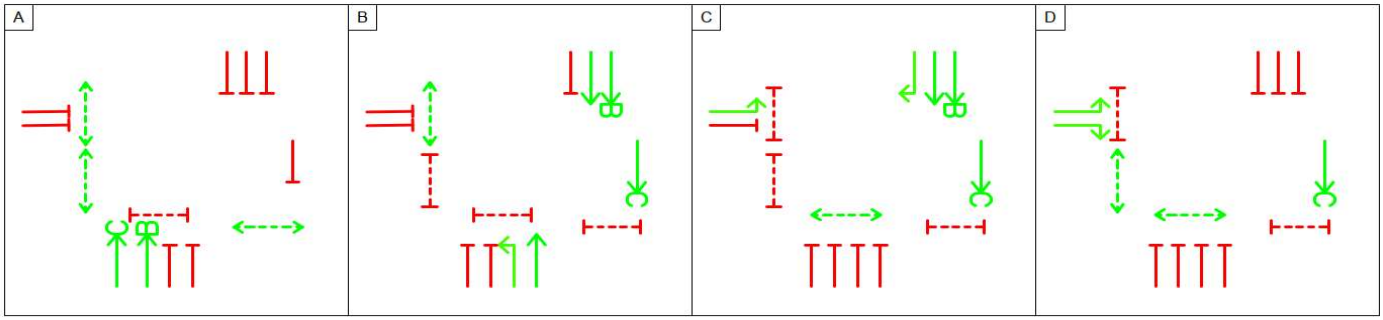
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,052	4%
Bus	67,568	91%
Walk	2,650	4%
Cycle	410	1%
Total	**73680**	**100%**

INDICATIVE METHOD OF CONTROL

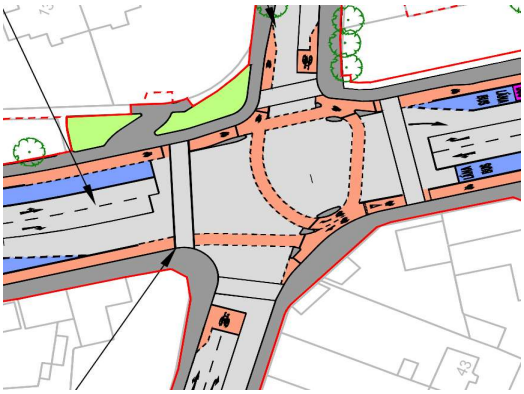


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	43

Junction **Dublin Road / Corke Abbey Avenue Junction**

EXISTING

FINAL DESIGN



Summary:
Junction Type 1 can be physically accommodated in both directions. Slip lanes removed onto Corke Abbey Avenue to improve pedestrian crossings. Cycle lanes improved with protected movement onto side roads.

Pedestrian Infrastructure
Pedestrian crossings improved with the removal of slip road onto Corke Abbey Avenue to reduce the number of crossings and wait times. Pedestrian crossing implimented across Corke Abbey Avenue side road. Crossing lengths are long over the mainline but within the bounds of 19m set out in the BusConnects Design Guide. A dedicated wrap around pedestrian crossing phase is demanded as required.

Cycle Infrastructure
Cycle lanes have been improved with protected approaches around junction. Updated arrangement provided to improve Corke Abbey Avenue tie-in by removing slip road. Single signal controlled crossing of road carriagway and cycle track provided. cycle lane lead ins and Advance Stop Lines for cyclists provided on side roads to improve junction tie in.

Bus Priority Infrastructure
Full bus priority provided. Northbound and Southbound buses and cycle movements run together.

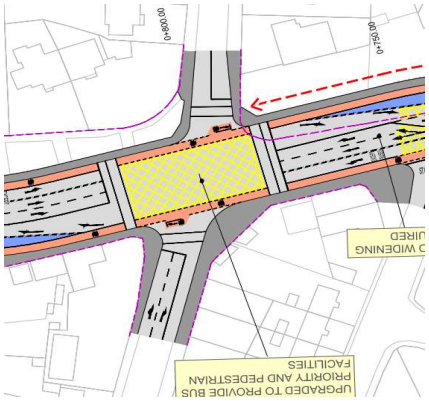
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	43

Design Evolution

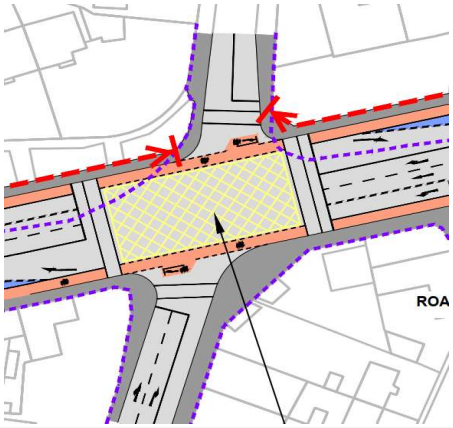
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

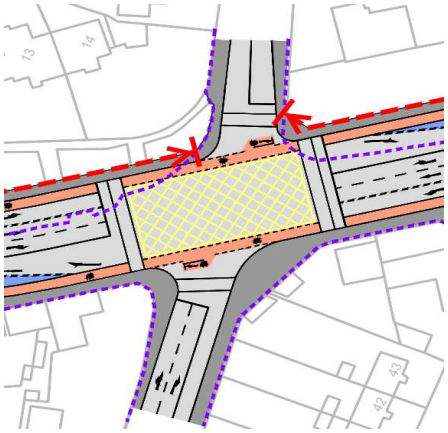
Concept Design Drawing



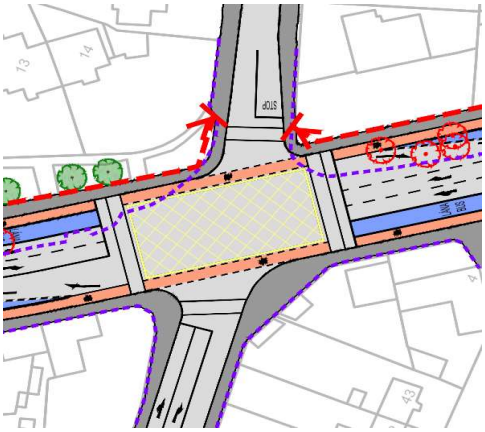
Emerging Preferred Route



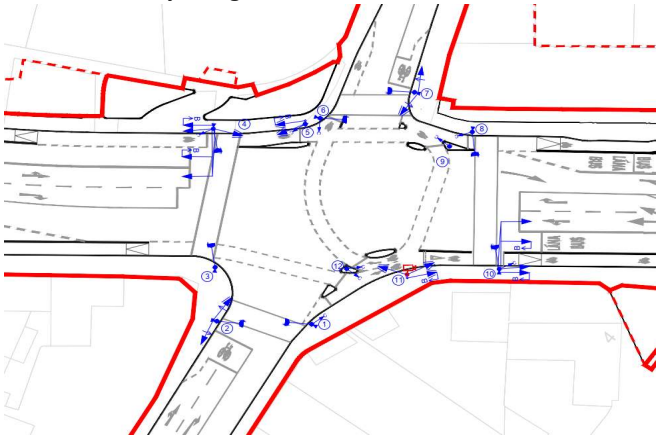
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	43

2028 AM Peak Hours
Fixed Time LinSig Results

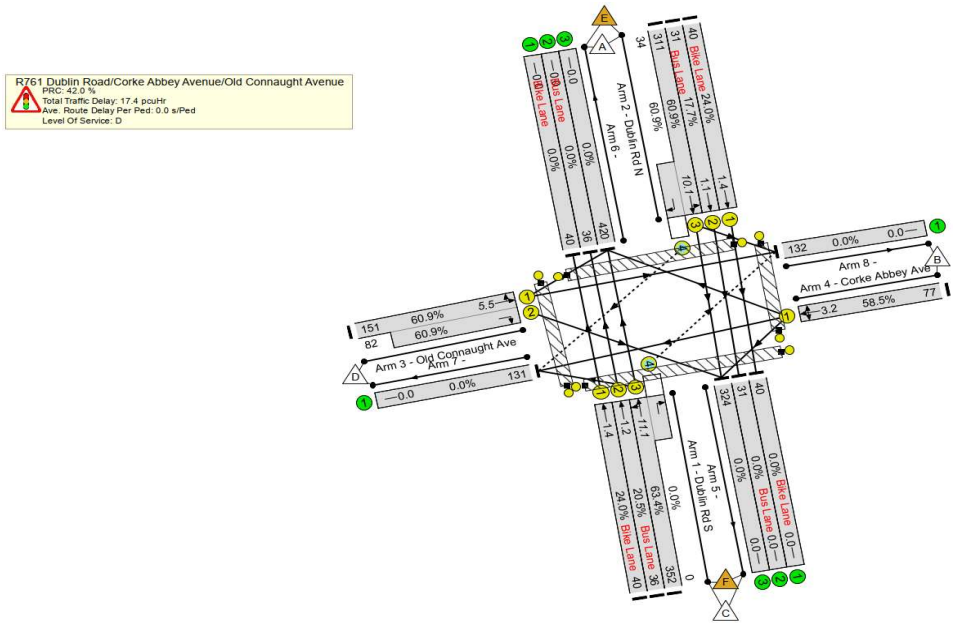
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 36.4%
PM: 24.5%

Junction Delay:
AM: 12.28 pcu/Hr
PM: 21.59 pcu/Hr

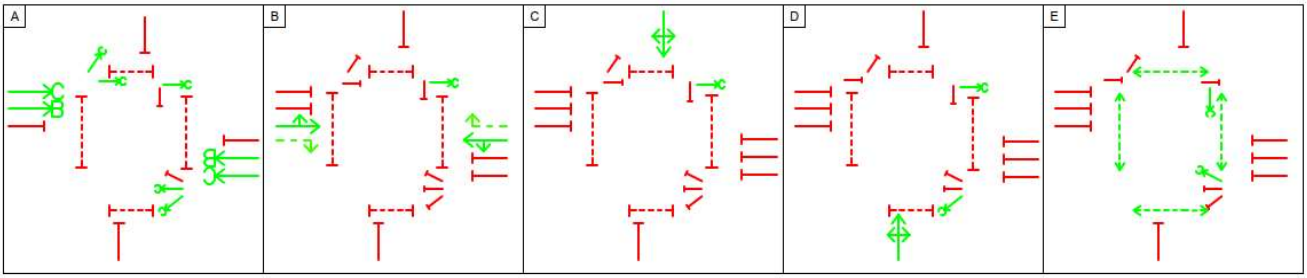
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,840	8%
Bus	18,480	79%
Walk	2,765	12%
Cycle	303	1%
Total	**23388**	**100%**

INDICATIVE METHOD OF CONTROL

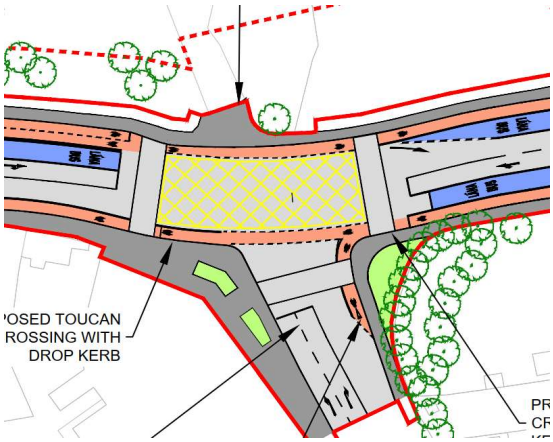


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	44

Junction **Dublin Road / Upper Dargle Road Junction**

EXISTING

FINAL DESIGN



Summary:
Junction Type 1 can be physically accommodated in both directions. Slip lanes removed onto Upper Dargle Road to improve pedestrian crossings. Wrap around pedestrian crossing provision has been retained. Cycle lanes improved with protected movement onto Upper Dargle Road northbound.

Pedestrian Infrastructure
Pedestrian crossings improved with the removal of slip road onto Upper Dargle Road to reduce the number of crossings and wait times. Toucan crossing implimented across northern arm of Dublin Road. Crossing lengths are long over the mainline but within the bounds of 19m set out in the BusConnects Design Guide. A dedicated wrap around pedestrian crossing phase is demanded as required.

