



Swords/Airport to City Centre

Route Options Assessment

Volume 2: Environmental Report

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Contents

	Page
1 Introduction	1
2 Report Structure	1
3 Assessment Methodology	1
3.1 Scoping	1
3.2 General Methodology	3
3.3 Topic Specific Methodology	5
3.4 Evaluation of Options	6
4 Description of Route Options	6
5 Environmental Assessment	12
5.1 Archaeological, Architectural and Cultural Heritage	12
5.2 Flora and Fauna	49
5.3 Soils and Geology	76
5.4 Hydrology	84
5.5 Landscape/Townscape and Visual Aspects	93
5.6 Air Quality	107
5.7 Noise and Vibration	112
6 References	118
6.1 Archaeological, Architectural and Cultural Heritage	118
6.2 Flora & Fauna	119
6.3 Soils and Geology	121
6.4 Hydrology	122
6.5 Landscape/Townscape and Visual Aspects	122
6.6 Air Quality	122
6.7 Noise and Vibration	122

Appendices

Appendix A

Figures

Appendix B

Ecological Site Evaluation and Significance

1 Introduction

This Environmental Assessment Report has been prepared to evaluate the available route options identified for the Swords/Airport to City Centre Swiftway BRT Scheme (the ‘proposed scheme’) from an environmental perspective. The results of this environmental assessment were considered as part of the overall Multi-Criteria Analysis (MCA) (refer to Section 5, Volume 1) used to select the preferred route option.

2 Report Structure

The report structure for this environmental assessment is as follows:

1. Introduction;
2. Report Structure;
3. Assessment Methodology;
4. Description of Route Options;
5. Environmental Assessment; and
6. References.

3 Assessment Methodology

3.1 Scoping

The scope and methodology for the environmental assessment was established by considering what environmental aspects were likely to be impacted by implementing Swiftway. A list of the environmental topics considered is outlined in **Table 3.1**. A number of topics were scoped out and, where this is the case, a rationale has been provided. The remaining environmental aspects which were considered to be the most important in the evaluation of route options are addressed in separate sections of the report. At the Environmental Impact Statement (EIS) stage for the proposed scheme, the environmental topics which have been scoped out (and others that are not considered relevant for the options assessment), will be reviewed and incorporated into the EIS as appropriate. This route options assessment report effectively supersedes earlier corridor assessment work undertaken and describes the detailed assessment of potentially viable route options within the study area identified for the proposed scheme against established assessment criteria.

Table 3.1: Environmental Criterion Considered

Criterion	Rationale
Included in Environmental Assessment	
Archaeological, Architectural and Cultural Heritage	The provision of Swiftway infrastructure has the potential to impact on the archaeological, architectural and cultural heritage environment. At this stage of the assessment process, a conservative approach has been adopted in assessing potential for impact and this is further described below (Section 3.1.1).
Flora and Fauna	The provision of Swiftway infrastructure has the potential to impact on flora and fauna.
Soils and Geology	The provision of Swiftway infrastructure has the potential to impact on soil and geology as a result of landtake and possible ground excavation (including potential to encounter ground contamination).
Hydrology	The provision of Swiftway infrastructure has the potential to impact on surface water bodies as a result of landtake (with particular emphasis on floodplains and flood zones).
Landscape/ Townscape and Visual	The provision of Swiftway infrastructure has the potential to impact the townscape/streetscape along the route.
Air Quality	The provision of Swiftway infrastructure has the potential to impact air quality along the route.
Noise & Vibration	The provision of Swiftway infrastructure has the potential to impact the noise environment along the route.
Scoped out of Environmental Assessment	
Agromony	Given the urban/suburban nature of the proposed scheme and the assumption that Swiftway will run on predominantly existing road infrastructure this aspect is not considered to be relevant to the assessment.
Hydrogeology	Hydrogeology is not considered to be a determining factor in the selection of the preferred route option. Also at this stage of the design process it is not possible to determine the quality, type or duration of these impacts, particularly as the location and type of structures e.g. underpasses, bridges etc. is unknown.
Property/Land Acquisition	This will be considered as part of the Economy criterion in the overall multi-criteria analysis commensurate with the information available at option assessment stage.
Socio-economics	Elements of socio-economics such as journey times, catchment analysis, transport integration, quality of service for cyclists etc. are assessed under other non-environmental criteria and will be considered as part of the multi-criteria analysis in the Options Assessment report.

3.1.1 Archaeological, Architectural and Cultural Heritage

As mentioned previously, a conservative approach has been adopted in undertaking the route options assessment in relation to the archaeological, architectural and cultural heritage environment. The constraints comprise Recorded Monuments (i.e. sites listed on the Record of Monuments and Places (RMPs)) and Protected Structures (i.e. sites listed on a Local Authorities Record of Protected Structures (RPS)) within 50m of each Swiftway route section, extending to 250m in greenfield areas. Sites of archaeological and cultural heritage merit, and sites of architectural heritage merit, which are directly intersected by the Swiftway route sections are also included within the scope of this assessment.

During the detailed design of the proposed scheme, the aim will be to avoid known constraints and/or minimise the number of constraints which may be directly or indirectly impacted by the installation of the Swiftway scheme. Appropriate mitigation for construction will be included which will seek, where practicable, to ensure preservation *in situ* of archaeological remains and the avoidance of impacts on archaeological and cultural heritage constraints.

A similar approach has been adopted in relation to the route options assessment for architectural heritage. At this stage of the assessment, the exact nature and extent of potential impacts cannot be determined for all route sections assessed. As a result, the assessment effectively evaluates the potential for impact on architectural heritage from façade to façade which provides for a comparative and qualitative evaluation of Protected Structures along route sections, in particular along heavily developed sections such as those identified within the City Centre.

However, it is important to note that the Swiftway route will primarily travel on existing established road networks. Other than locations of potential widening of the existing road curtilage, it is currently not anticipated that adjacent structures and buildings will be impacted by the proposed scheme (while acknowledging that the designation of, and protection afforded to, a Protected Structure is not restricted to the structure itself but to all elements within its curtilage, e.g. coal cellars and boundary elements). Within the City Centre, the selection of a viable route option will involve the running of the Swiftway service in the vicinity of numerous Protected Structures irrespective of which route section is preferred (archaeological, architectural and cultural heritage is only one of the criteria being considered as part of the MCA analysis). The detailed design of the proposed scheme will seek to avoid and minimise impacts on architectural heritage.

3.2 General Methodology

The high level criteria used in the Options Assessment are taken from the *Guidelines on a Common Appraisal Framework for Transport Projects and Programmes* (DoT, 2009) and comprise the following:

- Economy;
- Safety;
- Accessibility and Social Inclusion;
- Integration; and
- Environment.

This report provides details of the assessment which informed the analysis under the Environment criterion.

The assessment methodology undertaken for each of the environmental topics identified in **Table 3.1** is briefly outlined in **Table 3.2** below.

Table 3.2: Assessment Methodology undertaken for each Environmental Criterion

Environmental Criterion	Assessment Methodology
Archaeology and Cultural Heritage	<ul style="list-style-type: none"> • Preliminary Archaeological inventories have been prepared for the route options. • Impact Assessment tables were prepared to compare various route attributes and to determine an order of preference.
Architectural Heritage	<ul style="list-style-type: none"> • Preliminary Architectural inventories have been prepared for the route options. • Impact Assessment tables were prepared to compare various route attributes and to determine an order of preference.
Flora and Fauna	<ul style="list-style-type: none"> • A broad assessment of the likely impacts of each of the route options on the key ecological receptors was undertaken, with an indication as to which, if any, of these were likely to be significant, and at what geographical level. The impacts associated with each route option were tabulated. • The number of significant impacts, at each geographic level was compared to allow an order of preference to be determined.
Soils and Geology	<ul style="list-style-type: none"> • Attributes (and impacts) assessed for each route option included the following (where relevant): <ul style="list-style-type: none"> ○ geological heritage sites along each route corridor; ○ landfills, backfilled quarries or former industrial sites along each route corridor and the potential risk of encountering contaminated ground; ○ the quality, drainage characteristics and range of agricultural uses of soil along each route corridor; and ○ pits, quarries or mines in the vicinity of each route corridor, the potential implications (if any) for existing activities and future extractable reserves • The impact at each geographic level was compared to allow an order of preference to be determined.
Hydrology	<ul style="list-style-type: none"> • Attributes (and impacts) assessed for each route option included the following (where relevant): <ul style="list-style-type: none"> ○ watercourses crossed by each route corridor and potential impact on water quality arising from re-alignment works and discharge of surface water run-off; ○ aquatic ecological sites close to and downstream of water crossings;

Environmental Criterion	Assessment Methodology
	<ul style="list-style-type: none"> ○ surface water abstraction close to and downstream of water crossings; ○ established amenity value of surface waters traversed by each route corridor, and ○ potential increase (or reduction) in flood risk to existing properties. ● The impact at each geographic level was compared to allow an order of preference to be determined.
Landscape/Townscape and Visual	<ul style="list-style-type: none"> ● The assessment comprised the compilation of a desktop and site-based understanding of: <ul style="list-style-type: none"> ○ the landscape/townscape, its character and features; ○ the visual environment, including the location of residential and other properties and views over the landscape; and ○ the landscape planning context, including landscape designations, open spaces, identified views and prospects, <i>etc.</i> ○ relationship with protected structures, conservation areas, national monuments <i>etc.</i> ● The impact at each geographic level was compared to allow an order of preference to be determined.
Air Quality	<ul style="list-style-type: none"> ● A broad assessment was undertaken of the likely impacts of each of the route options on the existing environment and key sensitive receptors. ● The impacts associated with each route option were compared to allow an order of preference to be determined.
Noise and Vibration	<ul style="list-style-type: none"> ● A broad assessment was undertaken of the likely impacts of each of the route options on the existing noise environment and key sensitive receptors. ● The impacts associated with each route option were compared to allow an order of preference to be determined.

Following the identification of environmental constraints for each route option an impact assessment was undertaken and potential impact identified. The results were then ranked to allow an order of preference to be established.

3.3 Topic Specific Methodology

Topic specific methodology is addressed within each environmental subsection as necessary (refer to **Section 5**).

3.4 Evaluation of Options

For each individual environmental assessment criterion considered, routes have been relatively compared against each other based on a five point scale, ranging from having significant advantages to having significant disadvantages over other route options.

For illustrative purposes, this five point scale is colour coded as presented in **Table 3.3**, with advantageous routes graded to ‘dark green’ and disadvantaged routes graded to ‘dark red’. Each Specialist used this scale when ranking the route sections, and the results of this ranking exercise were then incorporated into the MCA tables contained in Volume 1, with the results from the other criteria, in order to determine the preferred route.

For certain route options, there is considered to be no feasible alternative and therefore comparative evaluation is not practical. In essence, these ‘fixed’ route sections are considered neutral for the purposes of the assessment. Notwithstanding this, for the environmental criteria included in this report, an assessment of the environmental baseline has been undertaken to understand what the likely environmental constraints are on these routes. The potential environmental impacts associated with these fixed route options will be assessed in greater detail at the next stage (the preparation of the Environmental Impact Statement) and appropriate mitigation strategies proposed where necessary.

