

Appendix A – Multi Criteria Analysis Tables

Table 1: MCA Table

MCA criteria	Assessment Sub-Criteria	Scheme Option 1A	Scheme Option 1B	Scheme Option 1C
Economy	1.a. Capital Cost	Capital Cost: €3.30 Length: 0.836km Cost/Km: 3.95m Indicative Scheme Infrastructure Works Cost - € 2.93M Land Acquisition Cost - € 0.37M - 245 sq.m. of land See exclusions in Land Acquisition Cost in Section 8.2.	Capital Cost: €1.01M Length: 0.836km Cost/Km: 1.2M Indicative Scheme Infrastructure Works Cost - € 1.01M Land Acquisition Cost - € 0	Capital Cost: €4.77M Length: 0.836km Cost/Km: 5.70M Indicative Scheme Infrastructure Works Cost - € 4.72M Land Acquisition Cost - € 0.050 - 32 sq.m. of land See exclusions in Land Acquisition Cost in Section 8.2.
	Rank			
	1.b. Transport Reliability and Quality (Journey Time)	Journey Time: 3 mins both directions Length: 0.836km No. of signalised intersections: 3	Journey Time: 6 mins inbound and 7 mins outbound Length: 0.836km No. of signalised intersections: 3	Journey Time: 3 mins both directions Length: 0.836km No. of signalised intersections: 3
Rank				
Integration	2.a. Land Use Integration	Integrates with existing / planned residential, educational, medical and leisure uses in this established area.	Integrates with existing / planned residential, educational, medical and leisure uses in this established area.	Scheme Option 1C would not integrate with the existing residential and medical uses in this established area, with westbound vehicular traffic rerouted for the most part via Ailesbury Road or Nutley Avenue and Nutley Road.
	Rank			
	2.b. Residential Population and Employment Catchments	All scheme options would use the same bus stops, hence the residential and employment catchments are the same.	All scheme options would use the same bus stops, hence the residential and employment catchments are the same.	All scheme options would use the same bus stops, hence the residential and employment catchments are the same.
	Rank			
	2.c. Transport Network Integration	Connects two proposed Core Bus Corridors i.e. Dun Laoghaire to City Centre CBC and UCD to City Centre CBC.	Connects two proposed Core Bus Corridors i.e. Dun Laoghaire to City Centre CBC and UCD to City Centre CBC.	Connects two proposed Core Bus Corridors i.e. Dun Laoghaire to City Centre CBC and UCD to City Centre CBC.
	Rank			
2.d. Cycle Network Integration	Both directions of Route 1 align with a secondary cycle route as identified in the GDA Cycle Network Plan. See report Section 2 Figure 2.2 and 2.3. Scheme Option 1A and 1C score higher than 1B due to the proposed segregated cycle lanes in both directions along the entire length of Route 1.	Both directions of Route 1 align with a secondary cycle route as identified in the GDA Cycle Network Plan. See report Section 2 Figure 2.2 and 2.3. Scheme Option 1B proposes shared bus and cycle lanes. Scheme Option 1A and 1C score higher than 1B due to the proposed segregated cycle lanes in both directions along the entire length of Route 1.	Both directions of Route 1 align with a secondary cycle route as identified in the GDA Cycle Network Plan. See report Section 2 Figure 2.2 and 2.3. Scheme Option 1A and 1C score higher than 1B due to the proposed segregated cycle lanes in both directions along the entire length of Route 1.	
Rank				