Cycle Infrastructure
Cycle lanes provided through junction and protected around northbound turn onto Upper Dargle Road. Offline cycle route located in close proximity to the northeast of the junction with toucan crossing tie-in.

Bus Priority Infrastructure
Full bus priority provided. Northbound and Southbound buses and cycle movements run together.

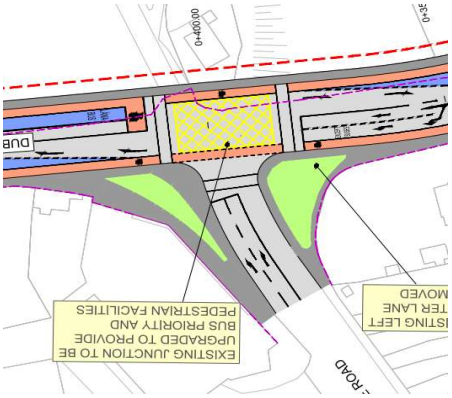
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	44

Design Evolution

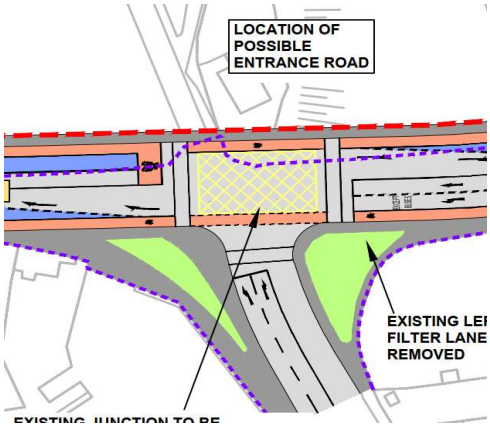
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

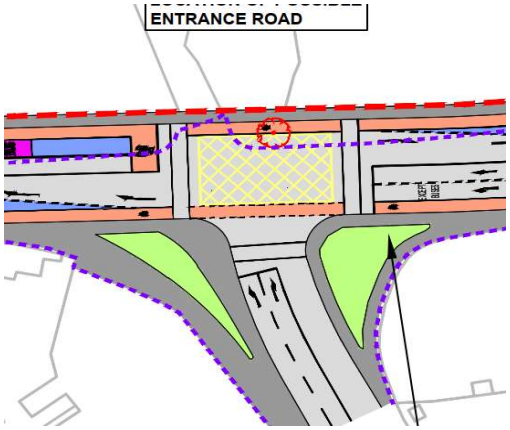
Concept Design Drawing



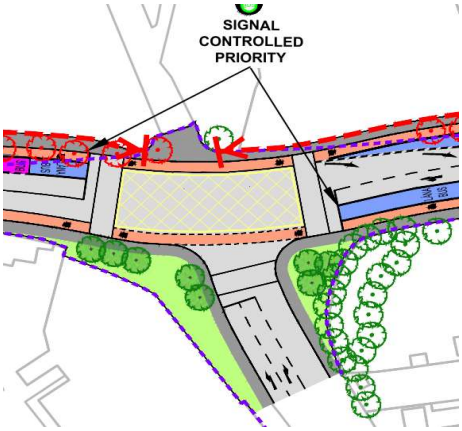
Emerging Preferred Route



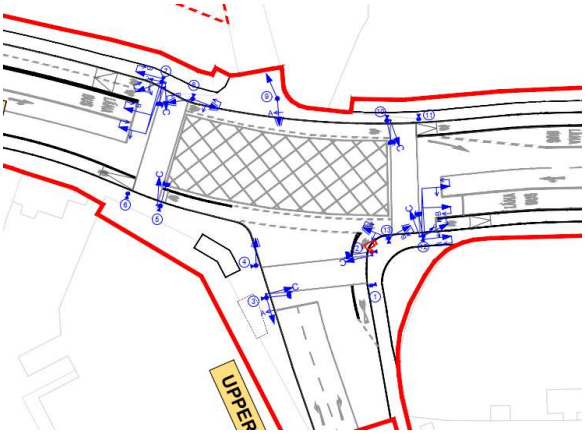
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	44

2028 AM Peak Hours
Fixed Time LinSig Results

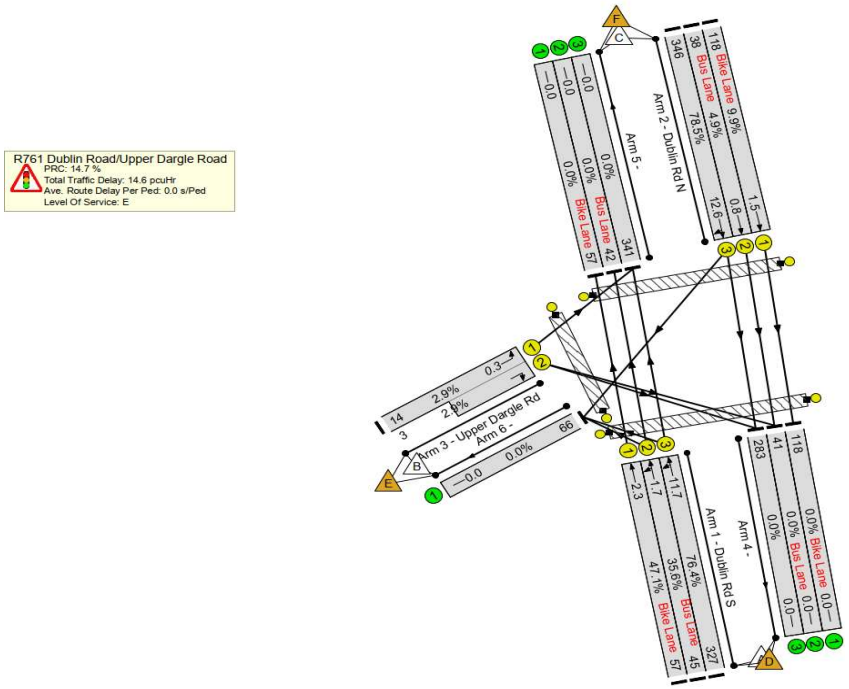
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 36.4%
PM: 14.7%

Junction Delay:
AM: 12.28 pcu/Hr
PM: 14.61 pcu/Hr

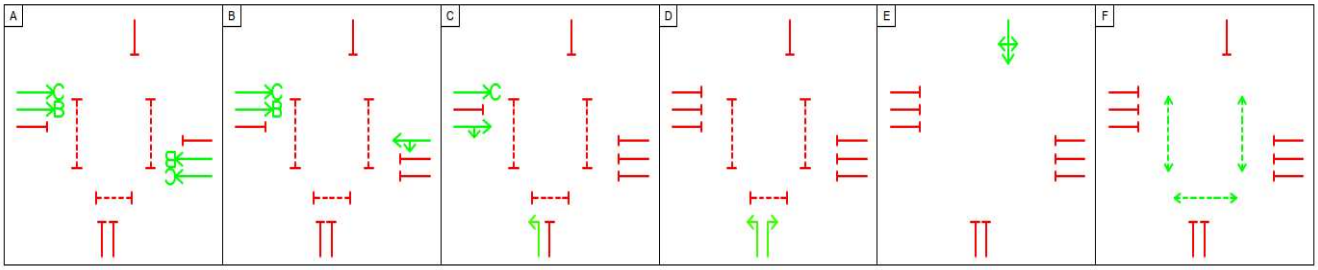
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,643	3%
Bus	45,150	92%
Walk	2,074	4%
Cycle	464	1%
Total	**49331**	**100%**

INDICATIVE METHOD OF CONTROL

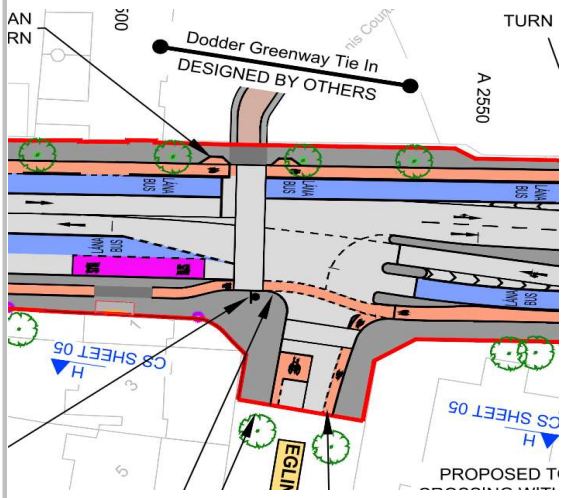


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	45

Junction **Donnybrook Road / Eglington Road Junction**

EXISTING

FINAL DESIGN



Summary:
Junction Type 1 can be physically accomodated in both directions to maximise bus priority through pinch point. Seperation islands designed to provide clear definition for bus signaling. Left turn slip removed and existing right turn ban onto Eglington Road from Donnybrook Road retained. Pedestrian crossing developed linking Dodder Greenway to Eglington Road. Cycle lanes improved and taken through the junction with protected approaches onto Eglington Road.

Pedestrian Infrastructure
Pedestrian crossing provision across the mainline improved with Toucan crossing along desire lines connecting the Dodder Greenway and Eglington Road.

Cycle Infrastructure
Cycle tracks brought through junction with guidance lead ins on southbound mainline to Toucan crossing and Dodder Greenway. Protected cycle tracks provided northbound on mainline and down Eglington Road to tie in to existing cycle lane. Advanced Stop Line provided on approach to mainline from Eglington Road.

Bus Priority Infrastructure
Full bus priority provided with buses and cycle movements runnig together and southbound and northbound general traffic running with southbound buses and cycles.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	45

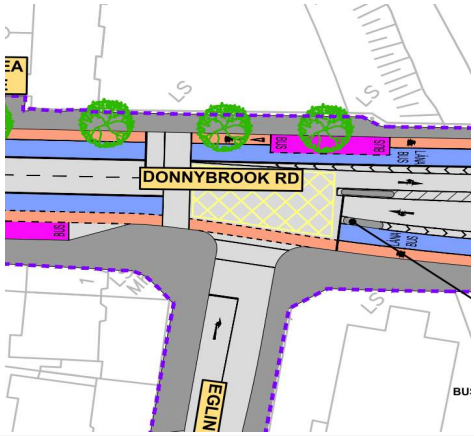
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

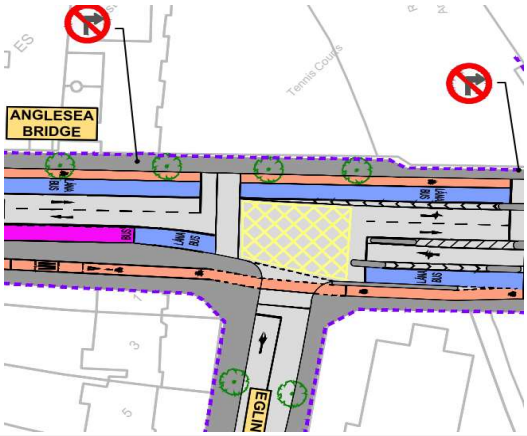
Existing

Concept Design Drawing

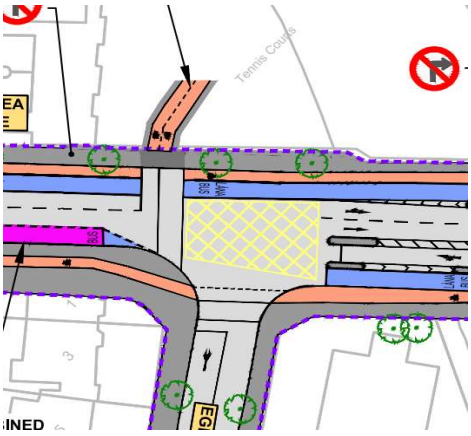
Emerging Preferred Route



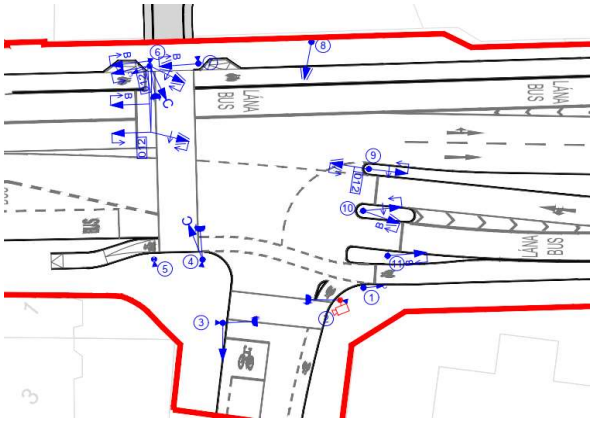
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	45