Table 3.3: Ranking Scale used

Ranking	Description
	Significant advantages over other options
	Some advantages over other options
	Neutral compared to other options
	Some disadvantages over other options
	Significant disadvantages compared to other options

4 Description of Route Options

As outlined in the main report (Volume 1- Section 5.1), a two-stage process was adopted for the identification of route options for assessment. An initial ‘Stage 1’ high-level route options assessment or ‘sifting’ process appraised a large number of routes in terms of ability to achieve scheme objectives and whether they could be practically delivered. Routes which passed this initial stage were taken forward to a more detailed Stage 2 assessment (refer to Section 5, Volume 1 for further information on the route identification and sifting process).

For the purposes of the assessment the study area was split into the following sections:

- **Section 1:** Swords North to Dublin Airport;
- **Section 2:** Dublin Airport to Royal Canal; and
- **Section 3:** Royal Canal to St. Stephens Green.

A description of the route options which passed through the initial sift for each section is outlined in **Table 4.1**.

Each route description describes the route in a north to south direction, where possible. The route options considered within each section are illustrated in **Figure 4.1** to **Figure 4.31** (**Appendix A**).

Table 4.1: Description of Route Options

Section	Route Option	Description
Section 1 – Swords North to Dublin Airport		
North-West Swords	GE1	This option extends from the R132 Estuary roundabout junction along the R125 Balheary Road and Glen Ellan Road travelling west to terminate on the Glen Ellan Road extension in Oldtown.
	GE2	This option follows the same route as GE1 to Applewood Roundabout and travels south along the Glen Ellan and Murrough Roads to Brackenstown Road. This route would terminate on Brackenstown Road.
	GE3	This option follows the same route as GE2 to Applewood Roundabout and turning south to the junction with Rathbeale Road. From here it follows the Rathbeale Road westwards to terminate on the Glen Ellan Road extension in Oldtown.
	PG1	This option extends from the R132 Estuary Roundabout and would see Swiftway vehicles travel along the R125, Castlegrange Green, a new 'Swiftway-only' link joining Castlegrange Green to Broadmeadow Road, Broadmeadow Road, a new 'Swiftway-only' link joining Broadmeadow Road to Pine Grove Park, onto Pine Grove Park and Rathbeale Road. This route option would terminate on the Glen Ellan Road extension in Oldtown.
	PG2	This option follows the same route as PG1 to the junction of Rathbeale Road with the Murrough Road where it will travel along the Murrough Road and Brackenstown Road. This route would terminate on Brackenstown Road.
	PG3	This option follows the same route as PG2 to the junction with the Murrough Road. At this location it will turn north travelling along the Glen Ellan Road and Glen Ellan Road extension. This route option would terminate on the Glen Ellan Road extension in Oldtown.
	SW14	This option runs along the existing R132 from Estuary Roundabout to Seatown Roundabout. This is a fixed route option with no feasible alternative.

Section	Route Option	Description
Swords Central	SW16	This option travels from the R132 at the Seatown roundabout onto Seatown Road before continuing towards Swords town centre turning onto Main Street. It would continue along Dublin Road and re-join the R132 at Pinnock Hill Roundabout.
	SW17	This option runs along the existing R132 from south of the Seatown Roundabout to the Pinnockhill roundabout, by-passing the Swords town centre area.
Swords Central to Dublin Airport	SW20	This option runs along the existing R132 between Pinnockhill roundabout and Airside Retail Park joining the roundabout on its western side. This option is a fixed route option with no feasible alternative.
	SW21	This option follows the existing R132 from Airside Retail Park to the Airport roundabout. This option is a fixed route option with no feasible alternative.
Section 2 - Dublin Airport to Royal Canal		
Dublin Airport	DA0	This option continues along the R132 and does not enter the airport campus.
	DA1	This option runs southbound from the Airport Roundabout to Corballis Road South via the eastern extent of Corballis Road North and the East Link Road. The return route (northbound) runs from Corballis Road South to Airport Roundabout via East Road Junction, Corballis Avenue and Corballis Road North. A new link would be required to connect East Road Junction to Corballis Avenue.
	DA2	This option runs southbound from Cloughran Roundabout to Corballis Road South via Castlemoate Road, Corballis Road North, Old West Link Road, T2 Parking Road and East Link Road junction. The return route would follow the same route northbound.
	DA3	This option runs southbound from the Airport Roundabout to Corballis Road South in a clockwise direction via the eastern extent of Corballis Road North, East Link Road, T2 Arrivals Road, New West Link Road back onto Corballis Road North and East Link Road before joining Corballis Road South. The return route (northbound) runs from Corballis Road South to the Airport Roundabout via T2 Arrivals Road, New West Link Road and Corballis Road North.
	DA4	This option runs southbound from the Airport Roundabout to Corballis Road South in a clockwise direction via the eastern extent of Corballis Road North, East Link Road and Atrium Road to the Ground Transport Hub. From here the route runs back onto Corballis Road North and East link Road before joining Corballis Road South.

Section	Route Option	Description
		The return route (northbound) runs from Corballis Road South to the Airport Roundabout via Atrium Road, the Ground Transport Hub and Corballis Road North.
	DA5	<p>This option runs southbound from the Airport Roundabout to Corballis Road South in a clockwise direction via the eastern extent of Corballis Road North, East Link Road, T2 Premium Departures Road, Atrium Road, Arrivals Road back onto Corballis Road North and East link Road before joining Corballis Road South.</p> <p>The return route (northbound) runs from Corballis Road South to the Airport Roundabout via T2 Premium Departures Road, Atrium Road, Arrivals Road and Corballis Road North.</p>
	DA6	<p>This option is a variant of DA5 and only differs in how southbound vehicles exit onto the R132. Instead of using East Link Road and Corballis Road South, the southbound route in this option would exit directly onto the R132 from Corballis Road North at the Airport Roundabout.</p> <p>The northbound road remains as per DA5.</p>
	DA7	<p>This option runs southbound from the Airport Roundabout to Corballis Road South via Corballis Road North (contraflow), Old West Link Road, T2 Parking Road and through East Link Road junction. A new access onto Old West Link Road from Corballis Road North would be required.</p> <p>The return route northbound would follow the same route in the opposite direction.</p>
Airport to Santry	SY4	This route follows the existing QBC corridor along the R132 from Corballis Road South to its junction with the R104 (Coolock Lane). This option is a fixed route option with no feasible alternative.
Santry	SY1	<p>This route follows the R132 through Santry Village. South of the village, Swiftway vehicles would travel along the Shantalla Road over bridge, turning right onto the southbound slip road and continue along the Swords Road past Whitehall Church towards the city centre.</p> <p>On the return route (northbound) the Swiftway service would diverge via the Santry village 'Shantalla' slip road and continue through the centre of Santry village along the R132.</p>
	SY2	<p>This route avoids Santry Village by turning off the R132 onto a dedicated segregated section of two-way 'Swiftway-only' road immediately to the north of Coolock Lane. At the junction with the N50, Swiftway vehicles would circulate the 'gyratory' in dedicated BRT lanes.</p> <p>The return route (northbound) would continue along the N50 before turning off at the Coolock Lane Interchange (Junction 2), joining the R132 immediately north of Santry village.</p>

Section	Route Option	Description
Santry to Royal Canal	F1	This route follows the existing QBC corridor along the R132 from the N50 junction to the Royal Canal (Binns Bridge). This option is a fixed route option with no feasible alternative.
Section 3: Royal Canal to St. Stephens Green		
North City Centre	N1	<p>This route goes southbound from Lower Drumcondra Road and runs southbound along Dorset Street, Belvidere Road and North Circular Road, continuing to the Five Lamps junction via Portland Row from where it would turn right onto Amiens Street, continuing to Memorial Road and Memorial Bridge.</p> <p>The northbound route would follow the same streets except at the Beresford Place area, where it would follow the existing gyratory traffic system via Beresford Place West to connect Butt Bridge to Amiens Street.</p>
	N2	<p>This route goes southbound from Lower Drumcondra Road and runs southbound along Dorset Street, Belvidere Road and Belvedere Place before turning right onto either Mountjoy Square North or South. The route option would then turn left onto Gardiner Street as far as Beresford Place, continuing to Memorial Road and Memorial Bridge.</p> <p>The northbound routing would follow the same streets except at the Beresford Place area, where it would follow the existing gyratory traffic system via Beresford Place West to connect Butt Bridge to Gardiner Street.</p>
	N3	<p>This route goes southbound from Lower Drumcondra Road and runs southbound along Dorset Street to the North Frederick Street junction where it would turn left onto North Frederick Street and continue to O'Connell Street via Parnell Square East and Cavendish Row. The route would connect to O'Connell Bridge at the southern end of O'Connell Street.</p> <p>The return route northbound would follow the same streets.</p>
	N4	<p>This route goes southbound from Lower Drumcondra Road and runs southbound along Dorset Street, Belvidere Road and Belvedere Place before turning right onto Mountjoy Square North.</p> <p>The route option would then continue onto Gardiner Place, Great Denmark Street and Gardiner Row before turning left onto Parnell Square East and onto Cavendish Row. The route would connect to O'Connell Bridge at the southern end of O'Connell Street.</p> <p>The return route northbound would follow the same streets.</p>

Section	Route Option	Description
South City Centre	S1	<p>This route runs from O'Connell Bridge southbound along D'Olier Street and onto Townsend Street travelling as far as the Lombard Street junction before turning right onto Lombard Street and continuing onto Westland Row and Merrion Street Lower. From there it would turn left onto Merrion Square North then right onto Merrion Square East/Fitzwilliam Street, continuing to the Leeson Street junction. Turnaround would be accommodated at Wilton Terrace/Cumberland Road.</p> <p>The return route northbound would follow the same route as far as Merrion Street Lower, where it would either operate on a shuttle basis or follow the existing gyratory system around Clare Street and Lincoln Place. At the northern end of Westland Row, the route would turn left onto Pearse Street, continuing onto College Street before turning right onto Westmoreland Street.</p>
	S2	<p>This route runs from O'Connell Bridge southbound along D'Olier Street and onto Townsend Street travelling as far as the Lombard Street junction before turning right onto Lombard Street and continuing onto Westland Row and Merrion Street Lower/Merrion Square West/Merrion Street Upper. The route would continue onto Ely Place and Hume Street before turning left onto St. Stephen's Green East and onto Earlsfort Terrace, returning via left turns onto Hatch Street and Leeson Street and a right turn onto St. Stephen's Green East.</p> <p>The return route northbound would follow the same route as far as Merrion Street Lower, where it would either operate on a shuttle basis or follow the existing gyratory system around Clare Street and Lincoln Place. At the northern end of Westland Row, the route would turn left onto Pearse Street, continuing onto College Street before turning right onto Westmoreland Street.</p>
	S3	<p>The route goes from Talbot Memorial Bridge and runs eastbound along City Quay until turning right onto Lombard Street and continuing onto Westland Row and Merrion Street Lower. From there it would turn left onto Merrion Square North then right onto Merrion Square East / Fitzwilliam Street, continuing to the Leeson Street junction. Turnaround would be accommodated at Wilton Terrace/Cumberland Road.</p> <p>The return route (northbound) would follow the same route as far as Merrion Street Lower, where it would either operate on a shuttle basis or follow the existing gyratory system around Clare Street and Lincoln Place. At the northern end of Westland Row, the route would turn left onto Pearse Street before turning right onto Tara Street and crossing the Liffey at Butt Bridge.</p>
	S4	<p>This route goes from Talbot Memorial Bridge and run eastbound along City Quay until turning right onto Lombard Street and continuing straight ahead onto Westland Row and Merrion Street Lower/Merrion Square West/Merrion Street</p>