	2.e. Traffic Network Integration	Scheme Option 1A and 1B would not impact on the existing number of traffic lanes.	Scheme Option 1A and 1B would not impact on the existing number of traffic lanes	Scheme Option 1C would reroute outbound (westbound) vehicular traffic on Nutley Lane for the most part via Ailesbury Road or Nutley Avenue and Nutley Road, removing an existing cul-de-sac.
	Rank			
Accessibility & Social Inclusion	3.a. Key Trip Attractors (Education/Health/Commercial/Employment)	All scheme options follow the same route and hence, serve the same trip attractors.	All scheme options follow the same route and hence, serve the same trip attractors.	All scheme options follow the same route and hence, serve the same trip attractors.
	Rank			
	3.b. Deprived Geographic Areas	This option primarily serves areas considered affluent, marginally above as identified in the Pobal Deprivation Index.	This option primarily serves areas considered affluent, marginally above as identified in the Pobal Deprivation Index.	This option primarily serves areas considered affluent, marginally above as identified in the Pobal Deprivation Index.
	Rank			
Safety	4.a. Road Safety	No. of Junctions: 3 <u>Turning movements:</u> Inbound: No turning movements required Outbound: No turning movements required Due to proposed segregation of traffic, bus and cycle lanes, Scheme option 1A scores higher than 1B.	No. of Junctions: 3 <u>Turning movements:</u> Inbound: No turning movements required Outbound: No turning movements required Scheme Option 1B does not propose the same level of segregation of buses and cyclists as 1A.	No. of Junctions: 3 <u>Turning movements:</u> Inbound: No turning movements required Outbound: No turning movements required Scheme Option 1C also proposes segregation of traffic, bus and cycle lanes (similar to Scheme Option 1A). However, this scheme option scores lower than Scheme Option 1A as the outbound (westbound) vehicular traffic would be rerouted along Nutley Avenue and Nutley Road, which are residential streets.
	Rank			
Physical Activity	5.a Physical Activity	This criterion relates to the health benefits derived from using different transport modes. The subject scheme options under consideration relate to the same mode of travel (bus). As such, this criterion will not produce any relative differences between the options.	This criterion relates to the health benefits derived from using different transport modes. The subject scheme options under consideration relate to the same mode of travel (bus). As such, this criterion will not produce any relative differences between the options.	This criterion relates to the health benefits derived from using different transport modes. The subject scheme options under consideration relate to the same mode of travel (bus). As such, this criterion will not produce any relative differences between the options.
	Rank			
Environment	6.a. Archaeology and Cultural Heritage	No appreciable impacts.	No appreciable impacts.	No appreciable impacts.
	Rank			
	6.b. Architectural Heritage	No appreciable impacts.	No appreciable impacts.	No appreciable impacts.
	Rank			
	6.c. Flora & Fauna	The installation of bus and cycle lanes would require the removal of existing trees within the road boundary along Nutley Lane. Also, a number of trees behind the road boundary would require removal (e.g. at the tennis courts). It is unlikely that these trees are of roosting importance for bats.	The installation of bus lanes would also require the removal of existing trees with the road boundary along Nutley Lane. However, Scheme Option 1B would not require the removal of trees outside the road boundary and thus scored highest. It is unlikely that these trees are of roosting importance for bats.	The installation of bus and cycle lanes would require the removal of existing trees within the road boundary along Nutley Lane. Also, a number of trees behind the road boundary would require removal (e.g. at the tennis courts). It is unlikely that these trees are of roosting importance for bats.
	Rank			
	6.d. Soils and Geology	No appreciable impacts	No appreciable impacts	No appreciable impacts
	Rank			
6.e. Hydrology	No appreciable impacts	No appreciable impacts	No appreciable impacts	
Rank				

	6.f. Landscape and Visual	The addition of bus and cycle lanes on Nutley Lane would have effects on the existing treelines and footpaths. Unlike Scheme Option 1B, this scheme option would require land-take and removal of some trees outside the current road boundary.	The addition of bus lanes on Nutley Lane would have effects on the existing treelines and footpath, though not to the same extent as Scheme Option 1A or 1C.	The addition of bus and cycle lanes on Nutley Lane would have effects on the existing treelines and footpaths. Unlike Scheme Option 1B, this scheme option would require land-take and removal of some trees outside the current road boundary.
	Rank			
	6.g. Air Quality	This scheme option would maintain two traffic lanes but possible impact on air quality due to the introduction of two bus lanes.	This scheme option would maintain two traffic lanes but possible impact on air quality due to the introduction of two bus lanes.	While the impact would be reduced over a short section on Nutley Lane, there would be an increased number of properties exposed along Nutley Avenue and Nutley Road.
	Rank			
	6.h. Noise & Vibration	This scheme options would maintain two traffic lanes but possible impact on noise quality due to the introduction of two bus lanes.	This scheme options would maintain two traffic lanes but possible impact on noise quality due to the introduction of two bus lanes.	While the impact would be reduced over a short section on Nutley Lane, there would be an increased number of properties exposed along Nutley Avenue and Nutley Road.
	Rank			
	6.i. Land Use Character	Road widening on Nutley Lane would impact on existing on-street parking provisions.	Road widening on Nutley Lane would impact on existing on-street parking provisions.	Road widening on Nutley Lane would impact on existing on-street parking provisions.
	Rank			

Appendix B – Data Collection



1. Study area visit

Each of the route sections were visited / driven and audited to identify any constraints which may not have been evident from maps and drawings. The site visits enabled a comprehensive evaluation of the route options in terms of their capacity to accommodate of a bus corridor.