2028 AM Peak Hours
Fixed Time LinSig Results

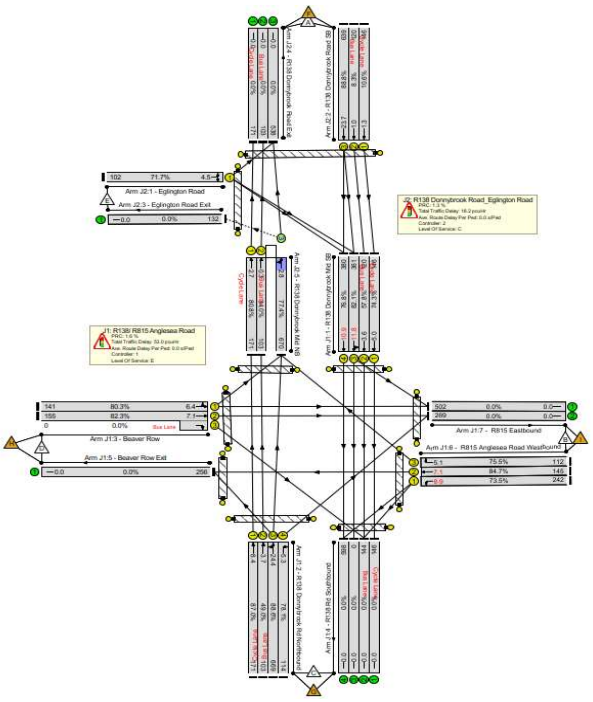
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 1.3%
PM: 9.7%

Junction Delay:
AM: 18.24 pcu/Hr
PM: 16.85 pcu/Hr

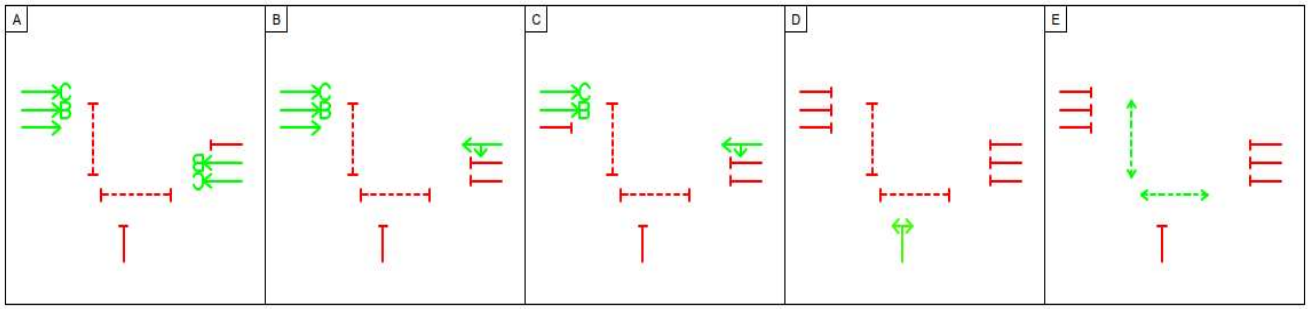
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,071	2%
Bus	92,138	93%
Walk	4,262	4%
Cycle	662	1%
Total	**99133**	**100%**

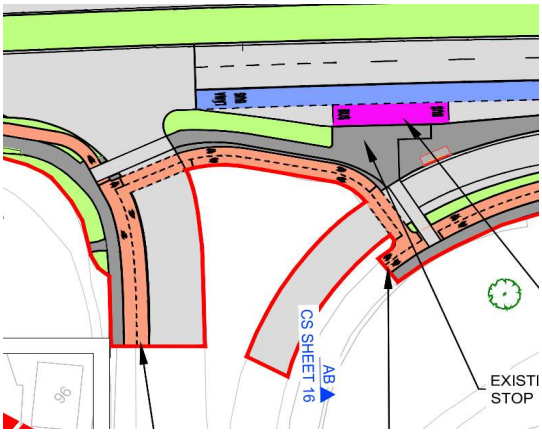
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	46
Junction	**N11 Bray Road / Wyattville Northbound Junction**		

EXISTING

FINAL DESIGN



Summary:
The N11 Bray Road / N11 Bray Road northbound slips junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The junction is split into two nodes that are both operated under the same controller; the merge slip junctionand the diverge slip mid-block crossing. Both nodes will be modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
The pedestrian crossing locations are broadly retained, however, the addition of dedicated crossing points for cycles has removed the interaction between pedestrians and cycles in the central section.

Pedestrians crossings are expected to be given a green period once in every 60 seconds signal cycle.

Cycle Infrastructure
The current arrangement has a bi-directional segregated cycle lane infrastructure on the diverge slip road and through the central section bewteen crossing points. The merge slip has a with flow uni-directional cycle track. The crossing points are currently shared between pedestrians and cycles but are only provided with pedestrian signals.

The CBC 13 proposal has fully segregated cycle provision that provides dedicated movements both northbound and southbound and a new bi-directional cycle track on the merge slip road. The conflict between pedestrians and cycles at crossing points have been designed out with the application of paralled cycle crossings.

Bus Priority Infrastructure
The current arrangement has a northbound bus lane on the N11 Bray Road with an island bus stop on the immediate approach to the signal stop line. This provision leads to buses having to wait while the bus infront loads/unloads passengers, or navigate into a high speed adjacent traffic lane.

The CBC proposal removes the island provision and provides a layby in its place, allowing buses to stop and pass at the same time. The bus lanes extends to the stop line to maximise bus progression.

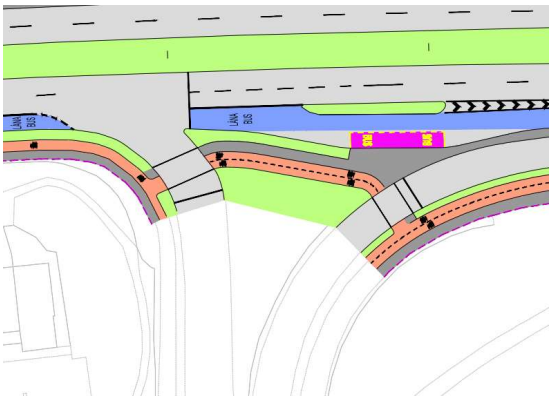
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	46

Design Evolution

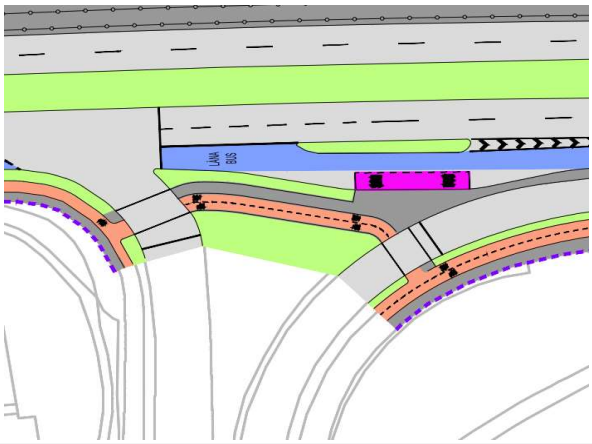
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

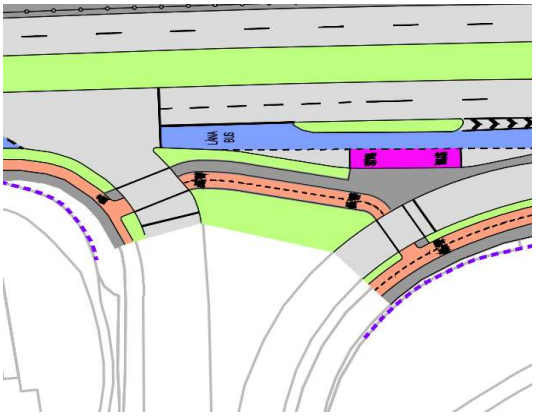
Concept Design Drawing



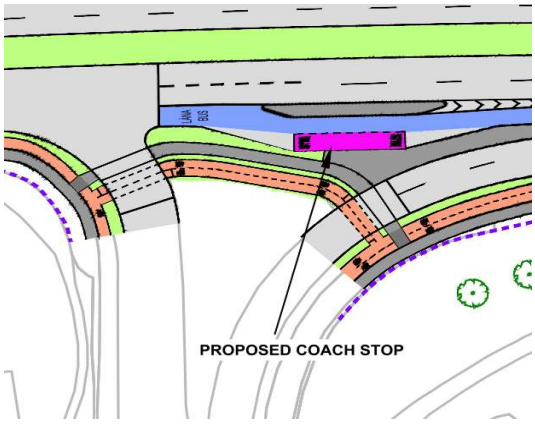
Emerging Preferred Route



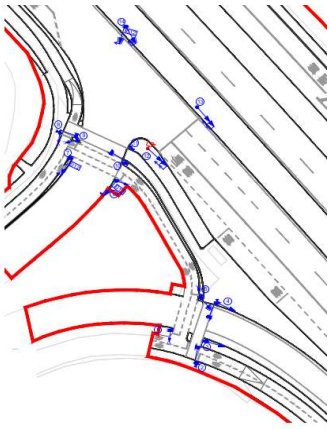
Public Consultation 2



Public Consultation 3



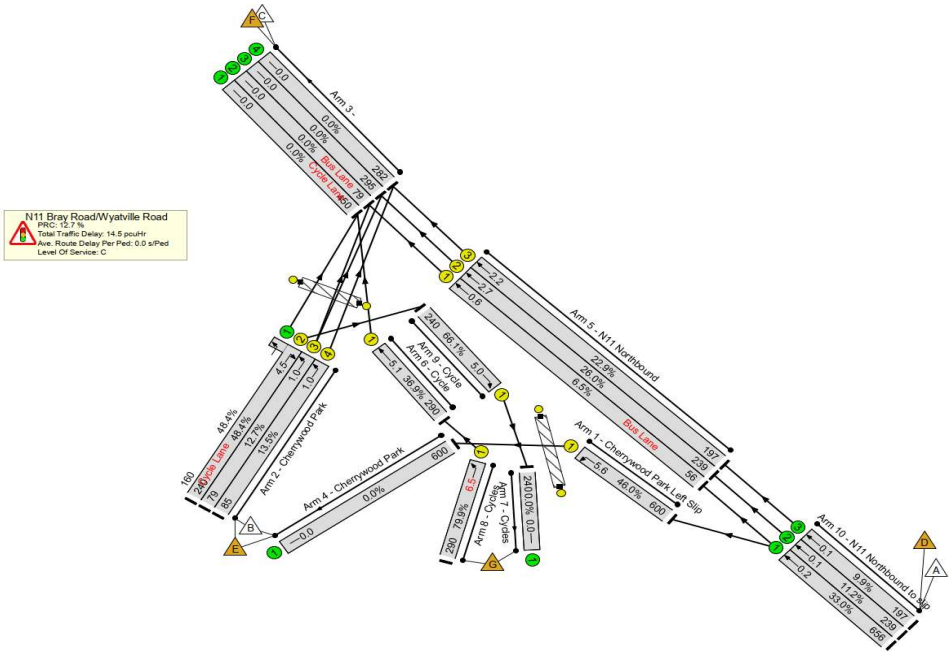
Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	46