Section	Route Option	Description
		<p>Upper. The route would continue onto Ely Place and Hume Street before turning left onto St. Stephen's Green East and onto Earlsfort Terrace, returning via left turns onto Hatch Street and Leeson Street and a right turn onto St. Stephen's Green East.</p> <p>The route northbound would follow the same route as far as Merrion Street Lower, where it would either operate on a shuttle basis or follow the existing gyratory system around Clare Street and Lincoln Place. At the northern end of Westland Row, the route would turn left onto Pearse Street before turning right onto Tara Street and crossing the Liffey at Butt Bridge.</p>

5 Environmental Assessment

5.1 Archaeological, Architectural and Cultural Heritage

5.1.1 Introduction

This section addresses the archaeological, architectural and cultural heritage impacts associated with the route options considered for the proposed scheme and was completed by the Railway Procurement Agency (RPA). The baseline environment is described in Section 5.1.2.2. A discussion of the evaluation of route options and conclusions is detailed in Sections 5.1.4 - 5.1.6 inclusive.

5.1.2 Assessment Methodology

The overall methodology comprises the following steps:

- Defining the study areas;
- Data collection;
- Baseline description, rating and categorisation;
- Description and evaluation of the options; and
- Ranking of the options.

5.1.2.1 Study Area

The scope of the archaeological, architectural and cultural heritage assessment comprises Recorded Monuments and Protected Structures within 50m of each route option, extending to 250m in greenfield areas. Areas of archaeological potential and sites of architectural heritage merit which are directly intersected by route option sections are also included within the scope of this assessment.

The dimensions of the study area are presented in **Table 5.1.1** and are illustrated on the archaeological, architectural and cultural heritage maps included in this report (refer to **Figure 5.1.1 – Figure 5.1.18** inclusive, **Appendix A**).

Table 5.1.1: Study area

Description	Study Area
Recorded Monuments (sites listed on the Record of Monuments and Places (RMP sites))	Within 50m of each route option section in urban areas extending to 250m in greenfield areas.
Protected Structures (sites listed on the Record of Protected Structures (RPS))	Within 50m of each route option section in urban areas extending to 250m in greenfield areas.
Areas of Archaeological and Cultural Heritage Merit	Directly intersected by route options in urban areas extending to 250m in greenfield areas.
Areas of Architectural Heritage Merit	Directly intersected by route options in urban areas extending to 250m in greenfield areas.

5.1.2.2 Baseline Environment

This section presents the methodology used in assessing the baseline archaeological, architectural and cultural heritage environment. The baseline environment is defined as the existing environment against which future changes can be measured. The baseline archaeological, architectural and cultural heritage environment has been defined through a high level desktop study. The baseline environment is then categorised using the criteria outlined below and baseline ratings are assigned.

Baseline Data

The data sources used to compile the baseline are presented in **Table 5.1.2**.

Table 5.1.2: Baseline Data

Information Acquired	Data Source
Recorded Monuments	Archaeological Survey of Ireland, National Monuments Service ¹ www.archaeology.ie
Protected Structures	Dublin City Development Plan (DCDP) 2011–2017 ² Fingal Development Plan (FDP) 2011–2017 ³
National Monuments	Archaeological Survey of Ireland, National Monuments Service ¹ www.archaeology.ie DCDP 2011–2017 ² FDP 2011–2017 ³ Metro North Environmental Impact Statement (EIS) ⁴ Luas Broombridge (now Luas Cross City) EIS ⁵
Recently identified archaeological sites Sites/areas of archaeological potential identified through the environmental assessment process Sites of high architectural and cultural heritage merit	Database of Irish Excavation Reports www.excavations.ie ⁶ Metro North EIS ⁴ Luas Broombridge (now Luas Cross City) EIS ⁵ Dublin City Graveyards Directory ⁷ http://dublinheritage.ie/graveyards/index.php National Inventory of Architectural Heritage www.buildingsofireland.ie ⁸
Greenfield areas with unknown archaeological potential Sites of medium architectural and cultural heritage merit	Archaeological Survey of Ireland, National Monuments Service – Aerial Photography www.archaeology.ie ¹

Baseline Categorisation Criteria

The baseline archaeological, architectural and cultural heritage environment is assigned a baseline rating taking account of the importance and sensitivity (and existing adverse effects where applicable) of the receiving environment. Each of these three terms is explained in detail in this section. The professional opinion of the assessor also plays an important role in assigning the baseline rating.

Importance of the Baseline Environment

Each Recorded Monument, National Monument and its associated constraint area is identified by a unique Recorded Monument reference number which is assigned by the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht (DoAHG). These sites are represented on the respective county's Archaeological Survey Database¹ as well as on the respective county/city development plan.^{2,3}

Recorded Monuments may be completely or partially upstanding or may be subsurface with no above ground register. Where a Recorded Monument has no above ground register, it is referred to as “site” or “site of”.

For the purposes of characterising the importance of the baseline environment, it is assumed that these “sites” are well preserved beneath the existing ground level.

The National Monuments Act 1930–2004⁹ does not differentiate between archaeological sites on the basis of relative importance. Consequently, each Recorded Monument and National Monument and its associated constraint area is considered to be of very high importance. The National Monuments legislation also legally protects access and the visual amenity associated with these monuments and also requires consent from the Minister for invasive works in the vicinity of the monuments.

Areas of archaeological potential are identified through a high level desktop study including a review of recent EIS’s (i.e. Metro North⁴ and Luas⁴ Boombridge⁵), and through a review of the database of Irish Excavations.⁶

Only those areas of archaeological potential which will be directly intersected by the route options are included within the baseline environment (refer to **Table 5.1.1**). Given the potential for previously unrecorded subsurface remains within these areas, each identified area of archaeological potential is considered to be of high importance.

Planning authorities are required to keep records of Protected Structures (RPS) and to designate Architectural Conservation Areas (ACAs) which are maintained within the relevant County/City Development Plan. County/city development plans and the planning legislation do not differentiate between Protected Structures and ACAs on the basis of relative importance. A structure is either a Protected Structure or it is not, and everything within its curtilage is protected (unless otherwise recorded within the record of the Protected Structure). Archaeological and cultural heritage sites may also be designated as Protected Structures. Archaeological, architectural and cultural heritage sites that are Protected Structures are considered to be of very high importance.

Section 81 of the Planning Act 2000–2013¹⁰ provides for the inclusion of ACAs in the development plans of planning authorities in the following terms:

“A development plan shall include an objective to preserve the character of a place, area, group of structures or townscape, taking account of building lines and heights that is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or value or contributes to the appreciation of Protected Structures, if the planning authority is of the opinion that its inclusion is necessary for the preservation of the character concerned”.

ACAs, proposed ACAs (pACAs) and the elements within them are therefore considered to be of very high importance. For the purpose of the route options assessment and in the absence of a detailed design, a worst case scenario approach has been adopted and the passing of the route sections through ACAs and the quantitative assessment of architectural heritage items are considered in the evaluation of these options.

County/city development plans also provide a list of Conservation Areas (CAs) which are established to protect the architectural design and overall setting of an area. A range of uses that do not impact negatively on the architectural character and setting of the area are permitted in such zones. CAs and the elements within them are therefore considered to be of high importance.

Structures, streetscapes, settings and features, such as historic furniture, may be considered of architectural heritage merit and have been included in this baseline characterisation where listed for protection within a county development plan. For example, historic paving and coal hole covers on designated streets in Dublin City are listed for protection under Variation 4 of the DCDP.² The architectural heritage importance of such a feature is considered under the following headings set out in the Architectural Heritage Guidelines for Planning Authorities¹¹ by the Department of the Environment, Heritage and Local Government (DoEHLG now the DoAHG): architectural, historical, archaeological, artistic, cultural, scientific, technical, social, vernacular and group. The different criteria for assessing each of these categories are documented in the Architectural Heritage Guidelines for Planning Authorities¹¹ and have been used to assign importance in the baseline assessment. For the purposes of this assessment, sites of architectural heritage merit are considered to be of high importance under these criteria.

Aspects of Ireland's tangible cultural heritage within the study area are represented by vernacular architecture, religious sites and statues and plaques; many of which commemorate and celebrate significant historical people and events. Additionally, many also serve to commemorate and celebrate day-to-day elements of Dublin life. For the purpose of this assessment, only tangible cultural heritage items that are afforded protection either as Record Monuments or as Protected Structures are included as constraints and are regarded as being of very high importance.

Sensitivity of the Baseline Environment

Archaeological and cultural heritage sites are considered to be a non-renewable resource and cultural heritage material assets are generally considered to be location sensitive. In this context, any change to their environment, such as construction activity and ground disturbance works, could adversely affect these sites and could result in irreversible damage or removal.

Architectural heritage is a unique and irreplaceable material asset which is given value by its design, setting, quality of workmanship and use of materials. In this context, any change to the architectural heritage fabric, structure and setting, resulting from construction and operation activity, may adversely affect these sites.

As such, all archaeological, architectural and cultural heritage sites are considered to have very high sensitivity.

Existing Adverse Effects

Due to their legal status, existing adverse effects on designated constraints including Recorded Monuments, National Monuments and Protected Structures were not considered, regardless of their present condition or extent. Additionally, existing adverse effects, such as damage to the integrity of a monument or feature of cultural heritage, were not considered in the categorisation as such effects do not impact on the cultural significance or function of these sites.

Baseline Rating

The baseline rating of the existing archaeological, architectural and cultural heritage environment is determined by having regard to the range of criteria which reflect its importance, sensitivity and existing adverse effects of the baseline environment. The criteria that have been defined are presented in **Table 5.1.3**.

Table 5.1.3: Criteria for Baseline Categorisation

Weighting / Topic	Low	Medium	High	Very High
Archaeological, Architectural and Cultural Heritage	N/A	Greenfield areas with unknown archaeological potential	Recently identified archaeological sites Sites/areas of archaeological potential identified through the environmental evaluation process Sites of architectural heritage merit Conservation Areas (CA)	Sites that are afforded legal protection (National Monuments, Recorded Monuments (RMPs), Register of Historic Monuments, Record of Protected Structures (RPS) and Architectural Conservation Areas (ACAs))

5.1.3 Existing Environment

Approximately 34 Recorded Monuments (RMPs)^{1,2,3}, 990 Protected Structures (RPS),^{2,3} 5 National Monuments,^{1,2,3} 2 areas of archaeological and cultural heritage merit^{7,12}, 51 sites of architectural heritage merit,^{8,2} 3 Architectural Conservation Areas (ACAs),^{2,3} and 1 Conservation Area (CA)² were identified within the study areas as illustrated in **Figure 5.1.1 – Figure 5.1.9** (Archaeological and Cultural Heritage), and **Figure 5.1.10 – Figure 5.1.18** (Architectural Heritage) included in **Appendix A** to this report.