2. Land Use and Planning

The land use assessment was carried out using GIS and examined private and public land along the different route options. This information was used for developing cost estimates for each of the route options, based on the area and nature (public or private) of the land acquisition required. The land use assessment results are presented in the MCA tables in Appendix A.

3. Existing Bus Lanes

A map indicating the existing bus lanes throughout the Study Area was produced to identify routes already capable of accommodating segregated facilities. Blue routes indicate inbound bus lanes while red routes indicated outbound bus lanes.

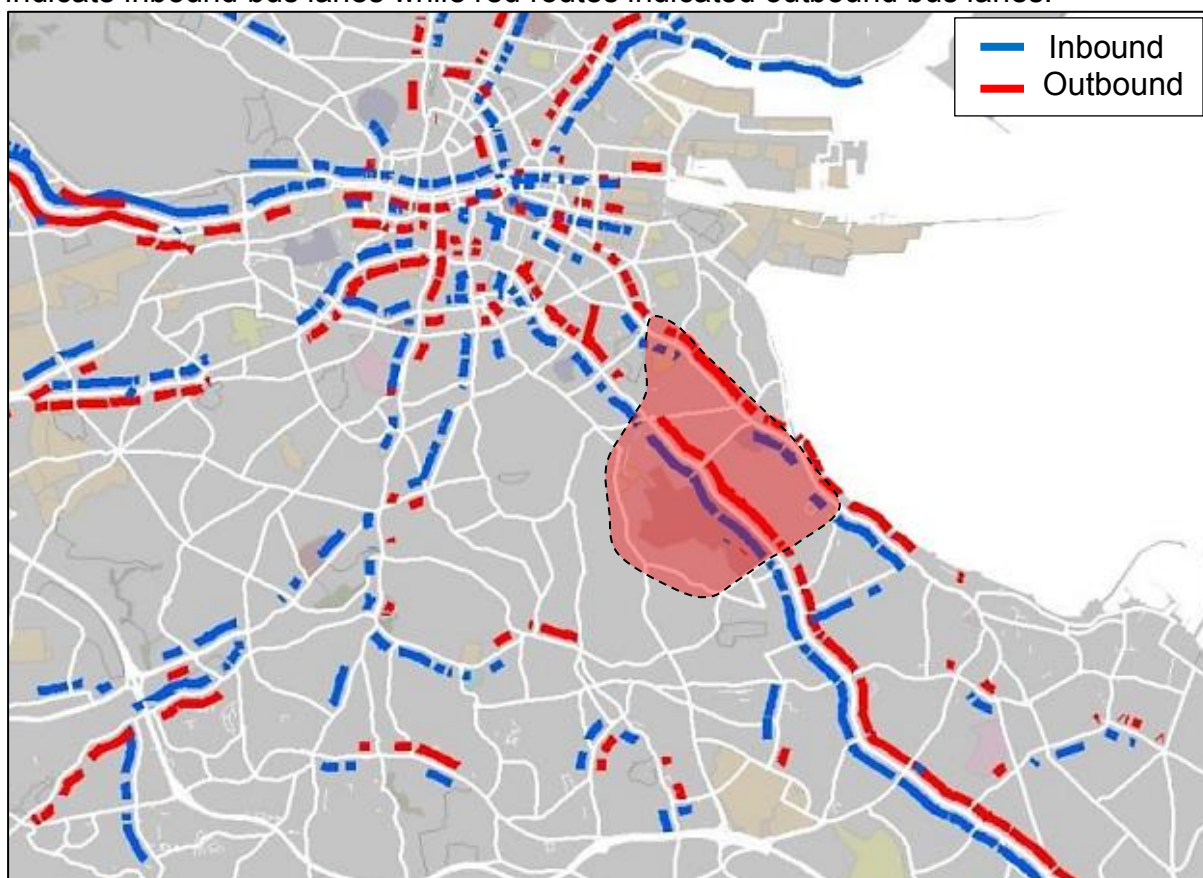


Figure 1: Existing bus lanes within the study area (Source: NTA Core Bus Network Report - Figure 4.1. Existing Bus Infrastructure – Metropolitan Area)

4. Bus Journey Times

The bus travel times for each scheme option were estimated based on a number of criteria, including;

- Length of segregated bus lane;
- Length of shared bus / traffic lane;
- Number of signalised junctions;
- Number of pedestrian crossings; and
- Number of bus stops.

Due to the large number of route options and calculations, the results of the bus journey time estimates are presented in Appendix C.