2028 AM Peak Hours
Fixed Time LinSig Results

Network Layout Diagram



2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 60 seconds

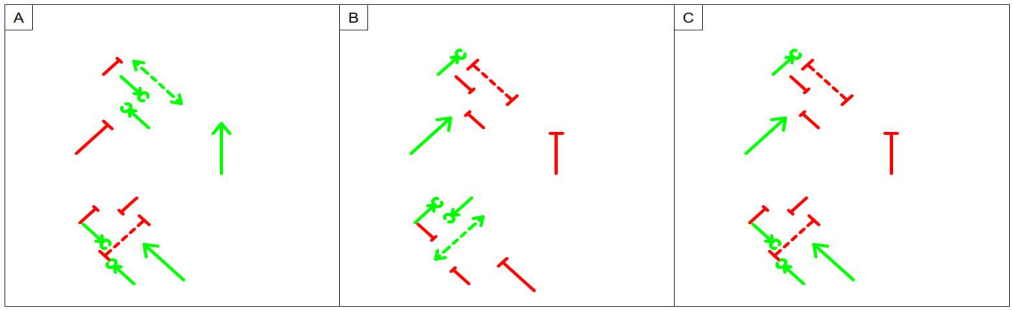
Junction PRC:
AM: 12.7%
PM: 12.7%

Junction Delay:
AM: 17.79 pcu/Hr
PM: 14.13 pcu/Hr

People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	3,635	7%
Bus	45,150	86%
Walk	2,765	5%
Cycle	1,300	2%
Total	**52850**	**100%**

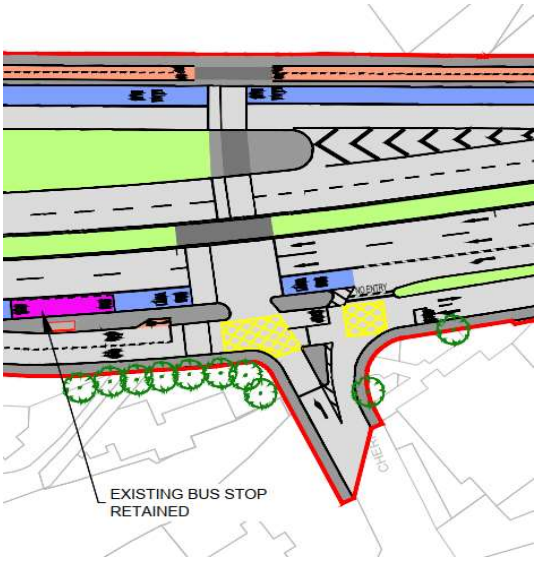
INDICATIVE METHOD OF CONTROL



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	47
Junction	**N11 Bray Road / Cherrywood Road Junction**		

EXISTING

FINAL DESIGN



Summary:
The N11 Bray Road / Cherrywood Road (Silver Tassie) junction is being upgraded as part of the NTA Dublin Bus Connects scheme which will provide connectivity from Bray to Dublin City Centre for buses, cyclists and pedestrians.

The junction is effectively made up of two mid-block crossings in the southbound direction and a complex T junction in the northbound direction that manages the interaction between the N11 northbound movement, Cherrywood Road and the two minor access roads that run parallel to the mainline and provide access to local services. The junction is being modified to include improved pedestrian, cycle and bus infrastructure.

Pedestrian Infrastructure
The current arrangement has controlled crossings for pedestrians and cycles connecting the footway and segregated cycle way on the the N11 southbound merge slip with the north side of the minor access Bray Road. No controlled crossing is offered over this minor access road.

The CBC proposal is to retain the wide shared pedestrian and cycle crossing provision linking the footway and two-way segregated cycle track on the N11 southbound merge slip with the quiet minor access roads and associated footways on the western side of the carriageway, but provide a fully controlled route that avoids the exposed triangular island that separates the N11 northbound from the minor access roads.

A dedicated pedestrian stage is provided with 6 seconds of green time and an intergreen of 10 seconds. Some crossings can also function as "walk with traffic" allowing operation across multiple stages. This increases the opportunities for pedestrian to progress through the junction and reduces pedestrian delay.

Cycle Infrastructure
The current arrangement has a two-way cycle track running along the east side of junction. Shared use pedestrian and cycle crossings are used to connect the cycle track with the quiet streets on the western side of the N11.

The CBC proposal is to retain the two-way cycle track and wide shared pedestrian and cycle crossing provision linking cycle facilities to the east and west of the N11, but provide better cycle connectivity with the quiet minor access roads.

Bus Priority Infrastructure
For the N11 southbound merge slip, the CBC proposal is to retain the bus lane from the existing arrangement which extends to the stop line of the crossing point and continues on the exit of the crossing.

For the N11 northbound approach, the CBC proposal is for a third lane to be added broadly from Loughlinstown roundabout to this junction, specifically for buses. On the immediate approach to the junction a gap is provided for general traffic to merge across the bus lane to turn left and exit via the priority junction, before the bus lane commences again on the immediate approach to the signal stop line. This arrangement is expected to provide good progression for buses with minimal impact from general traffic. The proposed bus lane provision is a significant improvement over the existing layout.

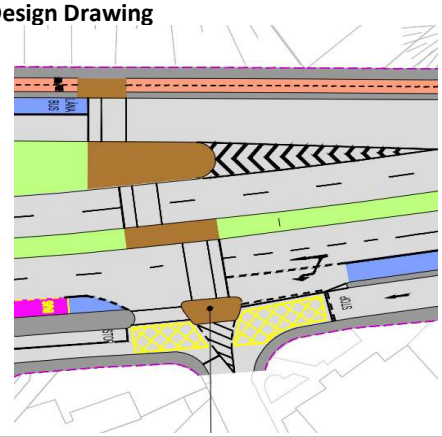
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	47

Design Evolution

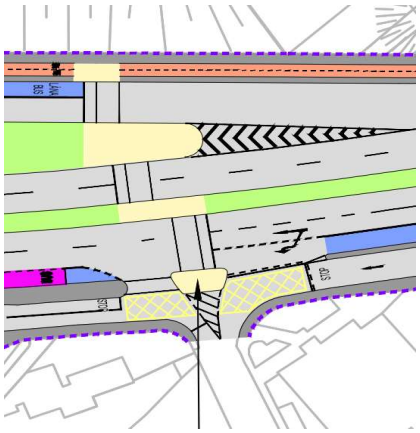
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

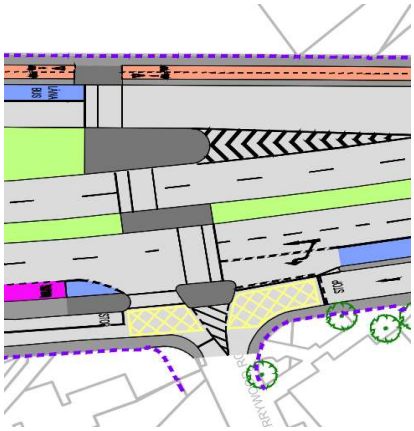
Concept Design Drawing



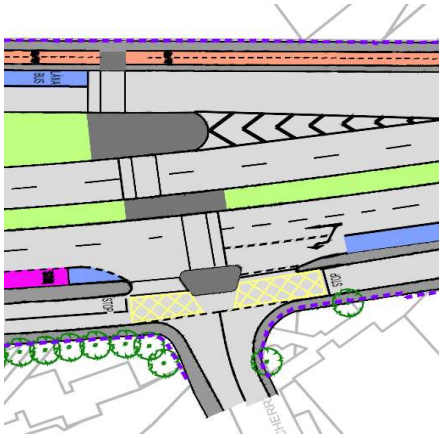
Emerging Preferred Route



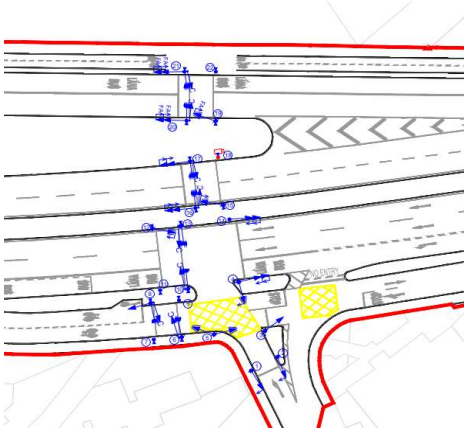
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	47

2028 AM Peak Hours
Fixed Time LinSig Results

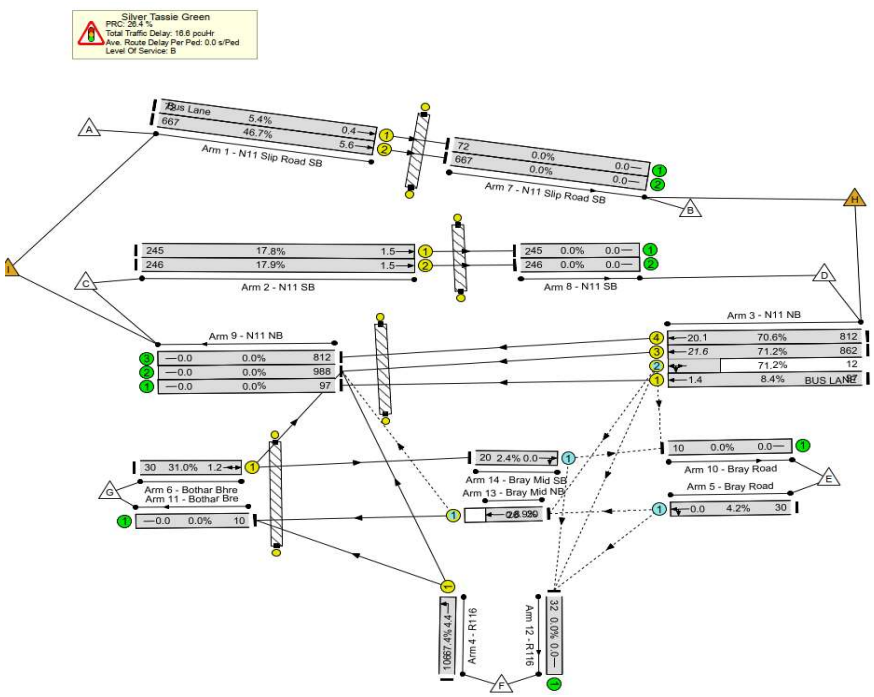
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 26.4%
PM: 54.7%

Junction Delay:
AM: 16.54 pcu/Hr
PM: 10.73 pcu/Hr

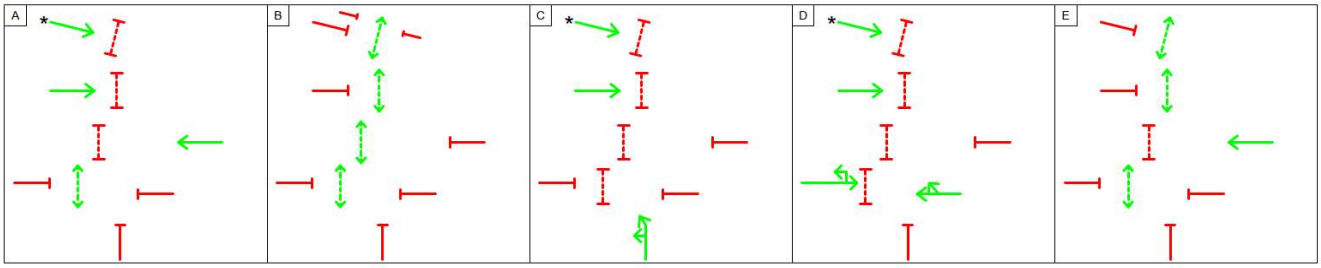
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	6523	5%
Bus	107205	88%
Walk	6106	5%
Cycle	2106	2%
Total	**121940**	**100%**

INDICATIVE METHOD OF CONTROL



* DENOTES FLASHING AMBER

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	48

Junction	**Dublin Road / Shanganagh Park Junction**

EXISTING

FINAL DESIGN

Summary:
Junction Type 1 provided in the northbound and southbound directions. Development junction received at Stage A and modified for BusConnects design guide requirements. Cycle lanes improved and taken through junction. Pedestrian crossings improved to toucan and provided on both arms on either side of new Shanganagh Park side road entrance.

Pedestrian Infrastructure
Pedestrian crossings modified to tie in with new Shanganagh Road entrance. Two toucan crossings designed on either side of junction, with pedestrian crossing provided across new side road. Pedestrian phase in one cycle as demanded

Cycle Infrastructure
Cycle lanes provided through junction. Cycle guidance crossings tie-in provided on northern Toucan arm.