Seven of the c.34 Recorded Monuments within the study area are presently stored within the premises of the Office of Public Works (OPW) on St. Stephen's Green and Hatch Street Lower.¹ These Recorded Monuments comprise a collection of cross slabs and inscribed crosses which have been moved from their original location to the OPW premises. Therefore, for the purposes of this Route Options Assessment: Environmental Report, these Recorded Monuments will be discounted, reducing the total number of Recorded Monuments within the study area to 27.

The highest concentration of both Recorded Monuments and Protected Structures is present within the boundaries of historic Dublin City, which extends from the Royal Canal in the north to the Grand Canal in the south.

This reflects the continuous intense occupation of a relatively confined area from at least the Neolithic period; however the majority of archaeological sites within this section of the study area date from the late Medieval period. The continuous occupation of historic Dublin City was greatly influenced by the presence of early medieval and medieval trade centres and the protection afforded to the citizens of Dublin by the town walls on the south banks of the River Liffey.

A significant number of Recorded Monuments, Protected Structures and sites of architectural heritage merit are also located in the north of the study area, concentrating around the 6th century village of Swords and the route of the River Tolka.

5.1.3.1 Archaeology and Cultural Heritage

The aim of this section is to present the findings of a high level desktop study, which included a review of previous archaeological investigations and EISs. A significant number of the Recorded Monuments within the study area are subsurface sites without upstanding elements, particularly those within Dublin City Centre.

Archaeological and cultural heritage site types within the study area include holy wells, early medieval settlement and ecclesiastical sites, burial grounds, churches, medieval towns, houses, bridges, hospitals, quays and quasi-industrial sites such as mills illustrated on the: Archaeological, Architectural and Cultural Heritage figures included in this report (refer to **Figure 5.1.1 – Figure 5.1.9** inclusive, **Appendix A**).

The earliest evidence for occupation within the environs of the study area is in the form of two Bronze Age *Fulachta Fia* and a ring ditch recently identified through archaeological investigations in Mooretown in the north of the study area.¹² Mooretown and the adjoining lands of Oldtown were exploited in the early and late medieval period, initially through the establishment of a substantial early medieval ecclesiastical site in Oldtown¹². The site, comprising a substantial sub-surface ecclesiastical enclosure, is likely to have been contemporary to, and associated with, a millrace on the Ward River and St. Cronin's Holy Well (RMP DU011-018). The latter is located outside of the study area in proximity to Glasmore Abbey (RMP DU011-019----) which appears to have been the focus of the late medieval occupation of this section of the study area.

A circular enclosure (RMP DU011-135----) identified through aerial photography and of probable early medieval date is located in the townland of Rathbeale in the north of the study area. It is associated with a possible field system (RMP DU011-137----) and a second enclosure (RMP DU011-136----) located in the same field but external to the study area.¹

A 6th century archaeological complex is also located in the village of Santry immediately adjacent to the study area and comprises an ecclesiastical enclosure, residence, church, graveyard and font (RMPs DU014-057001- – DU014-057003-; DU014-057005- – DU014-057006) (RMP DU014-057005-). The ecclesiastical enclosure (RMP DU014-057001-) is believed to have been rebuilt in the 12th, 16th and 18th centuries and is now occupied by St. Pappin's Church and Graveyard.^{1,7}

A significant archaeological and cultural heritage constraint, comprising the medieval town of Swords (RMP DU011-035----), is located in the north of the study area. A large number of Recorded Monuments are located within the Zone of Archaeological Potential (ZAP) for Swords town (RMP DU011-035----).¹

However, only Swords Castle National Monument (RMP DU011-034001-) and a Holy Well (RMP DU011-034013-) on Well Road are located within the study area for the proposed scheme. Swords Castle National Monument (RMP DU011-034001-), which was built c.1200 as the manorial residence of the Archbishop of Dublin. The Holy Well (RMP DU011-034013-), which is also listed in the NIAH (NIAH 11343013)⁸ is believed to have curative powers for sore eyes¹.

A late medieval castle (Corballis Castle, RMP DU014-011), was located on the grounds of Corballis House, on lands now occupied by Dublin Airport. It was annotated on the 1st edition Ordnance Survey map of 1837 as ‘Corballis Castle in ruins’. There are no surviving remains for this site.¹

St. Patrick’s College, located on Drumcondra Road Upper incorporates the remains of Belvedere House, a 17th century house with 18–19th century additions (RMP DU018-012001-, RPS 2369 DCC). The Civil survey (1654-6) describes the house, which was once the seat of the Coughill family, as a ‘faire brick house’. Elements of the house’s original 17th century fabric are incorporated into the present structure.¹

On crossing the Royal Canal the study area enters the ZAP for historic Dublin (RMP DU018-020-----). The majority of the Recorded Monuments within the study area are of post-medieval date, reflecting the fact that these lands were outside of the city’s medieval core, remaining primarily agricultural and undeveloped until the late 16th/early 17th century. Relatively few Recorded Monuments are located north of the River Liffey however, important archaeological and cultural heritage sites are still to be found, such as the site of a potential Viking Burial Ground which stretches from Mountjoy Square to Parnell Street (RMP DU018:020495). This burial ground is believed to contain the bodies of victims from the Battle of Clontarf.¹

Additional Recorded Monuments north of the River Liffey include a sea wall relating to the reclamation of the northern floodplain of the River Liffey on Memorial Road/Beresford Place (RMP. DU018-020505-), a well site on Frederick Street (RMP DU018-024-----) and a house site on Dorset Street Lower (RMP DU018-023-----).

To the south of the River Liffey the study area lies to the east of the medieval walled town (RMPs DU018-020001- and DU018-020268-), where a number of significant early and late medieval constraints were established, the most noted of which is Trinity College Dublin (TCD). Initially established in the late 12th century as the Augustinian Priory of All Saints (RMP DU018-020044-), it was established as the College of the Holy and Undivided Trinity of Queen Elizabeth in 1592.^{1,3,4} The college is surrounded by a number of Recorded Monuments including the site of a water mill on College Street (RMP DU018-020099-), the site of a boundary stone (RMP DU018-020129-) on the intersection of D’Olier Street and Pearse Street, and a brick works on the intersection of Pearse Street and Lombard Street (RMP DU018-020439-). The aforementioned boundary stone, known as the “Long Stone” is a significant archaeological and cultural heritage constraint, and is believed to have been erected c. AD841 by the Vikings at the mouth of the Stein River. It marked the site of their first landfall and was subsequently used as a guide for sailors. It is also an indicator of the original southern shore line of the River Liffey. The stone stood at this location until the end of the 17th century, and its site was marked by the “Steyne” sculpture erected in 1986.⁵

This sculpture has recently been removed to temporary storage as part of the enabling works for Luas Cross City (LCC) and is scheduled for reinstatement in late 2016/early 2017.

A significant archaeological constraint dating from the 17th century, is St. Stephen's Green Park (RMP DU018:020334: RPS 7751–7761 DCC). The park is both a Recorded Monument and a National Monument. The park's footprint and boundaries remain virtually unchanged since it was set out in 1664 to facilitate the lease of 96 plots for development around a green of 27 acres. In its earliest years, the park was surrounded by a perimeter wall constructed in 1669 and drained by a perimeter ditch. In 1818, the perimeter wall was replaced by railings, and the short granite posts that still line the outer pavement were installed.¹⁴ The park was transformed once again in the 1870s at the instigation of Arthur E. Guinness who engaged the architect J.E. Fuller and the landscape designer William Shepard to create the park's current picturesque landscaping. In 1907, the Royal Dublin Fusilier's Arch was erected at the northwest corner of the park to commemorate the casualties of the Boer War.

In the late 16th/early 17th century the floodplains of the River Liffey were reclaimed through the construction of the quay walls (e.g. George's Quay, Burgh Quay and City Quay RMP DU018-020479). This act released new land for development, both on the city's north and south sides. Some of the land was set out into lots (North and South lots) for development for residential purposes but the quays became a focus of industrial activity, facilitated by the opportunity to moor and load boats directly from the quay walls. Industries along the city's quays included glass works, iron works, windmills (RMP DU018-020464-) and shipyards, along with associated custom houses. A number of churches (RMPs DU018-020161-, DU018-020347-, DU018-020648-) and hospitals (RMP DU018-020061) were also constructed between George's Quay and Pearse Street to cater for the new populace.¹

5.1.3.2 Architectural Heritage

As with archaeological and cultural heritage, the majority of the Protected Structures within the study area are located within the administrative boundaries of DCC (c.990 RPSs); the remaining 10 Protected Structures are located within the administrative boundaries of FCC, illustrated on the Archaeological, Architectural and Cultural Heritage figures included in this report (refer to **Figure 5.1.10 – 5.1.18** inclusive, **Appendix A**).

A small number of the Protected Structures within the study area are also Recorded Monuments (RMPs), comprising a variety of sites such as colleges, parks, churches and graveyards (i.e.; TCD (RMP DU018-020044-; RPS 1999-2006 DCC); St. Stephen's Green (RMP DU018:020334: RPS 7751–7761 DCC) and St. Marks Street Church (RMP DU018-020347 RPS 6503 DCC)). Only the Recorded Monuments that incorporate upstanding architectural heritage elements are addressed within this section of the report.

The NIAH provides a valuable resource in assessing the architectural heritage of an area, providing information on both the built heritage and designed landscapes and gardens of the study area.⁸ This information has been taken into consideration in assessing the architectural heritage of the study area.

The NIAH survey for the FCC area is complete; however the survey, though in progress, has not been completed for DCC.⁸ Fourteen sites of architectural heritage merit identified by the NIAH are located within the FCC section of the study area; however 6 of these are also listed on the RPS for FCC, reducing the counted number to 8.

Nine Historic Gardens and Designed Landscapes identified by the NIAH, are also located within the study area. A further 28 architectural heritage constraints were identified through the analysis of development plans and EISs, and primarily comprise areas of historic street paving.^{2,4,5}

The architectural heritage of the north section of the study area from Oldtown/Mooretown to the Royal Canal is quite dispersed and, as for archaeological and cultural heritage, this is a reflection of the predominantly rural nature of this section of the study area. Consequently, the architectural heritage resource in north Dublin primarily comprises 17th–19th century demesne houses, Historic Gardens and Designed Landscapes in addition to industrial heritage items relating to the Royal Canal. The majority of estate houses which once stood within the study area have largely fallen into disrepair, with the surrounding lands developed for agriculture, housing and commercial airports.