5. Road Collision History

The Road Safety Authority database of personal injury accidents was examined to establish if there are any existing safety issues along the route options that were not evident from the site visits. The database provides accident records for the period 2005 to 2013; in terms of location, year, road user type involved (pedestrian, car, cyclist, motorcyclist, bus etc.), circumstances and severity of collision (minor, serious or fatal). The following bus collision history map indicates the location of incidents within the Study Area.

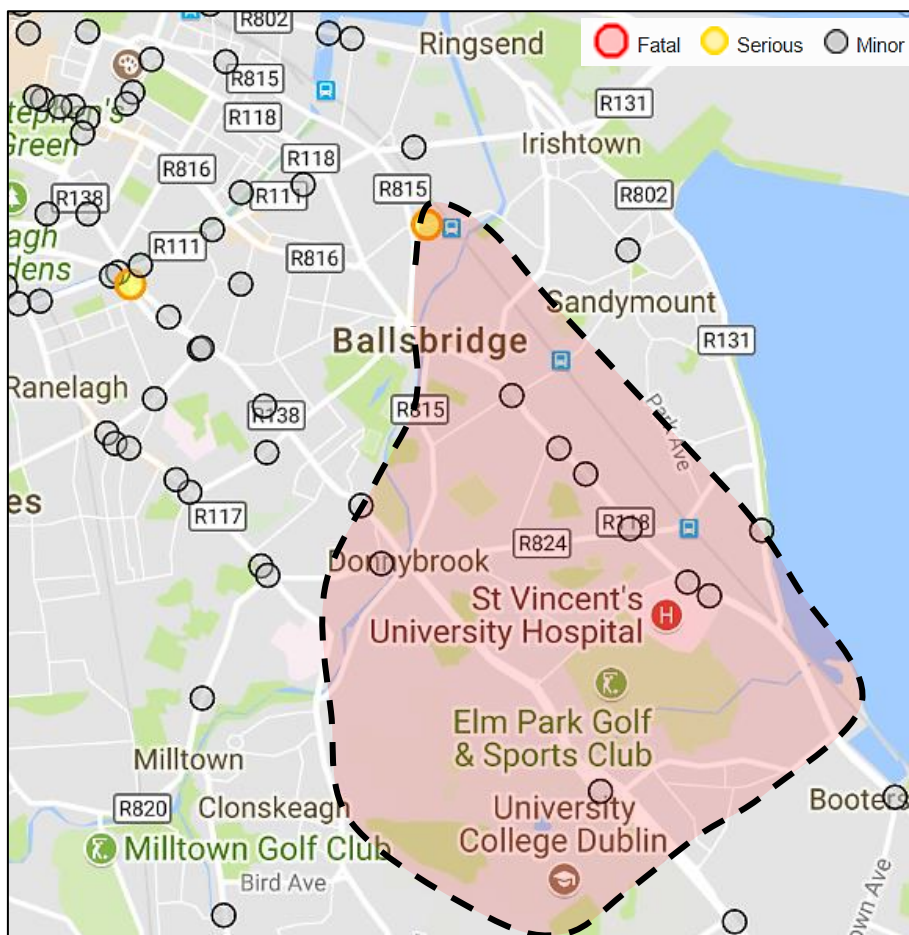


Figure 2: Bus collision history in Study Area

6. Tree surveys

A visual inspection of existing trees along each route option was carried out to identify tree locations and potential route option impacts. The results of these site observations are discussed within the Mutli Criteria Analysis in Appendix A.

7. Architectural and Archaeological information

Irish Archaeological Consultancy (IAC) and Roughan & O' Donovan (ROD) provided an environmental assessment of the different route options under the following criteria:

- Archaeology and Cultural Heritage
- Architectural Heritage
- Flora & Fauna
- Soils and Geology
- Hydrology
- Landscape and Visual
- Air Quality
- Noise & Vibration
- Land Use Character

The architectural and archaeological assessment results are presented in the MCA tables in Appendix A.

8. Route Audit

A assessment of each route option was carried out to identify existing facilities and constraints. The results of this assessment are contained in a report in Appendix D.

9. Parking survey

A parking survey study was carried out to identify the parking conditions in the existing road network. Each route was assessed under the following criteria:

- *Formal Parking*: On-street parking in which marked spaces has been provided. These are spaces in which the Local Authority charges an hourly rate to use.
- *Informal Parking*: On-street parking in which spaces may or may not be marked and in which the Local Authority does not charge for use.
- *Adjacent Parking*: Parking which is accessible to the general public and is located in close proximity to the street. These are spaces in which the Local Authority charges an hourly rate to use.