Bus Priority Infrastructure
Full bus priority provided. Northbound an Southbound buses and cycles move at the same phase and northbound buses and cycles move with general northbound and southbound traffic.

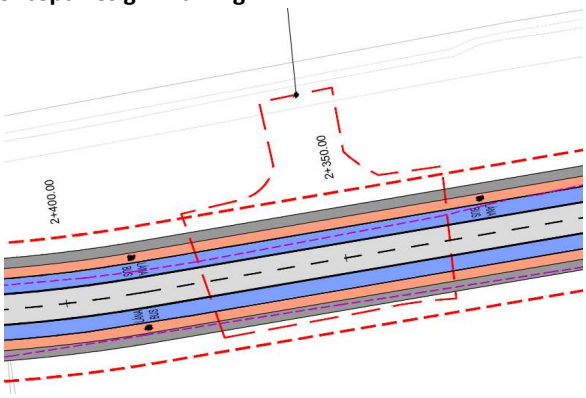
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	48

Design Evolution

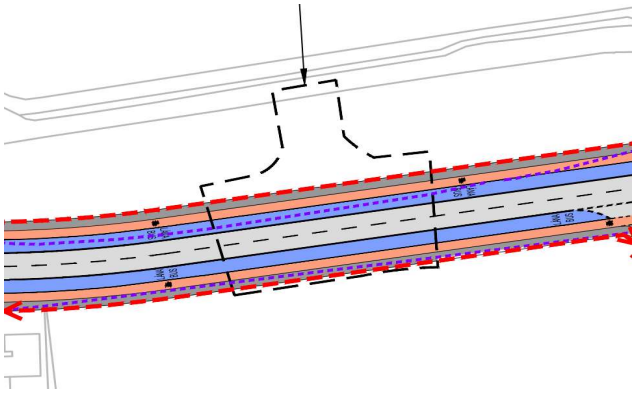
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

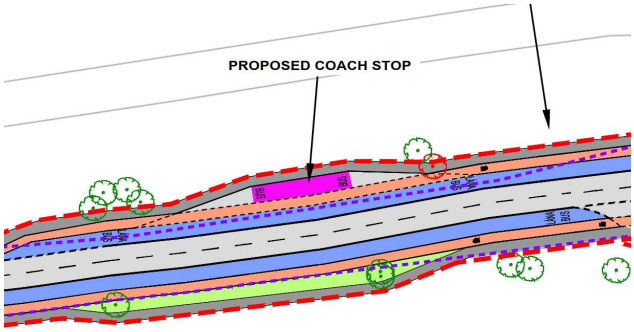
Concept Design Drawing



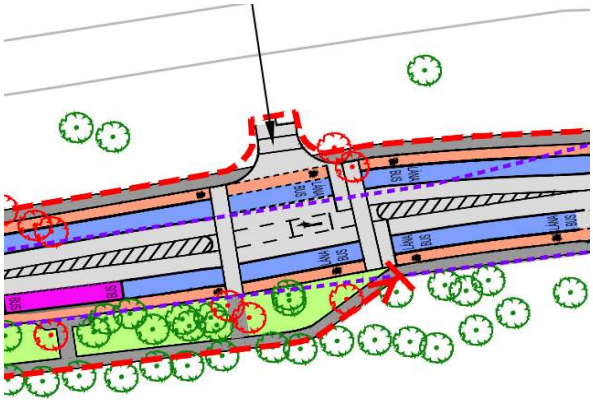
Emerging Preferred Route



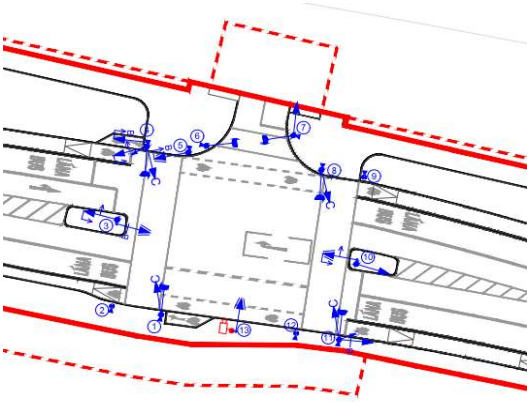
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	48

2028 AM Peak Hours
Fixed Time LinSig Results

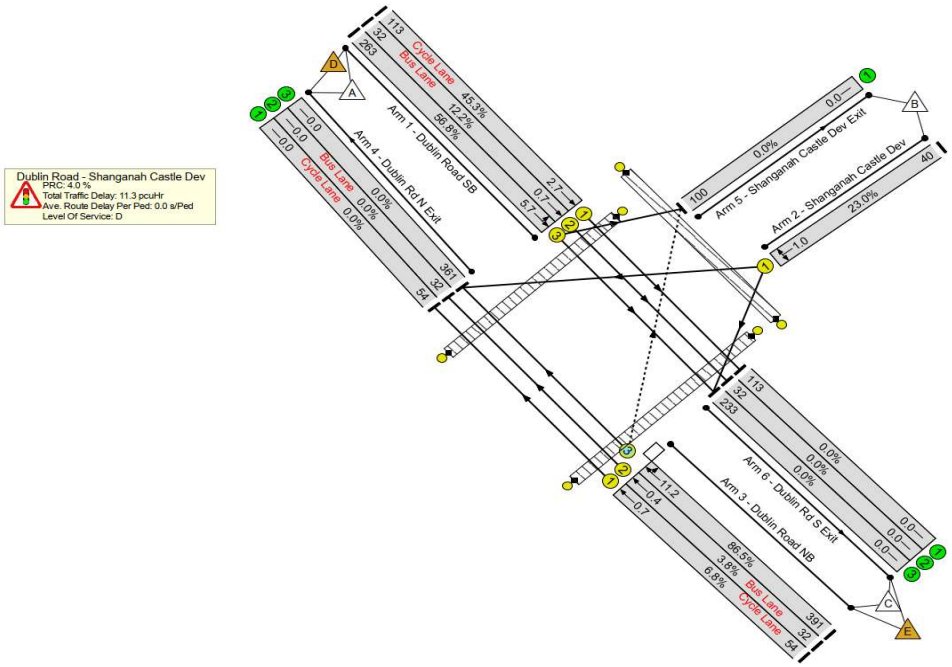
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 80 seconds

Junction PRC:
AM: 21.5%
PM: 4.0%

Junction Delay:
AM: 10.67 pcu/Hr
PM: 11.30 pcu/Hr

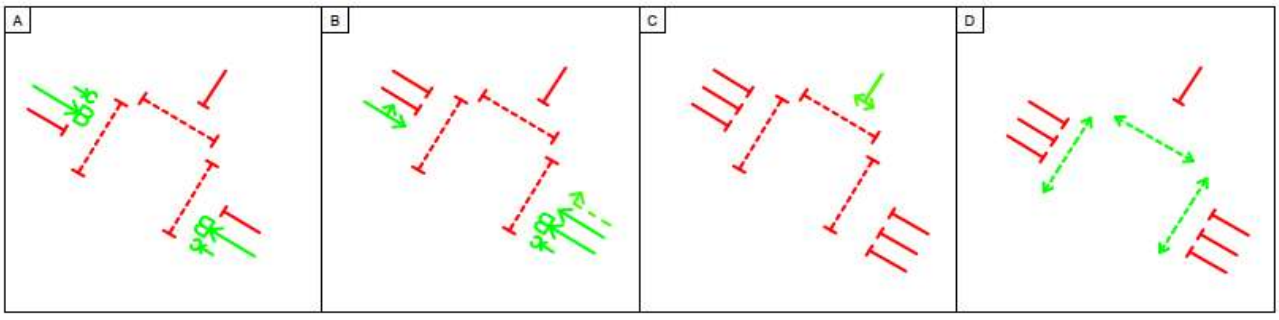
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,698	3%
Bus	61,215	93%
Walk	2,705	4%
Cycle	410	1%
Total	**66028**	**100%**

INDICATIVE METHOD OF CONTROL

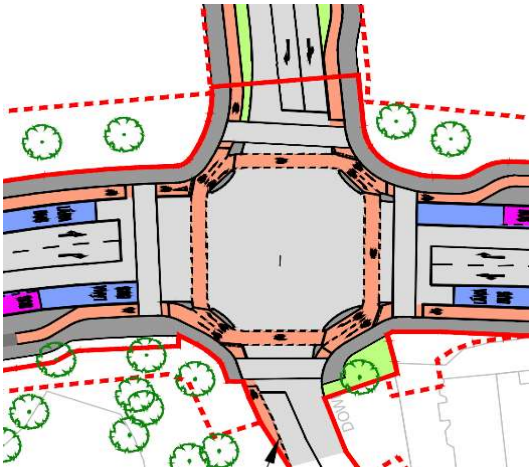


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	49

Junction **Dublin Road / Woodbrook Junction**

EXISTING

FINAL DESIGN



Summary:

Junction Type 1 provided in the northbound and southbound directions. Development junction received at Stage A and modified for BusConnects design guide requirements. Cycle track taken through junction and around side roads. Pedestrian crossing faciities improved via introduction of new crossing arms along desire lines. Property entrance has been moved to facilitate upgraded pedestrian and cyclist infrastructure.

Pedestrian Infrastructure

Pedestrian crossings modified to tie in with new Woodbrook Estate entrance. Four pedestrian crossings designed around all sides of junction along desire lines. Pedestrian and cycles move around junction in one cycle as demanded.

Cycle Infrastructure

Cycle lanes have been developed in Dutch style with protected approaches around junction. Private dwelling entrance moved from mainline Dublin Road to Woodbrook Downs to facilitate full cycle movements through junction.
Cycle lane with protected approaches developed to tie-in to Woodbrook Estate entrance, and lead in cycle lane developed from Woodbrook Downs side road to direct cyclists into junction cycle tracks.

Bus Priority Infrastructure

Full bus priority provided. Northbound and Southbound buses and cycles move during the same phase. New bus stop provision provided along CBC junction arms.

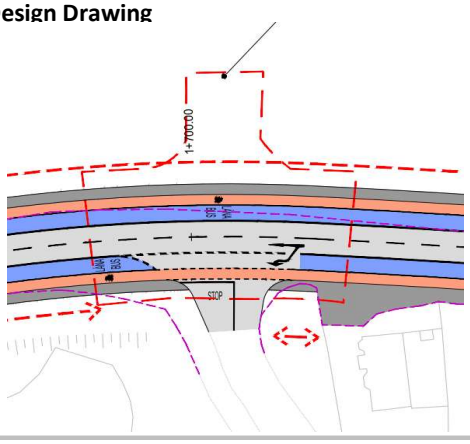
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	49

Design Evolution

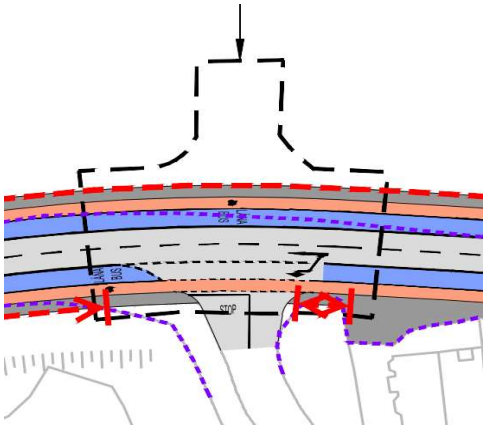
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