Examples of former estate houses within or bordering the northern section of the study area include Newtown House (RPS 329 FCC) and Balheary House in Swords, Corballis House (removed as part of the construction of Terminal 2 at Dublin Airport), Santry House on Swords Road and Belvedere House, Drumcondra (RMP DU018-012001-, RPS 2369 DCC).^{1,2,3,8} The latter now functions as St. Patrick's College and is also a Recorded Monument (refer to **Section 5.1.3.1**).

Additional structures of architectural heritage located within the northern section of the study area are primarily concentrated in the medieval town of Swords and comprise public and private buildings fronting onto the town's Main Street. Protected Structures in Swords include a Court House (RPS 350 FCC), a Parochial House (RPS 358 FCC), a bank (RPS 372 FCC) and structures relating to the former New Borough Male School (RPSs 353 and 354 FCC).³ Additional structures and items of street furniture, which are of architectural heritage merit were identified for Swords in the NIAH such as an historic post box (NIAH 11335013), water pump (NIAH 11343015), a road bridge (NIAH 11343016) and a late 19th century dispensary (NIAH 11343008).⁸

As the study area progresses southwards along the R132 it passes through the curtilage of Castle Moate House (RPS 611 FCC) in Cloghran comprising a five bay two storey house located north of Dublin Airport.³ Few Protected Structures are located in the study area from Dublin Airport to Royal Canal and all are located on Drumcondra Road. These protected structures comprise Whitehall Garda Station (RPS 3329 DCC), the aforementioned St. Patrick's College (RPS 2369 DCC; RMPDU018-012001-), a number of Georgian Buildings (RPS 2350-2367 DCC) and Binn's Bridge on the Royal Canal (RPS 908 DCC).²

On crossing the Royal Canal the study area enters the historic city of Dublin. Although continuously occupied throughout the medieval period, the surviving architecture and streetscape within the footprint of historic Dublin City predominantly dates from the late 18th–20th century. The majority of Protected Structures within the study area are of either Georgian or Victorian style, interspersed with religious and public buildings and 19th–20th century monumental art, as illustrated in **Figures 5.1.17 and 5.1.18 (Appendix A)**.

The late character of Dublin's architecture is greatly influenced by the 17th century reclamation of the floodplains of the River Liffey and the establishment of the "Commissioners for the Making of Wide and Convenient Streets and Passages", otherwise known as the Wide Street Commissioners (WSC), in 1757.

The reclamation of the city's floodplains extended the city eastwards, affording new land for both industrial and residential development. This work also resulted in the construction of the River Liffey's quay walls, and the formalisation of the river's crossing points, connecting north and south Dublin.

The WSC, established through a 1757 Act of Parliament, was tasked with reducing the city-centre congestion arising from the existing narrow medieval streets and consequently worked to widen and develop the thoroughfares of Dublin City Centre. The WSC had extensive powers including the authority to acquire property by compulsory purchase, to demolish structures and lay down new streets and set lots along the new streets to lease to builders for development. The work of the WSC resulted in the eradication of distinct house styles that once lined the city's streets, namely the Dutch Billy.

These were a late 17th century house style, the arrival of which is generally attributed to the influx of both the French Huguenots into Dublin *c.* 1685 and of Dutch and Flemish Protestants fleeing persecution *c.* 1690. The buildings were gable fronted brick houses with corner fireplaces. Dutch Billy's were once the dominant form of Dublin architecture but now only isolated examples survive. Two examples of Dutch Billy's are located on St. Stephen's Green (RPS 7781 and 7782 DCC) though these are masked by Georgian façades.¹⁵

During the 17th and 18th century, Dublin's north side was extremely fashionable, and was the primary focus of urban development. This did not change until the mid-18th century when the Earl of Kildare built his mansion, Kildare House (now Leinster House; RPS 4198 DCC), on the south side of the city, prompting rapid development of the surrounding lands. This development was further facilitated by the earlier formalisation of St. Stephen's Green Park (RPSs 7751–7761 DCC; a National Monument) in 1664 when the surrounding land was leased for the construction of private houses; the majority of which were constructed by 1756 (RPSs 77880–7799 and 7812–7818 DCC).

The architectural development of the study area was further influenced by the Gardiner family to the north of the River Liffey and the Fitzwilliam family to the south. Both families were influential landowners who leased and developed their estates for housing; landmark elements of which are Dublin's Georgian Squares, namely Parnell Square, Mountjoy Square, Merrion Square, Fitzwilliam Square and Mountpleasant Square. Four of Dublin's five Georgian Squares are located within the study area.

Mountjoy and Parnell Square are present north of the River Liffey with Merrion Square and Fitzwilliam Square located to the south. Parnell Square (RPSs 6366-6418 DCC) was the first Georgian Square constructed in Dublin (*c.* 1753-1785), while Mountjoy Square (RPSs 5412-5454 DCC) is the city's only true Georgian Square and is also an ACA. The construction of these squares instigated a wave of residential development particularly on Gardiner Street (RPSs 3043–3138 DCC), Gardiner Place (RPSs 3002-3036 DCC) and Amiens Street (RPS 98–129 DCC). A particularly significant Georgian development at this location is the crescent of Beresford Place (RPS 730–734 DCC) built to a design of John Gandon and approved by the WSC in 1792.¹⁶

The Georgian streets south of the River Liffey are primarily intact with significant concentrations of buildings identified along Leeson Street Lower (RPSs 4388–4399 and 4434–4454 DCC) and Fitzwilliam Street Lower (RPSs 2865–2876 DCC), Baggot Street Lower (RPSs 339–366 and 411–430 DCC) and Pembroke Street (RPSs 6638–6678 DCC).

As for the lands north of the River Liffey, these streets radiate out from two Georgian squares: Fitzwilliam Square (RPSs 2824–2852 DCC; ACA) and Merrion Square (RPSs 5102–5105 and 5182–5202 DCC). Fitzwilliam Square's central private park remains unchanged since it was first laid out in 1813 and is a Historic Garden and Designed Landscape as listed in the NIAH.^{8,17}

A small number of private mansion houses constructed in the 18th century lie within the study area; the most notable example of which is the aforementioned Kildare House on Kildare Street (now Leinster House; RPS 4198 DCC, c. 1745). The house was designed by Richard Castle and was the largest townhouse built in Dublin in the 18th century.¹⁶

The Victorian architecture of historic Dublin is well preserved along numerous streets and squares, essentially infilling the city's Georgian streetscape. The majority of Victorian buildings within this section of the study area are located south of the River Liffey such as on Westland Row (RPS 8484–8520 DCC).

O'Connell Street is an important area of architectural heritage, along which three National Monuments are located comprising the O'Connell (RPS 5990 DCC), O'Brien (RPS 5997 DCC) and Parnell National Monuments (RPS 6020). This street is also an ACA integral to which are sites of architectural and cultural heritage importance namely the General Post Office (GPO; RPS 6010-6011 DCC), O'Connell Bridge (RPS 901 DCC) and The Spire. The latter, a site of architectural and cultural heritage merit marks the former site of Nelson's Pillar.^{4,5}

St. Stephen's Green Park National Monument is also located south of the River Liffey (RMP DU018:020334: RPS 7751–7761 DCC). The National Monument contains a number of Protected Structures which include the enclosing walls, railings and street furniture, a bandstand, the superintendent's house and a number of statues representing notable individuals such as the Countess Markievicz and Robert Emmet (RPSs 7751–7761 DCC). St. Stephen's Green Park is also a Historic Garden and Designed Landscape as listed in the NIAH.⁸

Public buildings constructed in the 18th and 19th centuries within this section of the study area include the Rotunda Hospital on Parnell Square (RPS 6419-6420); the Custom House on Custom House Quay (RPS 2096 DCC; c. 1791); TCD and all related buildings on College Green, Pearse Street and Westmoreland Row (RPSs 1999–2006 DCC; c. 1750); Leinster House (RPS 4198 DCC; c. 1745), the National Gallery of Ireland (RPS 5191 DCC, c. 1861-1864) and the National History Museum (RPS 5186 DCC; c. 1856–1857) located between Kildare Street and Merrion Square West (and the National Concert Hall (RPS 2425 DCC) on Earlsfort Terrace.^{1,6,7}

A number of important churches were also constructed during this period, noted examples of which are Findlater's Church on Parnell Square North (RPS 6379 DCC; c. 1862-1864); and St. Andrew's Church on Westland Row (RPSs 8517-8519 DCC; c. 1832-1843).¹⁶

Ireland's industrial heritage is also represented within the study area, significantly by the Royal and Grand Canals and the Dublin-Maynooth, Dublin-Wexford railway lines. Industrial buildings within the historic city include Connolly Station on Amiens Street (RPS 130 DCC; c. 1844–1846) which is the terminal building for the Dublin – Drogheda railway line. The Parcel Post Depot is also located on Amiens Street and was constructed in 1892 to the design of J. Howard Pentland (RPS 126 DCC).¹⁶ Pearse Street Station on Westland Row is a Protected Structure as is the associated railway bridge (RPSs 8520 and 890 DCC).²

An additional Protected Structure which is also of cultural heritage significance is the Five Lamps (RPS 5831 DCC) on North Strand Street which incorporates a drinking fountain. The Five Lamps was erected in 1880 to the memory of General Henry Hall, and is a notable landmark in the area.

A number of streets within the study area contain historic paving and street furniture such as coal hole covers and protective bollards, which under the DCDP are to be retained or restored at their original location.² Examples of historic street paving and furniture can be found on Beresford Place, Custom House Quay, Fitzwilliam Square and Merrion Square.

5.1.4 Options Assessment

As outlined previously, for assessment purposes the scheme was divided into three route sections as follows:

- **Section 1:** Swords North to Dublin Airport ;
- **Section 2:** Dublin Airport to Royal Canal; and
- **Section 3:** Royal Canal to St. Stephen's Green.

The archaeological, architectural and cultural heritage constraints for each of the route options are described in this section and are presented in summarised form in **Table 5.1.4**. The various route options will be ranked in **Section 5.1.5**.