The results of the parking survey assessment are contained in a report in Appendix E.

10. Cost estimates

A breakdown of the cost estimation process is presented in Appendix F.

Appendix C – Bus Journey Times

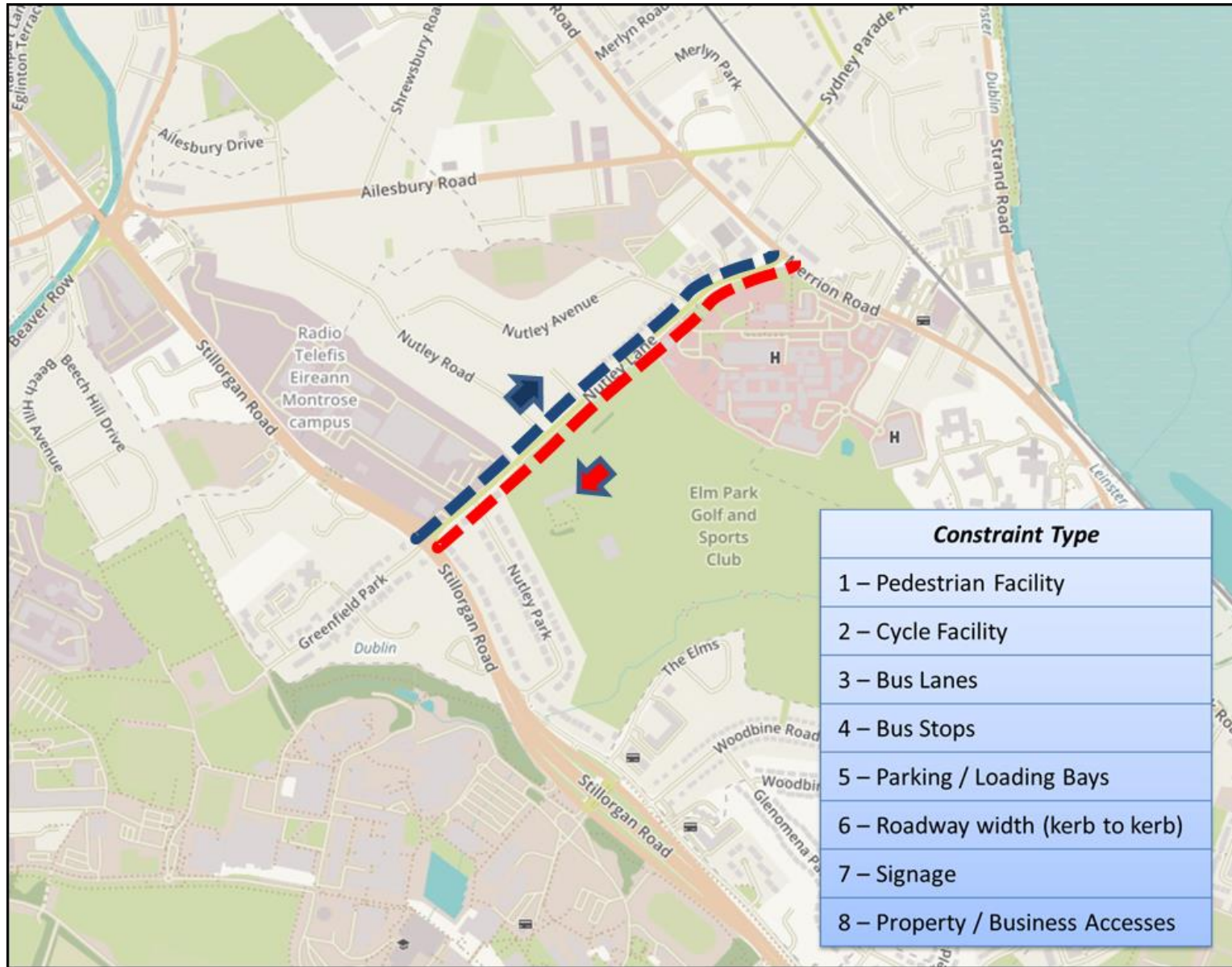


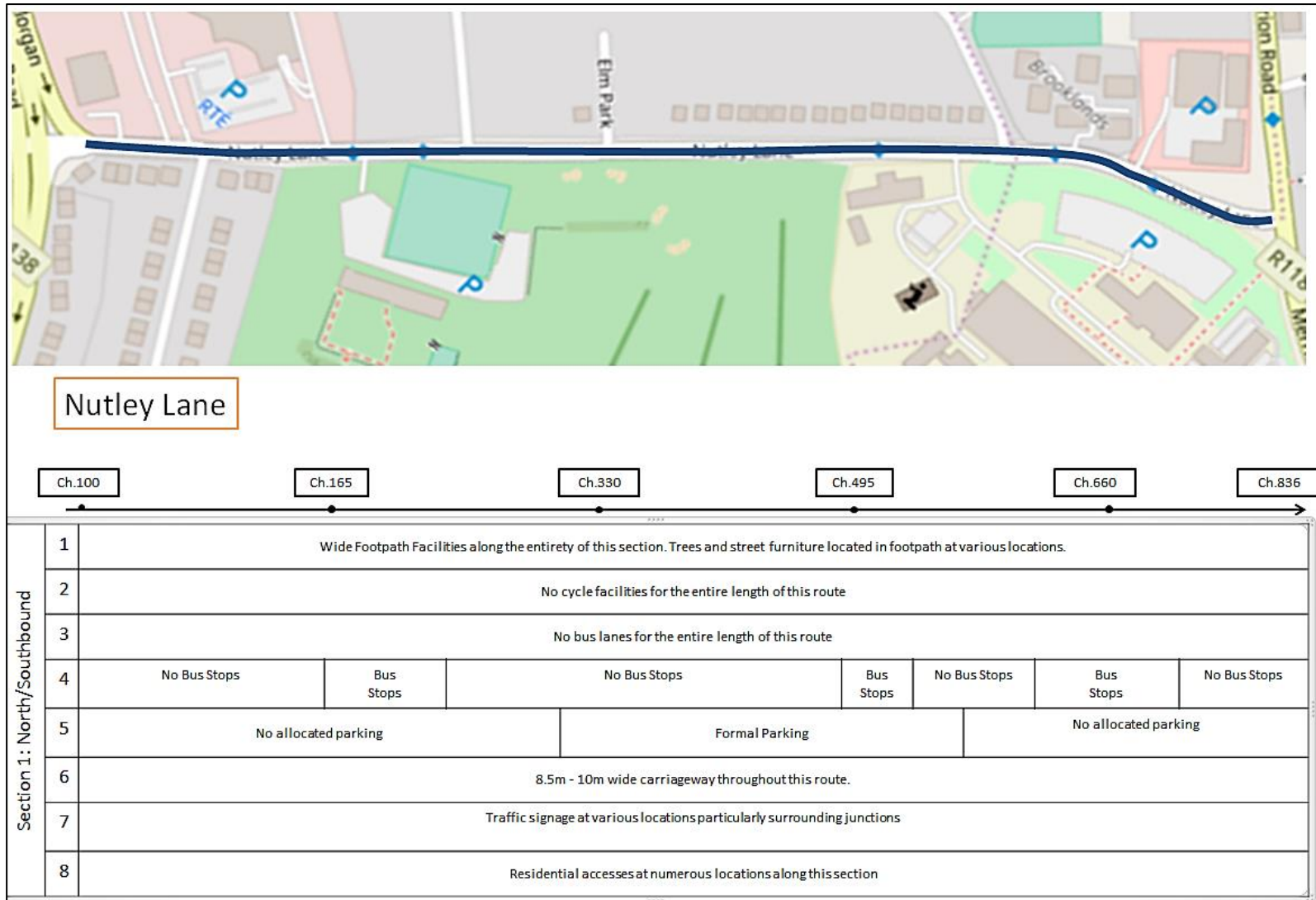
Route 1A and 1B Journey Times

Route 1			Scheme Options			
			1A inbound + outbound	1B inbound	1B outbound	1C inbound + outbound
	<i>KM per Hour</i>	<i>Average Delay (Minute)</i>	<i>Length (KM)/Nr Stops or Junctions</i>	<i>Length (KM)/Nr Stops or Junctions</i>	<i>Length (KM)/Nr Stops or Junctions</i>	<i>Length (KM)/Nr Stops or Junctions</i>
Total Length			0.84	0.84	0.84	0.84
Fully Segregated Bus Lane (50kph top operational speed, travelling at average speed of 30kph)	30		0.84	0.14		0.84
Shared Bus/Cycle Lane	10			0.70	0.84	
Signalised Junction (Dwell time of 15 seconds per stop on average)		0.25	3	3	3	3
Pedestrian Crossing (15 second average)		0.25	0	0	0	0
Bus Stop Dwell Time (15 seconds average)		0.25	3	3	3	3
<i>Route Segment Journey Time (Minutes)</i>			3	6	7	3

Appendix D – Route Audit







Appendix E – Parking Survey

1. Introduction






AECOM have been tasked by the National Transport Authority (NTA) to identify viable routes for a bus corridor which aims to provide a link between Merrion road and University College Dublin (UCD).