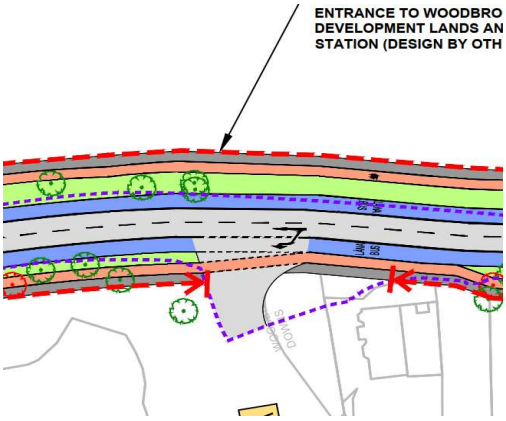
Concept Design Drawing



Emerging Preferred Route

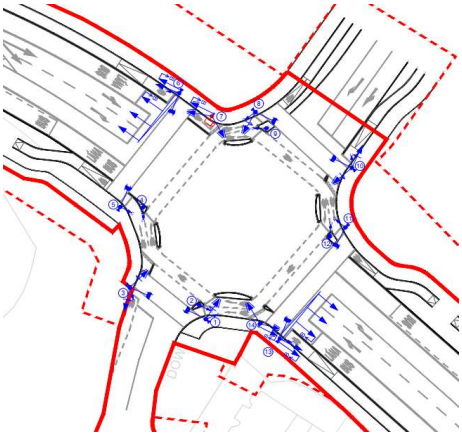


Public Consultation 2



Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	49

2028 Peak Hours
Fixed Time LinSig Results

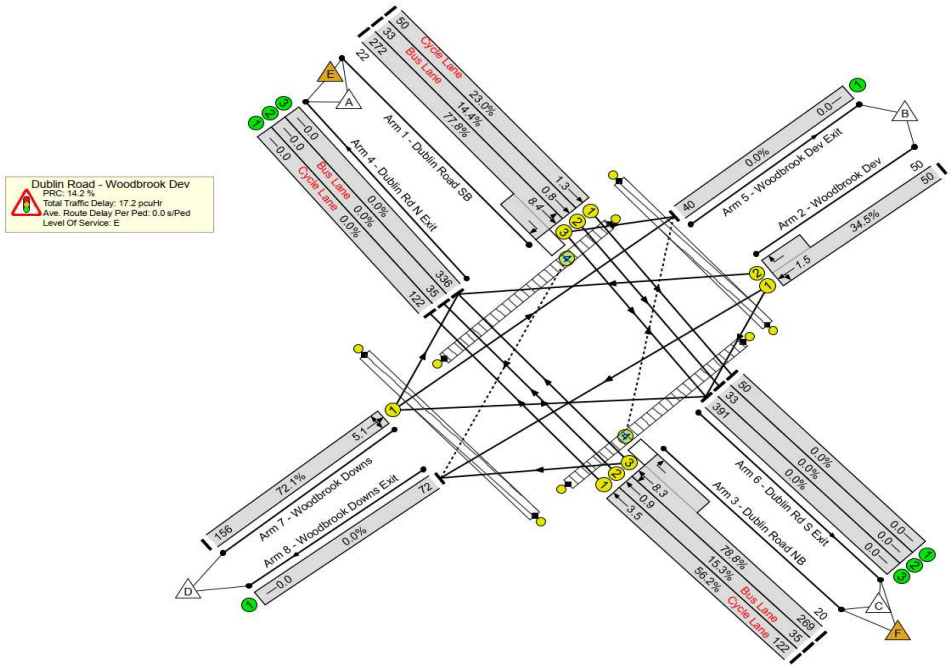
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 92 seconds

Junction PRC:
AM: 14.2%
PM: 6.9%

Junction Delay:
AM: 17.16 pcu/Hr
PM: 14.56 pcu/Hr

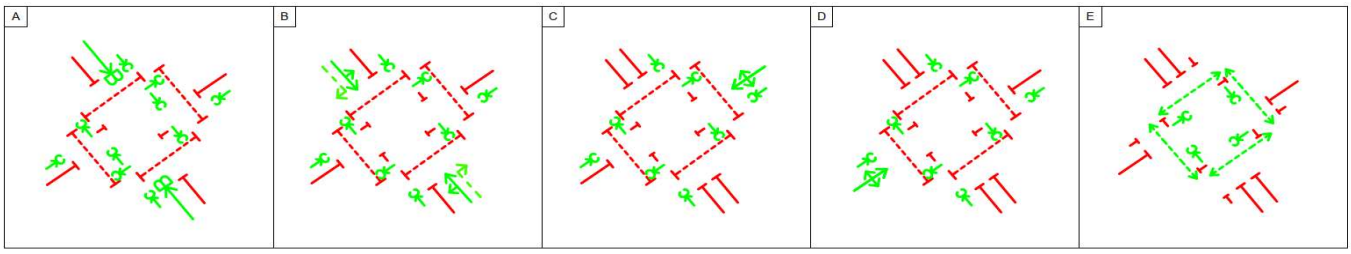
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,501	5%
Bus	24,045	83%
Walk	3,606	12%
Cycle	0	0%
Total	**29152**	**100%**

INDICATIVE METHOD OF CONTROL

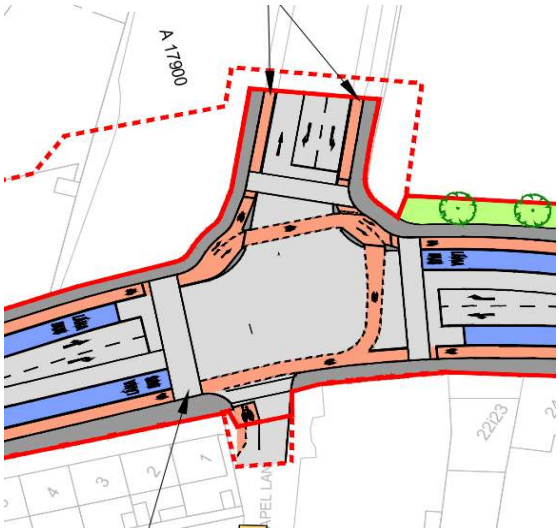


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	50

Junction **Dublin Road / Chapel Lane Junction**

EXISTING

FINAL DESIGN



Summary:
Junction Type 1 provided in the northbound and southbound directions. Junction developed at Stage A to reflect increased traffic movements at side road and widening of the mainline corridor for bus lane requirements. Cycle track improved through junction and around side road. Pedestrian crossing faciities improved via introduction of new crossings at each junction arm desire line.

Pedestrian Infrastructure
Pedestrian crossings modified for new junction design. Four pedestrian crossings designed around all sides of junction along desire lines. Northernmost arm is designed as a Toucan crossing to provide cyclist connection between Chapel Lane and newly developed Ravenswell road. Pedestrian and cycles move around junction in one cycle.

Cycle Infrastructure
Cycle lanes have been developed in Dutch style with protected approaches around junction. Toucan crossing developed on northern arm to provide cyclist connection between Chapel Lane and Ravenswell Road due to space constraints at the location. Cycle lane with protected approaches developed to tie-in toRavenswell Road. Cycle lane lead in and Advanced Stop Line provided on Chapel Lane to direct cyclists into new junction configuration.

Bus Priority Infrastructure
Full bus priority provided. Northbound and southbound buses and cycles move in the same phase.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	50

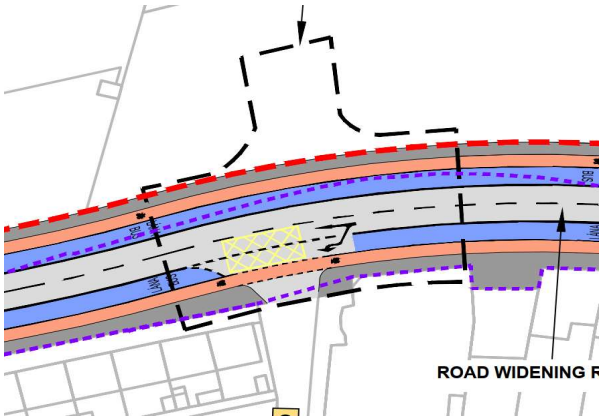
Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

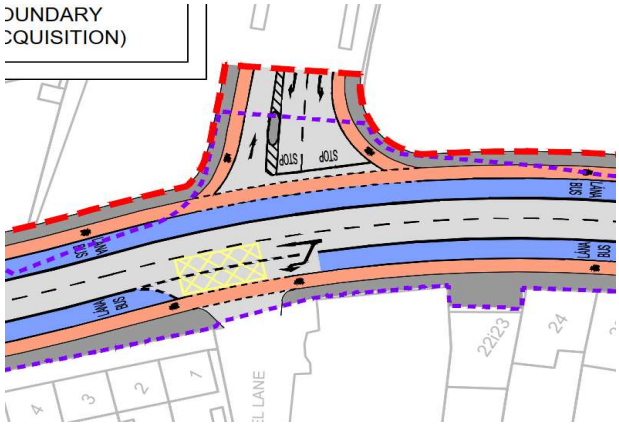
Existing

Concept Design Drawing

Emerging Preferred Route

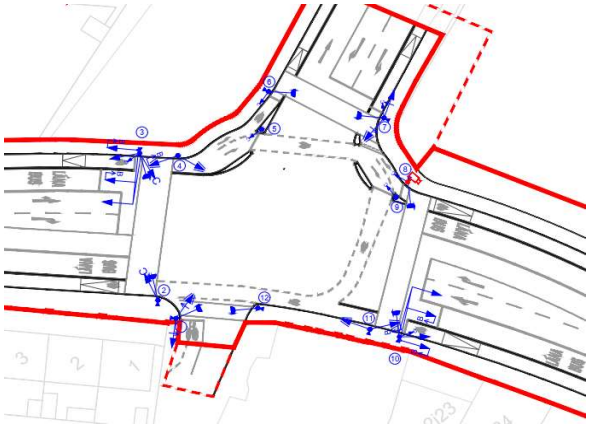


Public Consultation 2



Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	50

2028 AM Peak Hours
Fixed Time LinSig Results

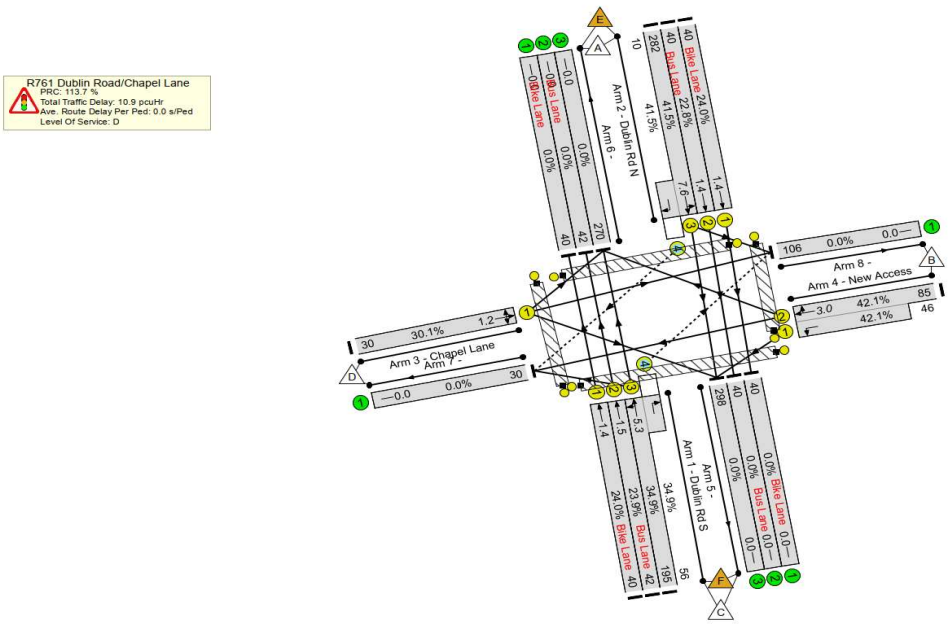
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 120 seconds

Junction PRC:
AM: 47.5%
PM: 47.5%

Junction Delay:
AM: 13.28 pcu/Hr
PM: 15.7 pcu/Hr

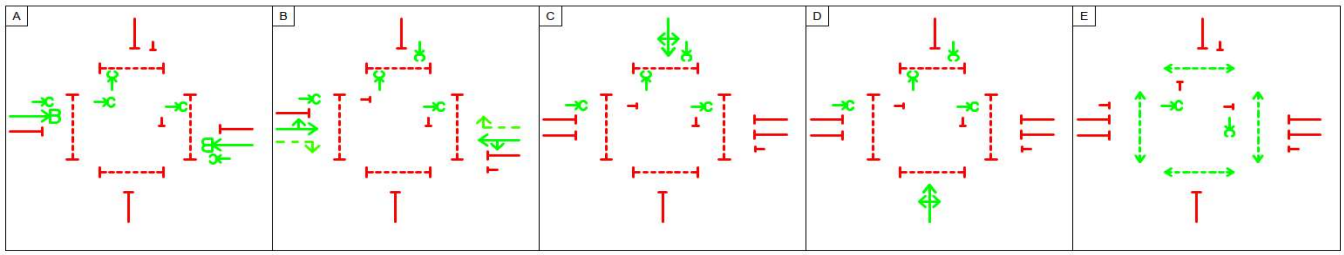
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