Table 5.1.4: Summary of Archaeological, Architectural and Cultural Heritage constraints per route option

Section	Description	Constraint	RMP	RPS	National Monument	Archaeological and Cultural Heritage Merit	Architectural Heritage Merit	ACA	CA
		Baseline Rating	Very High	Very High	Very High	High	High	Very High	High
Section 1: Swords North to Dublin Airport	North-West Swords	GE1	1	1	0	1	2	0	0
		GE2	0	1	0	0	2	0	0
		GE3	1	1	0	1	2	0	0
		PG1	1	0	0	1	1	0	0
		PG2	0	0	0	0	1	0	0
		PG3	1	0	0	1	1	0	0
		SW14	0	0	0	0	1	0	0
	Swords Central	SW16	3	7	1	0	7	0	0
		SW17	0	0	0	0	0	0	0
	Swords Central to Dublin Airport	SW20	0	0	0	0	0	0	0
		SW21	0	1	0	0	0	0	0

Section	Description	Constraint	RMP	RPS	National Monument	Archaeological and Cultural Heritage Merit	Architectural Heritage Merit	ACA	CA
		Baseline Rating	Very High	Very High	Very High	High	High	Very High	High
Section 2: Dublin Airport to Royal Canal	Dublin Airport	DA0	0	0	0	0	0	0	0
		DA1	0	0	0	0	0	0	0
		DA2	0	1	0	0	0	0	0
		DA3	0	0	0	0	0	0	0
		DA4	0	0	0	0	1	0	0
		DA5	0	0	0	0	1	0	0
		DA6	0	0	0	0	1	0	0
		DA7	0	0	0	0	0	0	0
	Dublin Airport to Santry	SY4	0	1	0	0	2	0	0
	Santry	SY1	0	0	0	1	2	0	1
		SY2	0	0	0	0	1	0	0
	Santry to Royal Canal	F1	0	34	0	0	1	0	1

Section	Description	Constraint	RMP	RPS	National Monument	Archaeological and Cultural Heritage Merit	Architectural Heritage Merit	ACA	CA
		Baseline Rating	Very High	Very High	Very High	High	High	Very High	High
Section 3: Royal Canal to St. Stephens Green	Royal Canal to River Liffey	N1	4	137	0	0	3	0	1
		N2	4	150	0	0	4	1	1
		N3	4	144	3	0	7	1	1
		N4	2	188	3	0	8	2	1
	River Liffey to St. Stephens Green	S1	13	352	0	0	15	2	1
		S2	15	291	1	0	12	1	1
		S3	10	301	0	0	15	1	1
		S4	12	238	1	0	12	0	1

5.1.4.1 Section 1: Swords North to Dublin Airport

North-West Swords

This section (**Table 5.1.5**) evaluates seven route options comprising GE1, GE2, GE3, PG1, PG2, PG3 and SW14 in the North-West Swords area. As outlined previously, SW14 is a fixed route option with no feasible alternative.

Table 5.1.5: Impacts of proposed options within the North-West Swords on Archaeological, Architectural and Cultural Heritage

Route	Impact Assessment
GE1	<p>One Recorded Monument, one protected structure, one site of archaeological and cultural heritage merit and two sites of architectural heritage merit were identified within the study area of route option GE1. No Protected Structures were identified within the study area of this route option.</p> <p>The Recorded Monument comprises a circular enclosure (RMP DU011-135----) of probable early medieval date. The site of archaeological and cultural heritage merit comprises an extensive archaeological complex in the townlands of Mooretown and Oldtown which incorporates an early medieval ecclesiastical enclosure.</p> <p>The Protected Structure, Newtown House (RPS 329 FCC), is located c.173 m to the north of Balheary Road, the curtilage of which falls within the southern extent of the study area. The sites of architectural heritage merit comprise the former demesne lands of Balheary House and the aforementioned Newtown House (RPS 329 FCC). The sites, which are only partially located within the study area are listed as Historic Gardens and Designed Landscapes in the NIAH.⁸ However, the grounds of both houses have been significantly altered with most of the original features removed. Both sites are now partially occupied by industrial units.</p>
GE2	<p>One protected structure and two sites of architectural heritage merit were identified within the study area of route option GE2. No Recorded Monuments, Protected Structures or sites of archaeological and cultural heritage merit were identified within the study area of this route option.</p> <p>The Protected Structure, Newtown House (RPS 329 FCC), is located c.173 m to the north of Balheary Road, the curtilage of which falls within the southern extent of the study area. The sites of architectural heritage merit comprise the former demesne lands of Balheary House and the aforementioned Newtown House (RPS 329 FCC). The sites, which are only partially located within the study area are listed as Historic Gardens and Designed Landscapes in the NIAH.⁸ However, the grounds of both houses have been significantly altered with most of the original features removed. Both sites are now partially occupied by industrial units.</p>

Route	Impact Assessment
GE3	<p>One Recorded Monument, one protected structure, one site of archaeological and cultural heritage merit and two sites of architectural heritage merit were identified within the study area of route option GE3. No Protected Structures were identified within the study area of this route option.</p> <p>The Recorded Monument comprises a circular enclosure (RMP DU011-135----) of probable early medieval date. The site of archaeological and cultural heritage merit comprises an extensive archaeological complex in the townlands of Mooretown and Oldtown which incorporates an early medieval ecclesiastical enclosure.</p> <p>The Protected Structure, Newtown House (RPS 329 FCC), is located c.173 m to the north of Balheary Road, the curtilage of which falls within the southern extent of the study area. The sites of architectural heritage merit comprise the former demesne lands of Balheary House and the aforementioned Newtown House (RPS 329 FCC). The sites, which are only partially located within the study area are listed as Historic Gardens and Designed Landscapes in the NIAH.⁸ However, the grounds of both houses have been significantly altered with most of the original features removed. Both sites are now partially occupied by industrial units.</p>
PG1	<p>One Recorded Monument, one site of archaeological and cultural heritage merit and one site of architectural heritage merit were identified within the study area of route option PG1. No Protected Structures were identified within the study area of this route option.</p> <p>The Recorded Monument comprises a circular enclosure (RMP DU011-135----) of probable early medieval date. The site of archaeological and cultural heritage merit comprises an extensive archaeological complex in the townlands of Mooretown and Oldtown.</p> <p>The site of architectural heritage merit comprises the former demesne lands of Balheary House, of which only the southern limits fall within the study area for the proposed scheme. The site is listed as a Historic Garden and Designed Landscape in the NIAH⁸, however the grounds have been significantly altered with most of the original features removed. The site is now partially occupied by industrial units.</p>
PG2	<p>One site of architectural heritage merit was identified within the study area of route option PG2. No Recorded Monuments, Protected Structures or sites of archaeological and cultural heritage merit were identified within the study area of this route option.</p> <p>The site of architectural heritage merit comprises the former demesne lands of Balheary House, of which only the southern limits fall within the study area for the proposed scheme. The site is listed as a Historic Garden and Designed Landscape in the NIAH⁸, however the grounds have been significantly altered with most of the original features removed. The site is now partially occupied by industrial units.</p>

Route	Impact Assessment
PG3	<p>One Recorded Monument, one site of archaeological and cultural heritage merit and one site of architectural heritage merit were identified within the study area of route option PG3. No Protected Structures were identified within the study area of this route option.</p> <p>The Recorded Monument comprises a circular enclosure (RMP DU011-135----) of probable early medieval date. The site of archaeological and cultural heritage merit comprises an extensive archaeological complex in the townlands of Mooretown and Oldtown.</p> <p>The site of architectural heritage merit comprises the former demesne lands of Balheary House, of which only the southern limits fall within the study area for the proposed scheme. The site is listed as a Historic Garden and Designed Landscape in the NIAH⁸; however the grounds have been significantly altered with most of the original features removed. The site is now partially occupied by industrial units.</p>
SW14	<p>One site of architectural heritage merit was identified within the study area of route option SW14. No Recorded Monuments, Protected Structures or sites of archaeological and cultural heritage merit were identified within the study area of this route option.</p> <p>The site of architectural heritage merit comprises the former demesne lands of Balheary House, of which only the southern limits fall within the study area for the proposed scheme. The site is listed as a Historic Garden and Designed Landscape in the NIAH⁸; however the grounds have been significantly altered with most of the original features removed. The site is now partially occupied by industrial units.</p>

Swords Central

This section (**Table 5.1.6**) evaluates two route options comprising SW16 and SW17 in the Swords Central area.

Table 5.1.6: Impacts of proposed options within the Swords Central Area on Archaeological, Architectural and Cultural Heritage

Route	Impact Assessment
SW16	<p>One National Monument, three Recorded Monuments, seven Protected Structures and seven sites of architectural heritage merit were identified within the study area of route option SW16.</p> <p>The route would pass immediately adjacent and within the ZAP of Swords Castle National Monument which is located at the intersection of North Street and Seatown Road. This upstanding Anglo-Norman castle is a National Monument, a Recorded Monument (RMP DU011-034001-) and a Protected Structure (RPS 350 FCC). As a dominant feature of the townscape it is intended that the forthcoming Swords Local Area Plan¹⁸ will include an objective to ensure that development will not intrude significantly on or materially alter the view or prospect of the castle.</p>

Route	Impact Assessment
	<p>The route would also pass through the centre of the historic medieval town of Swords (RMP DU011-035----) and its associated ZAP. A holy well (RMP DU011-034013-) is located in the west of the study area on Well Road.</p> <p>The town of Swords contains a number of Protected Structures (in addition to Swords Castle National Monument (RMP DU011-034001-; RPS 350 FCC) including the Court House (RPS 350 FCC), and the Old Borough School (RPS 357 FCC).</p> <p>Sites of architectural heritage merit within the town include a cast-iron post box (NIAH 11335013), a cast-iron water pump associated with a Holy Well (NIAH 11343013; RMP DU011-034013-) and a stone bridge (NIAH 11343016). These structures define and provide character to the town and streetscape of Swords.</p> <p>There are currently no ACAs within Swords although there is an intention stated in the 'Your Swords: An Emerging City Strategic Vision 2035,¹⁸ to designate Church Road and North Street as an ACA. Such a designation will be part of a future Local Area Plan or as a Variation to the FCDP.³</p>
SW17	No Recorded Monuments, Protected Structures or sites of archaeological, architectural and cultural heritage merit were identified within the study area of this route section.

Swords Central to Dublin Airport

This section (**Table 5.1.7**) evaluates two route options comprising SW20 and SW21 in the Swords Central to Dublin Airport area. As outlined previously, both of these routes are fixed route options with no feasible alternatives.

Table 5.1.7: Impacts of proposed options within the Swords Central to Dublin Airport Area on Archaeological, Architectural and Cultural Heritage

Route	Impact Assessment
SW20	No Recorded Monuments, Protected Structures or sites of archaeological, architectural and cultural heritage merit were identified within the study area of route option SW20.
SW21	<p>One Protected Structure was identified within the study area for route option SW21. No Recorded Monuments or sites of archaeological, architectural and cultural heritage merit were identified within the study area for this route section.</p> <p>The Protected Structure comprises the curtilage of Castlemoate House (RPS 611 FCC) a five-bay two-storey house with out-offices and gates.³</p>

5.1.4.2 Section 2: Dublin Airport to Royal Canal

Dublin Airport

This section (**Table 5.1.8**) evaluates eight route options comprising DA0 – DA7 within the Dublin Airport Campus.