This report shall seek to identify the parking conditions in the existing road network. Each route was assessed using criteria specified by the NTA. The assessment criteria for the existing parking on the separate routes are listed as follows:

- *Formal Parking*: On-street parking in which marked spaces has been provided. These are spaces in which the Local Authority charges an hourly rate to use.
- *Informal Parking*: On-street parking in which spaces may or may not be marked and in which the Local Authority does not charge for use.
- *Adjacent Parking*: Parking which is accessible to the general public and is located in close proximity to the street. These are spaces in which the Local Authority charges an hourly rate to use.
- *Taxi Facilities*: Parking which is used exclusively for taxis.

This report shall seek to quantify the impact on the existing parking conditions in the road network by the proposed scheme options.

2. Legend

-  - This colour represents sections along a route which has no parking facilities.
-  - This colour represents sections along a route which has formal parking facilities.
-  - This colour represents sections along a route which has informal parking facilities.
-  - This colour represents sections along a route which has adjacent parking facilities.
-  - This colour represents sections along a route which have taxi facilities.

3. Nutley Lane

The survey has shown formal car parking facilities at certain locations along the length of Nutley Lane as shown below. There are no informal or adjacent parking spaces on Nutley Lane.

- Formal Parking – Approximately 56 (Of which 4 are Disabled Parking) Spaces.



Both scheme options require full usage of the entire width of Nutley Road and as such, the formal parking spaces (approximately 56 No.) will be removed as part of the proposed works.

The image features a solid blue background on the left side, which transitions into a white background on the right side. A thick, diagonal green line runs from the top right corner towards the bottom left, separating the blue and white areas.

Appendix F – Cost Estimate

Scheme Option 1A					
Route Sections		Route Section Cost Rates (EUR / km)			Route Section Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 650,000	€ 1,300,000	€ 2,500,000	
1	Section Length (km)			0.167	€ 417,500
2				0.607	€ 1,517,500
3					
4					
Total of Route Sections Cost					€ 1,935,000
Junctions		Junction Cost Rates (EUR / junction)			Junctions Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 70,000	€ 230,000	€ 1,000,000	
No of CL1					€ 0
No of CL2					€ 0
No of CL3			1		€ 1,000,000
Total of Junctions Lower Costs					€ 1,000,000
Land Acquisition		Average Land Value (EUR / sq.m.)		Land Take Cost	
		1,500 €			
Sum of Residential along Route (sq.m).		245		€ 367,500	
Sum of Commercial along Route (sq.m).				0 €	
Sum of Agricultural along Route (sq.m).				0 €	
Sum of Industrial along Route (sq.m).				0 €	
Total of Route Junctions Cost					€ 367,500
Total Cost =					€ 3,302,500

Scheme Option 1B					
Route Sections		Route Section Cost Rates (EUR / km)			Route Section Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 650,000	€ 1,300,000	€ 2,500,000	
1	Section Length (km)		0.774		€ 1,006,200
2					€ 0
3					€ 0
4					€ 0
Total of Route Sections Cost					€ 1,006,200
Junctions		Junction Cost Rates (EUR / junction)			Junctions Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 70,000	€ 230,000	€ 1,000,000	
No of CL1					€ 0
No of CL2					€ 0
No of CL3					€ 0
Total of Junctions Lower Costs					€ 0
Land Acquisition		Average Land Value (EUR / sq.m.)		Land Take Cost	
		1,500 €			
Sum of Residential along Route (sq.m).				0 €	
Sum of Commercial along Route (sq.m).				0 €	
Sum of Agricultural along Route (sq.m).				0 €	
Sum of Industrial along Route (sq.m).				0 €	
Total of Route Junctions Cost					€ 0
Total Cost =					€ 1,006,200

Scheme Option 1C				
Route Sections	Route Section Cost Rates (EUR / km)			Route Section Cost
	CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
	€ 650,000	€ 1,300,000	€ 2,500,000	
1	Section Length (km)		0.167	€ 417,500
2		0.610		€ 396,500
3		0.345		€ 224,250
4			0.320	€ 800,000
5			0.260	€ 650,000
Total of Route Sections Cost				€ 2,488,250
Junctions	Junction Cost Rates (EUR / junction)			Junctions Cost
	CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
	€ 70,000	€ 230,000	€ 1,000,000	
No of CL1				€ 0
No of CL2		1		€ 230,000
No of CL3			2	€ 2,000,000
Total of Junctions Lower Costs				€ 2,230,000
Land Acquisition	Average Land Value (EUR / sq.m.)		Land Take Cost	
	1,500 €			
Sum of Residential along Route (sq.m).	32		€ 48,000	
Sum of Commercial along Route (sq.m).			€ 0	
Sum of Agricultural along Route (sq.m).			€ 0	
Sum of Industrial along Route (sq.m).			€ 0	
Total of Route Junctions Cost				€ 0
Total Cost =				€ 4,766,250