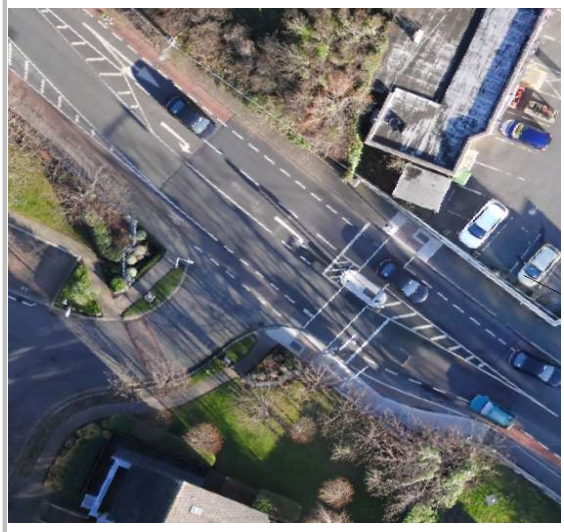
Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1031	8%
Bus	8925	65%
Walk	3686	27%
Cycle	0	0%
Total	**13642**	**100%**

INDICATIVE METHOD OF CONTROL

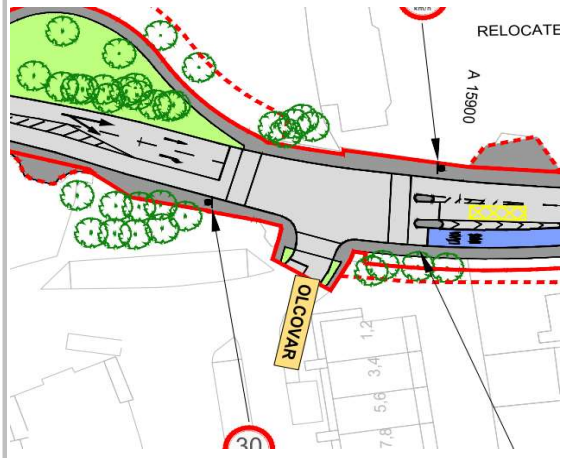


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	51
Junction	**Dublin Road / Olcovar Junction**		

EXISTING



FINAL DESIGN



Summary:
Junction Type 1 provided in the northbound direction. Bus priority ensured southbound using signal controls. Junction developed at Stage A to reflect changes made to Dublin Road / Quinn's Road and the need to provide northbound bus priority further south. Pedestrian crossing faciities improved via introduction of new crossings at each junction arm desire line.

Pedestrian Infrastructure
Pedestrian crossings modified for new junction design. Three pedestrian crossings designed around all sides of junction along desire lines. Pedestrian and cycles move around junction in one cycle as demanded.

Cycle Infrastructure
Due to space constraints, cyclists move as part of the general traffic along this section of the route.

Bus Priority Infrastructure
Full bus priority provided via signal control. Seperation islands introduced in the northbound direction to facilitate dedicated bus lane signals ahead of general traffic.

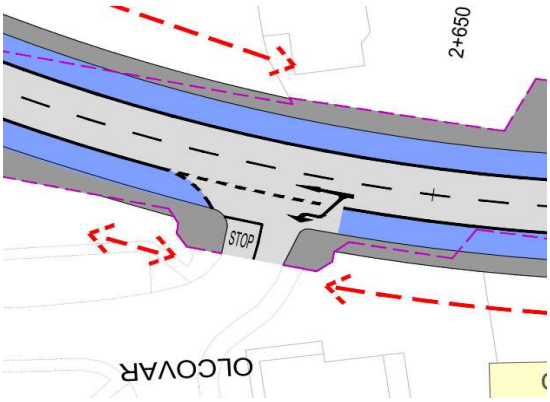
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	51

Design Evolution

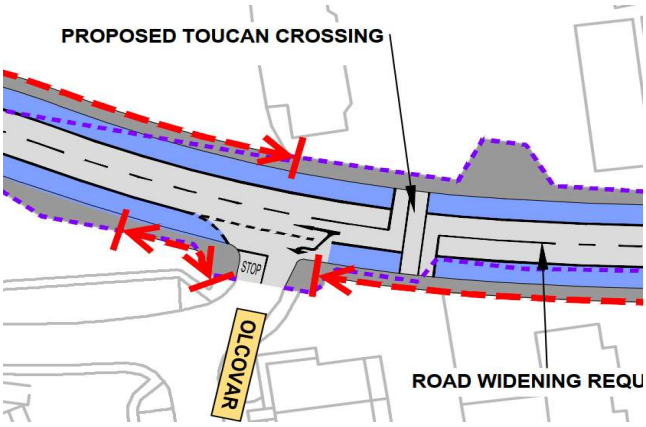
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

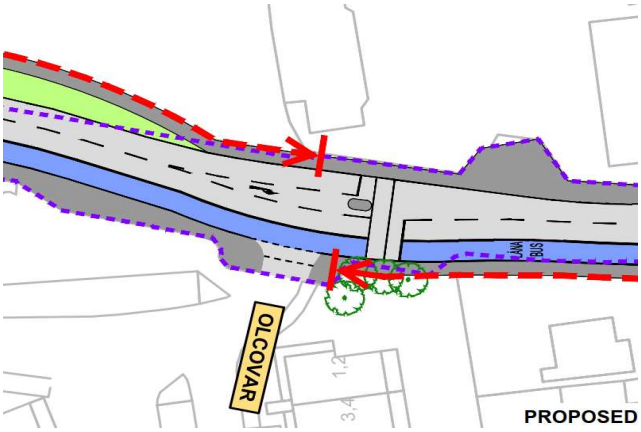
Concept Design Drawing



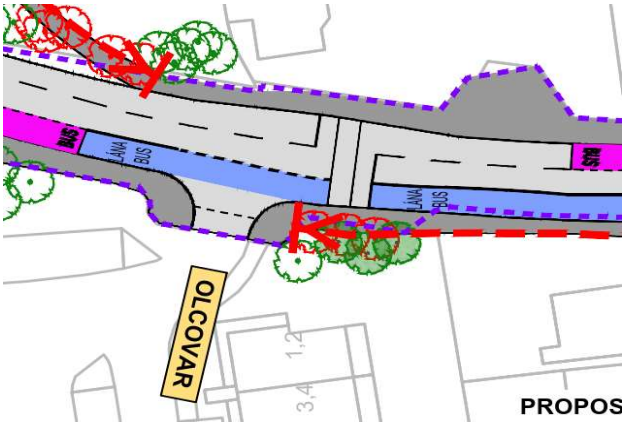
Emerging Preferred Route



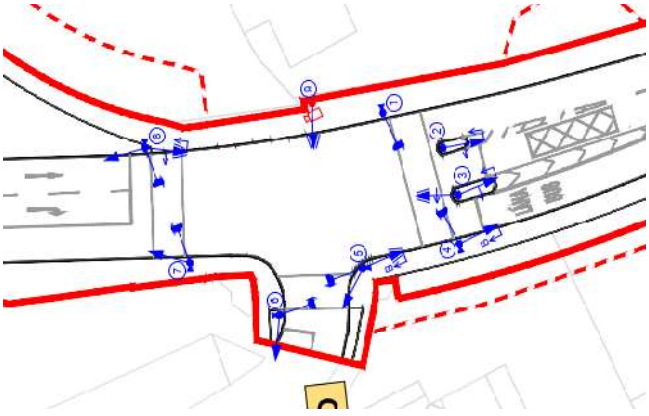
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	51

2028 AM Peak Hours
Fixed Time LinSig Results

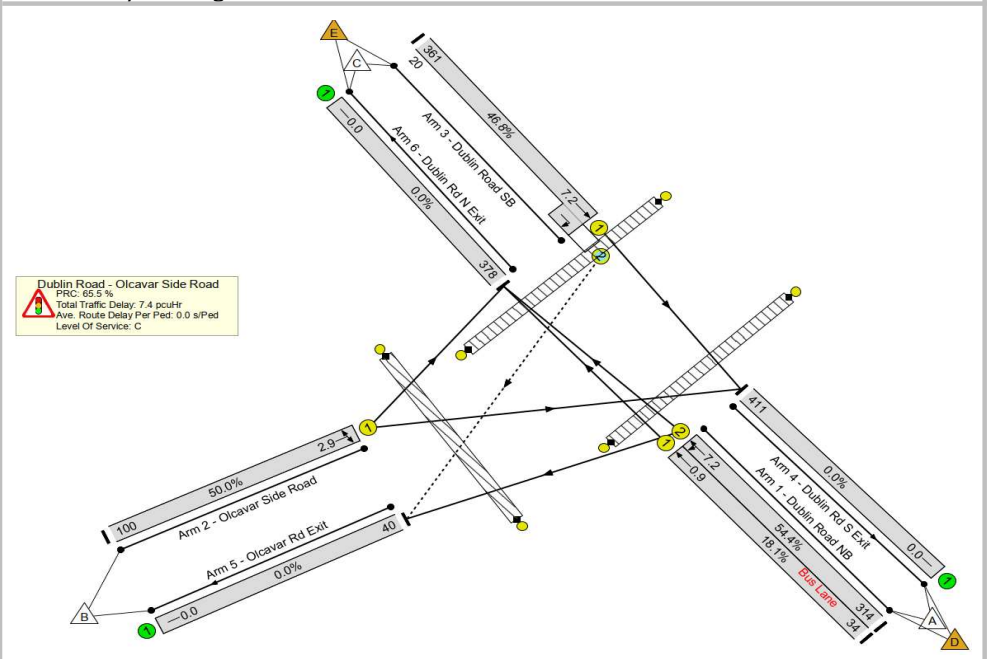
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 80 seconds

Junction PRC:
AM: 29.1%
PM: 1.0%

Junction Delay:
AM: 8.27 pcu/Hr
PM: 9.95 pcu/Hr

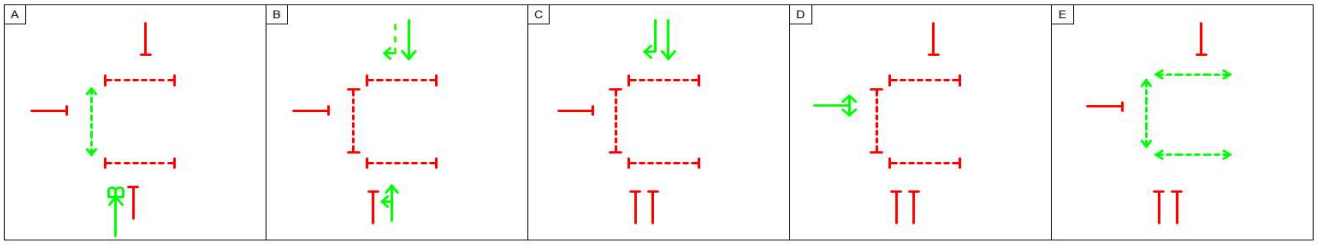
Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	1,909	11%
Bus	9,818	57%
Walk	5,409	32%
Cycle	0	0%
Total	**17136**	**100%**

INDICATIVE METHOD OF CONTROL

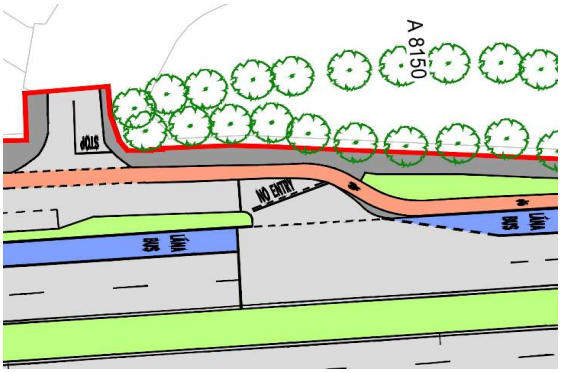


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	52

Junction **N11 Stillorgan Road / Belmont Terrace Junction**

EXISTING

FINAL DESIGN



Summary:
Signal control of slip road retained.