Table 5.1.8: Impacts of proposed options within the Dublin Airport Campus on Archaeological, Architectural and Cultural Heritage

Route	Impact Assessment
DA0	No Recorded Monuments, Protected Structures or sites of archaeological, architectural and cultural heritage merit were identified within the study area of route option DA0.
DA1	No Recorded Monuments, Protected Structures or sites of archaeological, architectural and cultural heritage merit were identified within the study area of route option DA1.
DA2	One Protected Structure was identified within the study area for route option DA2. No Recorded Monuments or sites of archaeological, architectural and cultural heritage merit were identified within the study area for this route option. The Protected Structure comprises the curtilage of Castlemoate House (RPS 611 FCC) a five-bay two-storey house with out-offices and gates. ³
DA3	No Recorded Monuments, Protected Structures or sites of archaeological, architectural and cultural heritage merit were identified within the study area of route option DA3.
DA4	One site of architectural heritage merit was identified within the study area of route option DA4. No Recorded Monuments, Protected Structures or sites of archaeological and cultural heritage merit were identified within the study area of this route option. The site of architectural heritage merit comprises the former demesne lands of Corballis House. The site is listed as a Historic Garden and Designed Landscape in the NIAH, however there are no above ground remains surviving and the site is now completely occupied by Dublin Airport. ⁸
DA5	One site of architectural heritage merit was identified within the study area of route option DA5. No Recorded Monuments, Protected Structures or sites of archaeological and cultural heritage merit were identified within the study area of this route option. The site of architectural heritage merit comprises the former demesne lands of Corballis House. The site is listed as a Historic Garden and Designed Landscape in the NIAH, however there are no above ground remains surviving and the site is now completely occupied by Dublin Airport. ⁸

Route	Impact Assessment
DA6	<p>One site of architectural heritage merit was identified within the study area of route option DA6. No Recorded Monuments, Protected Structures or sites of archaeological and cultural heritage merit were identified within the study area of this route option.</p> <p>The site of architectural heritage merit comprises the former demesne lands of Corballis House.</p> <p>The site is listed as a Historic Garden and Designed Landscape in the NIAH, however there are no above ground remains surviving and the site is now completely occupied by Dublin Airport.⁸</p>
DA7	<p>No Recorded Monuments, Protected Structures or sites of archaeological, architectural and cultural heritage merit were identified within the study area of route option DA7.</p>

Dublin Airport to Royal Canal

This section (**Table 5.1.9**) evaluates four route section options comprising SY4, SY1, SY2 and F1 which run from Dublin Airport to the Royal Canal on the route of the R132. As outlined previously, SY4 and F1 are fixed route options with no feasible alternatives.

Table 5.1.9: Impacts of proposed options from Dublin Airport Campus to the Royal Canal on Archaeological, Architectural and Cultural Heritage

Route	Impact Assessment
SY4	<p>One Protected Structure and two sites of architectural heritage merit were identified within the study area of route option SY4. No Recorded Monuments or sites of archaeological and cultural heritage merit were identified within the study area of this route option.</p> <p>The Protected Structure (RPS 604 FCC) and one site of architectural heritage (NIAH 11349004)⁸ merit comprise a pair of thatched cottages of c.1800 date fronting onto the Swords Road. The second site of architectural heritage merit comprises the demesne lands of Santry House. The site is listed as a Historic Garden and Designed Landscape in the NIAH, with many of its original features surviving.⁸ A significant length of the demesne wall survives and bounds the western side of Swords Road.</p>
SY1	<p>One site of archaeological and cultural heritage merit, two sites of architectural heritage merit and one CA were identified within the study area of route option SY1. No Recorded Monuments or Protected Structures were identified within the study area of this route option</p> <p>The site of archaeological and cultural heritage merit comprises Saint Pappin's Graveyard. This is an 18th century cemetery on the edge of the study area.⁷ It is associated with the site of St. Pappin's Church located outside and to the east of the study area, which as detailed in Section 5.1.3.4 occupies the site of a medieval and late medieval archaeological complex (RMPs DU014-057001- - DU014-057003-;</p>

Route	Impact Assessment
	<p>DU014-057005- – DU014-057006).¹ This site also comprises part of the Dublin City CA.</p> <p>The demesne lands of Santry House and Santry Lodge, which are sites of architectural heritage merit (listed as a Historic Garden and Designed Landscape in the NIAH)⁸ and are also partially located in the study area of this route option. Many of the original features of the Santry House demesne lands survive with a significant length of the demesne wall bounding Swords Road.</p> <p>No original features relating to Santry Lodge survive and the site is now completely occupied by industrial and commercial buildings.</p>
SY2	<p>One site of architectural heritage merit was identified within the study area of route option SY2. No Recorded Monuments, Protected Structures or sites of archaeological and cultural heritage merit were identified within the study area of this route option.</p> <p>The site of architectural heritage merit comprises the demesne lands of Santry House. The site is listed as a Historic Garden and Designed Landscape in the NIAH.⁸ Many of the original features of the Santry House demesne lands survive, with a significant length of the demesne wall bounding Swords Road.</p>
F1	<p>Thirty four Protected Structures, one site of architectural heritage merit and one CA were identified within the study area of route option F1. No Recorded Monuments or sites of archaeological and cultural heritage merit were identified within the study area of this route option.</p> <p>The Protected Structures are primarily located towards the south of the study area for the route option and comprise terraces of Georgian Houses fronting onto Drumcondra Road Lower (RPSs 2350-2367 DCC). Additional Protected Structures include Whitehall Garda Station (RPS 3329 DCC) on the intersection of Griffith Avenue and Swords Road, Binn’s Bridge over the Royal Canal (RPS 908 DCC), and Belvedere House (RMP DU018-012001-, RPS 2369 DCC) on Drumcondra Road Upper. The latter site comprises a 17th century house, gates and railings. The house was modified in the 18 and 19th century and now functions as St. Patrick’s College.</p> <p>The Royal Canal, complete with its associated locks and tow paths, is a site of architectural and industrial heritage merit located in the south of the study area for F1. The Dublin City CA was identified at two locations within the study area, in the vicinity of the Tolka River and the aforementioned Royal Canal.</p>

5.1.4.3 Section 3: Royal Canal to St. Stephen’s Green

This section (**Table 5.1.10**) evaluates eight route options comprising N1, N2, N3, N4, S1, S2, S3 and S4 extending from the Royal Canal to St. Stephens’ Green.

Table 5.1.10: Impacts of proposed options from the Royal Canal to St. Stephens' Green on Archaeological, Architectural and Cultural Heritage

Route	Impact Assessment
North City Centre – Royal Canal to River Liffey	
N1	<p>Four Recorded Monuments, approximately 137 Protected Structures, three sites of architectural heritage merit and one CA were identified within the study area of route option N1. No sites of archaeological and cultural heritage merit were identified.</p> <p>The four Recorded Monuments comprise the site of a sea wall on Memorial Road/Beresford Place (RMP DU018-020505-), the site of a windmill on Burgh Quay (RMP DU018-020464-), the site of a quay (City Quay; RMP DU018-020479-), and the ZAP for the historic town of Dublin (RMP DU018-020----).</p> <p>The Protected Structures within the study area for this route option include a number of landmark buildings and structures including Connolly Railway Station (RPS 130 DCC) and the associated railway bridges at North Circular Road (RPS 887) and Beresford Place (RPS 881 DCC), the Custom House (RPS 2096 DCC), Busáras bus station (RPS 7852 DCC) and Aldborough House (RPS 6844 DCC) on Portland Row.</p> <p>The sites of architectural heritage merit identified within the study area comprise the Royal Canal and historic street paving on Amiens Street and Beresford Place. The Dublin City CA was identified within the study area at the Royal Canal and Beresford Place.</p>
N2	<p>Four Recorded Monuments, approximately 150 Protected Structures, one ACA, one CA and four sites of architectural and industrial heritage merit were identified within the study area of route option N2. No sites of archaeological and cultural heritage merit were identified.</p> <p>The four Recorded Monuments comprise the site of a sea wall on Memorial Road/Beresford Place (RMP DU018-020505-), the site of a windmill on Burgh Quay (RMP DU018-020464-), the site of a quay (City Quay; RMP DU018-020479-), and the ZAP for the historic town of Dublin (RMP DU018-020----).</p> <p>The Protected Structures within the study area for this route section include Mountjoy Square (RPSs 5412–5454 DCC) and its associated ACA located in the north of the study area. Mountjoy Square is also a site of architectural heritage merit listed as a Historic Garden and Designed Landscape in the NIAH.⁸ Additional Protected Structures within the study area include the Custom House (RPS 2096 DCC), which is a landmark building, and the railway bridge (RPS 881 DCC), and crescent of buildings on Beresford Place (RPS 676-734 DCC).</p> <p>The remaining sites of architectural heritage merit identified within the study area comprise the Royal Canal and historic street paving on Amiens Street and Beresford Place. The Dublin City CA was identified within the study area at the Royal Canal, Mountjoy Square, Gardiner Street, Gardiner Street Upper and Beresford Place.</p>

Route	Impact Assessment
N3	<p>Three National Monuments, four Recorded Monuments, approximately 144 Protected Structures, one ACA, one CA (Dublin) and seven sites of architectural and cultural heritage merit were identified within the study area of route option N3. No sites of archaeological heritage merit were identified.</p> <p>The three National Monuments are all memorial sculptures of leading Irish historical figures situated in the central median of the O'Connell Street ACA.</p> <p>At the intersection of Parnell Street and O'Connell Street Upper, stands the Charles Stewart Parnell National Monument (RPS 6020 DCC). Four cast iron bollards associated with the National Monument have been temporarily removed to storage as part of the LCC enabling works, but are scheduled for reinstatement in late 2016/early 2017. Located on O'Connell Street Lower, north of O'Connell Bridge (RPS 901 DCC), are the William Smith O'Brien National Monument (RPS 5997 DCC) and the Daniel O'Connell National Monument (RPS 5990 DCC).</p> <p>The four Recorded Monuments comprise the site of a glasshouse shown on Rocque's 1756 Map of the City of Dublin to the east of O'Connell Street Lower (RMP DU018-020154-), the site of a house of indeterminate date on the junction of North Circular Road and Dorset Street Lower (RMP DU018-023----), the site of a well near the junction of Dorset Street and Frederick Street (RMP DU018-024----) and the ZAP for the historic town of Dublin (RMP DU018-020).</p> <p>The Protected Structures within the study area for this route section include a number of landmark buildings and structures in particular Findlaters Church (RPS 6379 DCC), the Rotunda Hospital (main buildings and west wing), the former Rotunda Rooms (known more recently as the Ambassador Cinema) and the Garden of Remembrance (RPSs 6419-6420 DCC) on Parnell Square. Landmark buildings of particular note within the O'Connell Street ACA are the General Post Office (GPO, RPS 6010 DCC), Clery's Department Store (RPS 6003 DCC), the Gresham Hotel (RPS 6019 DCC) and the aforementioned O'Connell Bridge over the River Liffey (RPS 901 DCC). The Sir John Gray Monument (RPS 5998 DCC) and the statue of Father Theobald Matthew (RPS 6017 DCC) are also Protected Structures located within the O'Connell Street ACA.</p> <p>The seven sites of architectural and cultural heritage merit identified within the study area comprise the Royal Canal, the Taxi Drivers Shrine, The Spire and historic street paving on Parnell Square, Bachelors Walk, O'Connell Street and O'Connell Bridge.</p> <p>The Dublin City CA was identified within the study area at the Royal Canal, Gardiner Street Upper, Parnell Square and O'Connell Street.</p>