Appendix G – Infrastructural Cost Estimate

1. Nutley Lane Scheme Option 1A - Proposed Works

For approximately 167m, from the Nutley Lane/Merrion Road junction, the proposed works have been categorised as **major** i.e. the works associated with widening of the road to accommodate full bus and cyclist facilities include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the road widening, a number of trees are to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage is to be removed/ relocated or replaced. Boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings are to be removed and replaced. Local road re-surfacing needed along parts of the route.

Major modifications are required at the Nutley Avenue/Nutley Lane/St.Vincents Hospital junction. i.e. the works associated with this categorisation include: removal and replacement of kerbs, footways and paved areas, laying of anti-skid surface, protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Works including road re-alignment is required at this junction and as such property boundary re-instatement works are needed.

For the next 607m, approximately, the proposed works have been categorised as **major** i.e. the works associated with widening of the road to accommodate full bus and cyclist facilities include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the road widening, a number of trees are to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage is to be removed/ relocated or replaced. Boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings are to be removed and replaced. Local road re-surfacing needed along parts of the route.

2. Nutley Lane Scheme Option 1B - Proposed Works

For approximately 774m, from the Nutley Lane/Merrion Road junction works have been categorised as **moderate** due to the removal of kerbs and footways with a width greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage and road furniture (bins and bollards) are to be removed/ relocated or replaced. No land take is required along this section.

3. Nutley Lane Scheme Option 1C - Proposed Works

For approximately 167m, from the Nutley Lane/Merrion Road junction, the proposed works have been categorised as **major** i.e. the works associated with widening of the road to accommodate full bus and cyclist facilities include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the road widening, a number of trees are to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage is to be removed/ relocated or replaced. Boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings are to be removed and replaced. Local road re-surfacing needed along parts of the route.

Major modifications are required at the Nutley Avenue/Nutley Lane/St.Vincents Hospital junction. i.e. the works associated with this categorisation include: removal and replacement of kerbs, footways and paved areas, laying of anti-skid surface, protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Works including road re-alignment is required at this junction and as such property boundary re-instatement works are needed.

For approximately 610m, from the Nutley Lane/Nutley Avenue junction, along Nutley Avenue, the proposed works have been categorized as **minor** i.e. the works associated with this section involve removing and replacing existing road markings and local resurfacing of both the carriageway. No land take is required along this section.

Moderate modifications are required at the Nutley Avenue/Nutley Road junction i.e. the works to accommodate the proposed design include: general site clearance, removal and replacement of kerbs, footways and paved areas, laying of anti-skid surface, protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works. No land take is required at this junction and as such property boundary re-instatement works are not needed.

For approximately 345m, from the Nutley Avenue junction, along Nutley Road, the proposed works have been categorized as **minor** i.e. the works associated with this section involve removing and replacing existing road markings and local resurfacing of both the carriageway. No land take is required along this section.

Major modifications are required at the Nutley Road/Nutley Lane junction. i.e. the works associated with this categorisation include: removal and replacement of kerbs, footways and paved areas, laying of anti-skid surface, protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Works including road re-alignment is required at this junction and as such property boundary re-instatement works are needed.

For approximately 320m, between the Nutley Avenue/Nutley Lane/St.Vincent's Hospital junction and Nutley Road junctions, along Nutley Lane, the proposed works have been categorized as **major** i.e. the works associated with widening of the road to accommodate full bus and cyclist facilities include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the road widening, a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage is to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works are needed. Existing road markings are to be removed and replaced.

For approximately 260m from Nutley Road junction, along Nutley Lane, the proposed works have been categorized as **major** i.e. the works associated with widening of the road to accommodate full bus and cyclist facilities include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the road widening, a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage is to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings are to be removed and replaced.

Appendix H – Concept Design Drawings and Staging Diagrams

1. MCA Scheme Options

2. Emerging Preferred Scheme Option

1. MCA Scheme Options

2. Emerging Preferred Scheme Option