Pedestrian Infrastructure
Pedestrian infrastructure retained as per existing.

Cycle Infrastructure
Cycle track adjusted to run along eastern side of Belmont Terrace and removed from N11 Stillorgan Road for safety and cyclist comfort purposes.

Bus Priority Infrastructure
Full bus priority provided along the southern arm of the N11 Stillorgan Road using signal controls at Belmont Terrace slip road.

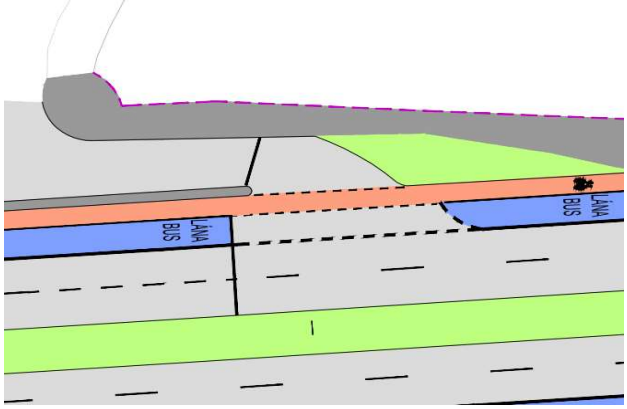
Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	52

Design Evolution

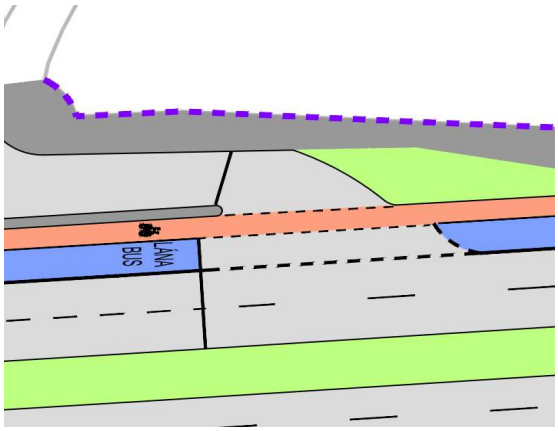
The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

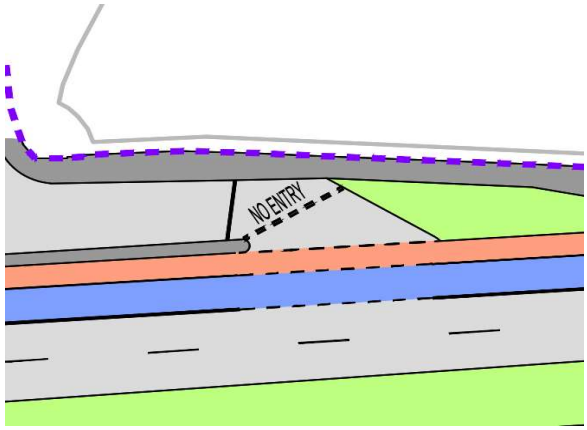
Concept Design Drawing



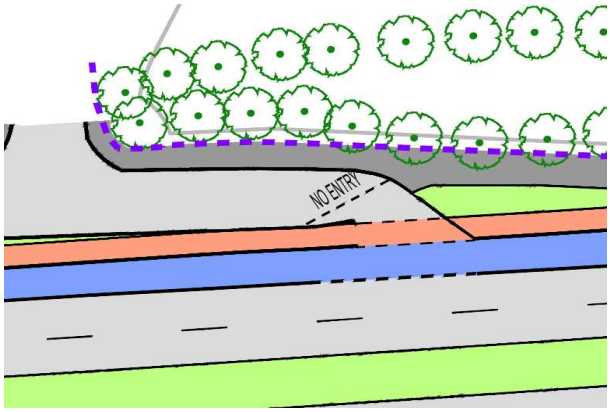
Emerging Preferred Route



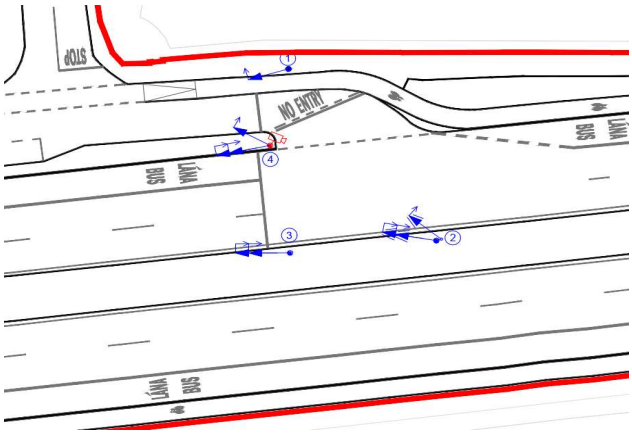
Public Consultation 2



Public Consultation 3



Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	52

2028 AM Peak Hours
Fixed Time LinSig Results

Network Layout Diagram

No Linsig analysis. Simple two stage operation with minor side road called infrequently (demand dependent)

2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: NA

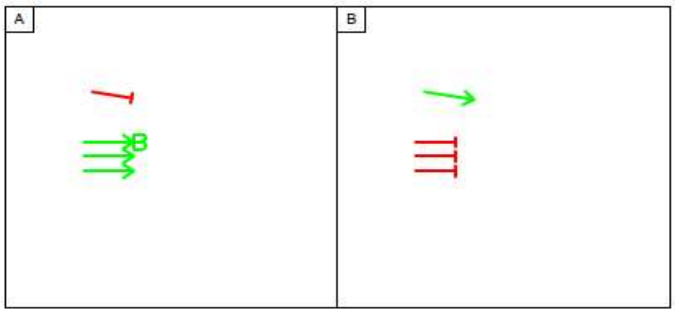
Junction PRC:
AM: NA
PM: NA

Junction Delay:
AM: NA
PM: NA

People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	N/A	
Bus		
Walk		
Cycle		
Total	**0**	**0%**

INDICATIVE METHOD OF CONTROL

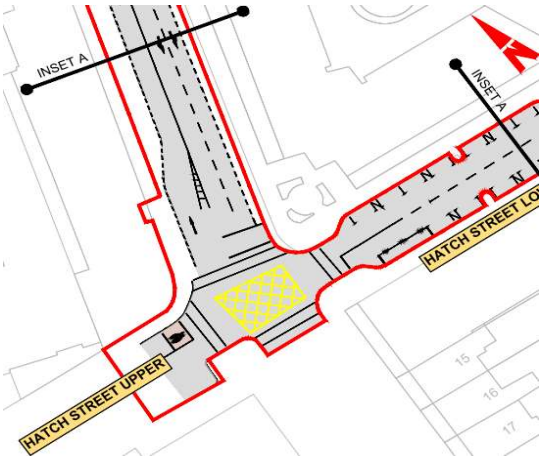


Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	53

Junction	**Hatch Street Lower / Earlsfort Terrace Junction**

EXISTING

FINAL DESIGN



Summary:
Junction added to design at Stage A. Scheme extents revised due to the incorporation of a bus gate on Leeson Street Lower. Junction added to demonstrate re-routing of traffic via Earlsfort Terrace. No infrastructural changes envisioned. Junction is not part of the core bus route.

Pedestrian Infrastructure
Retained as per existing. Full pedestrian crossing phase for all arms of junction as per demand.

Cycle Infrastructure
Retained as per existing. Advanced Stop Line provided on eastbound approach to junction along Hatch Street Upper.

Bus Priority Infrastructure
Buses re-routed away from Leeson Street Lower via bus gate and down Earlsfort Terrace.

Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	53

Design Evolution

The proposed junction design has evolved on the BusConnects project from initial Concept Design, Emerging Preferred Route, Public Consultation 2, Public Consultation 3 up to the Current Design. The junction design iterations have been undertaken to optimise pedestrian, cyclist and bus priority infrastructure on the scheme.

Existing

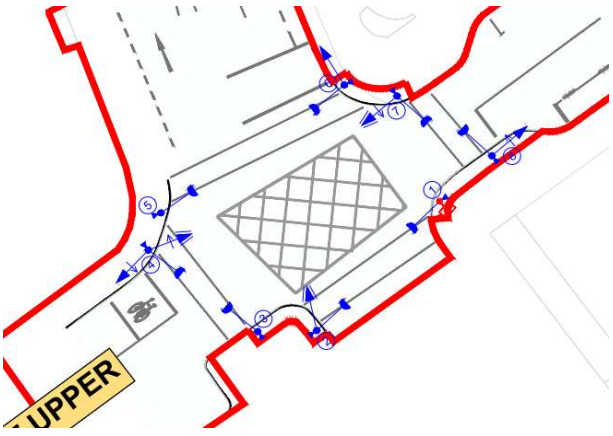
Concept Design Drawing

Emerging Preferred Route

Public Consultation 2

Public Consultation 3

Final Preliminary Design



Subject	BusConnects Core Bus Corridors Transport Modelling		
Date	Apr-22		
Route	Route 13: Bray to City Centre	Junction Ref	53

2028 AM Peak Hours
Fixed Time LinSig Results

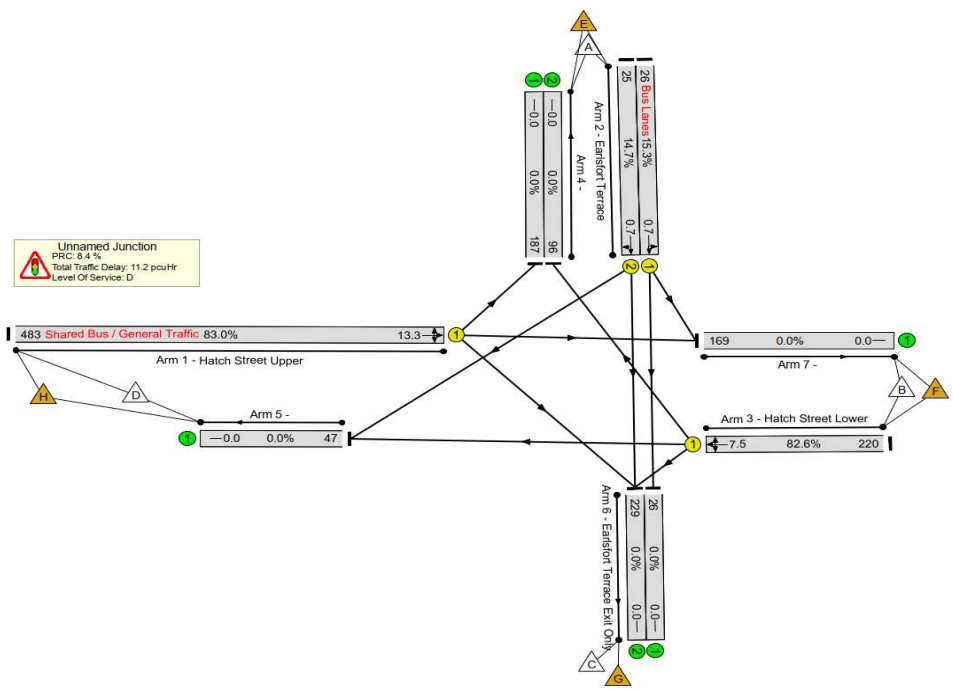
2028 Peak Hours
Fixed Time LinSig Results

Cycle Time: 90 seconds

Junction PRC:
AM: 8.4%
PM: 2.1%

Junction Delay:
AM: 11.18 pcu/Hr
PM: 12.70pcu/Hr

Network Layout Diagram



People Movement Assessment (Typical Peak Period)

Junction	All Arms	
Mode	**People Movement**	**Mode Share**
Car	2,153	8%
Bus	21,735	80%
Walk	2,765	10%
Cycle	460	2%
Total	**27,113**	**100%**

INDICATIVE METHOD OF CONTROL