Route	Impact Assessment
<p>N4</p>	<p>Three National Monuments, two Recorded Monuments, approximately 188 Protected Structures, two ACAs, one CA and eight sites of architectural and cultural heritage merit and were identified within the study area of route option N4. No sites of archaeological heritage merit were identified.</p> <p>The three National Monuments are all memorial sculptures of leading Irish historical figures situated in the central median of the O’Connell Street ACA comprising the Charles Stewart Parnell National Monument (RPS 6020 DCC) and the four cast iron bollards (temporarily removed to storage as part of the Luas Cross City enabling works), the William Smith O’Brien National Monument (RPS 5997 DCC) and the Daniel O’Connell National Monument (RPS 5990 DCC).</p> <p>The two Recorded Monuments are the site of a glasshouse located to the east of O’Connell Street (DU018-020154) and the ZAP for the historic town of Dublin (RMP DU018-020---).</p> <p>The Protected Structures within the study area for this route section include a number of landmark buildings and structures on and surrounding Parnell Square and the O’Connell Street ACA including Findlaters Church (RPS 6379 DCC), the Rotunda Hospital main buildings, the former Rotunda Rooms (known more recently as the Ambassador Cinema) and the Garden of Remembrance (RPSs 6419-6420 DCC); and the Sir John Gray Monument (RPS 5998 DCC), the statue of Father Theobald Matthew (RPS 6017 DCC), the GPO, (RPS 6010 DCC), Clery’s Department Store (RPS 6003 DCC) and the Gresham Hotel (RPS 6019 DCC). O’Connell Bridge over the River Liffey (RPS 901 DCC) is also a Protected Structure.</p> <p>Mountjoy Square (RPSs 5412–5454 DCC) and its associated ACA is located in the north of the study area. Mountjoy Square is also a site of architectural heritage merit listed as a Historic Garden and Designed Landscape in the NIAH.⁸</p> <p>The remaining seven sites of architectural and cultural heritage merit identified within the study area comprise the Royal Canal, the Taxi Drivers Shrine, The Spire and historic street paving on Parnell Square, Bachelors Walk, O’Connell Street and O’Connell Bridge.</p> <p>The Dublin City CA was identified within the study area at the Royal Canal, Mountjoy Square, Gardiner Street Upper / Gardiner Place/Denmark Street, Parnell Square and O’Connell Street.</p>
<p>South City Centre – River Liffey to St. Stephen’s Green</p>	
<p>S1</p>	<p>Thirteen Recorded Monuments, approximately 352 Protected Structures, two ACAs, one CA and 15 sites of architectural and industrial heritage merit are located within the study area for route option S1.</p> <p>The 13 Recorded Monuments include a former hospital and House of Parliament on College Green (now the Bank of Ireland; RMP DU018-020430-), a bridge site (RMP DU018-020385-) and a former ecclesiastical site on College Street (RMP DU018-020487-) and a</p>

Route	Impact Assessment
	<p>Boundary Stone on the intersection of D'Olier Street and Hawkins Street (RMP DU018-020129-). A church and a hospital site on Luke Street (RMPs DU018-020648- and DU018-020061-), a chapel on Tara Street (RMP DU018-020161-) and a brick works on Lombard Street/Pearse Street (RMP DU018-020439-) relate to the urban extension of the city on the southern lots. The ZAP for the historic town of Dublin (RMP DU018-020----) is also located within the study area of this route option.</p> <p>The Protected Structures within the study area for this route option include two significant constraints – Merrion Square and Fitzwilliam Square (RPSs 5102–5202 and 2796–2864 DCC) - two well preserved Georgian Squares and their associated parks (listed as a Historic Gardens and Designed Landscape in the NIAH).⁸ Fitzwilliam Square which is an ACA was built on the lands of Baggotrath and was a prestigious place to live and work. Its central private park remains unchanged since it was first laid out in 1813.</p> <p>The National Maternity Hospital is located on Merrion Square North/Mount Street Lower (RPS 5619-5625 DCC).</p> <p>Important examples of Georgian houses are also present on Fitzwilliam Place (RPSs 2754-2795 DCC) and Leeson Street Lower (RPSs 4420-4424 DCC).</p> <p>Trinity College Dublin (RPS 1999-2006 DCC) and its related structures on College Street and Westland Row (RPSs 8484-8504 DCC), St. Andrews Church and burial ground on Westland Row (RPSs 8517-8519 DCC) and Pearse Street Train Station (RPS 8520 DCC) are examples of landmark buildings within the study area.</p> <p>The O'Connell Street ACA is also located in the north of the study area encompassing Westmoreland Street, D'Olier Street and College Street.</p> <p>Sites of architectural heritage merit within the study area include a sub-surface Victorian Toilet Block on the intersection of College Street and Westmoreland Street, a brick kiosk at the junction of Adelaide Road/Leeson Street. The Dublin City CA is also located within the study area for this route option. The Grand Canal is a site of industrial heritage merit in the south of the study area and is crossed by Eustace Bridge (RPS 873 DCC).</p> <p>Examples of historic street furniture and paving within the study area can be found on Pearse Street, Merrion Square, Leeson Street Lower, Fitzwilliam Street, Fitzwilliam Place, Fitzwilliam Square and Mount Street Lower.</p>
S2	<p>One National Monument, 15 Recorded Monuments, approximately 291 Protected Structures, one ACA, one CA and 12 sites of architectural heritage merit are located within the study area for route option S2.</p> <p>St. Stephen's Green National Monument (RMP DU018-020334- RPSs 7751–7761 DCC) is also a Recorded Monument and a Protected Structure established in 1664. The surrounding land was divided into 96 lots to be leased for the construction of private houses; the majority</p>

Route	Impact Assessment
	<p>of which were constructed by 1756 and are also Protected Structures (RPSs 7780–7789 DCC).</p> <p>The 15 Recorded Monuments include a former hospital and House of Parliament on College Green (now the Bank of Ireland; RMP DU018-020430-), a former ecclesiastical site on College Street (RMP DU018-020487-) and a Boundary Stone on the intersection of D’Olier Street and Hawkins Street (RMP DU018-020129-).</p> <p>A church and a hospital site on Luke Street (RMPs DU018-020648- and DU018-020061-), a chapel on Tara Street (RMP DU018-020161-) and a brick works on Lombard Street/Pearse Street (RMP DU018-020439-) relate to the urban extension of the city on the southern lots.</p> <p>The ZAP for the historic town of Dublin (RMP DU018-020----) and an 18th/19th century house site (RMP DU018-020249-) on Leeson Street Lower are also located within the study area of this route option.</p> <p>The Protected Structures within the study area for this route option include a number of landmark buildings and structures on College Street and Westland Row namely TCD (RPS 1999-2006 and 8484-8504 DCC), St. Andrews Church and burial ground (RPSs 8517-8519 DCC) and Pearse Street Train Station (RPS 8520 DCC).</p> <p>Two Georgian Squares, the aforementioned St. Stephen’s Green and Merrion Square, are located within the study area. Two Dutch billies, which are significant constraints, are located on 41-43 St. Stephen’s Green (RPS 7781-7782 DCC). The west side of Merrion Square is formed by Leinster House (RPS 4198 DCC), the National Gallery of Ireland (RPS 5191 DCC) and the National History Museum (RPS 5186 DCC). Both squares are sites of architectural heritage merit (listed as a Historic Gardens and Designed Landscapes in the NIAH).⁸ A significant number of Georgian houses are also located on Leeson Street Lower (RPSs 4388-4454 DCC).</p> <p>The study area for this route section incorporates the O’Connell Street ACA and the Dublin City CA. Sites of architectural heritage merit also include the sub-surface Victorian Toilet Block located on the intersection of College Street and Westmoreland Street and historic street furniture and paving on Pearse Street, Westland Row, Merrion Street Upper, Merrion Square, St. Stephen’s Green and Leeson Street Lower.</p>
S3	<p>Ten Recorded Monuments, approximately 301 Protected Structures, one ACA, one CA and fifteen sites of architectural and industrial heritage merit are located within the study area for route option S3.</p> <p>The 10 Recorded Monuments include a building related to TCD (RMP DU018-020508-). A church and a hospital site on Luke Street (RMPs DU018-020648- and DU018-020061-), a chapel on Tara Street (RMP DU018-020161-) and a brick works on Lombard Street/Pearse Street (RMP DU018-020439-) relate to the urban extension of the city on the southern lots. The ZAP for the historic town of Dublin (RMP DU018-020----) is also located within the study area of this route option.</p>

Route	Impact Assessment
	<p>The Protected Structures within the study area for this route option include two significant constraints – Merrion Square and Fitzwilliam Square (RPSs 5102–5202 and 2796–2864 DCC) - two well preserved Georgian Squares and their associated parks (listed as a Historic Gardens and Designed Landscape in the NIAH).⁸ Fitzwilliam Square, which is an ACA, was built on the lands of Baggotrath and was a prestigious place to live and work.</p> <p>The study area incorporates Merrion Square North and East (RPSs 5102-5150 DCC) and the National Maternity Hospital on Merrion Square North/Mount Street Lower (RPS 5619-5625 DCC).</p> <p>Important examples of Georgian houses are also present on Fitzwilliam Place (RPSs 2754-2795 DCC) and Leeson Street Lower (RPSs 43419-4429 DCC).</p> <p>TCD (RPS 1999-2006 DCC) and its related structures on Westland Row (RPSs 8484-8504 DCC), St. Andrews Church and burial ground on Westland Row (RPSs 8517-8519 DCC) and Pearse Street Train Station (RPS 8520 DCC) are examples of landmark buildings within the study area.</p> <p>Sites of architectural and industrial heritage merit within the study area include a brick kiosk at the junction of Adelaide Road/Leeson Street, the Grand Canal and historic street furniture and paving on Pearse Street, Merrion Square, Leeson Street Lower, Fitzwilliam Street, Fitzwilliam Place, Fitzwilliam Square and Mount Street Lower.</p> <p>The Dublin City CA is also located within the study area for this route option.</p>
S4	<p>One National Monument, 12 Recorded Monuments, approximately 238 Protected Structures, one CA and 12 sites of architectural heritage merit are located within the study area for route option S4.</p> <p>St. Stephen’s Green National Monument (RMP DU018-020334- RPSs 7751–7761 DCC) is also a Recorded Monument and a Protected Structure established in 1664.</p> <p>The 12 Recorded Monuments include a building related to TCD (RMP DU018-020508-). A church and a hospital site on Luke Street (RMPs DU018-020648- and DU018-020061-), a chapel on Tara Street (RMP DU018-020161-) and a brick works on Lombard Street/Pearse Street (RMP DU018-020439-) relate to the urban extension of the city on the southern lots. The ZAP for the historic town of Dublin (RMP DU018-020----) and an 18th/19th century house site (RMP DU018-020249-) on Leeson Street Lower are also located within the study area of this route option.</p> <p>The Protected Structures within the study area for this route option include a number of landmark buildings and structures on Westland Row such as TCD (RPSs 8484-8504 DCC), St. Andrews Church and burial ground (RPSs 8517-8519 DCC) and Pearse Street Train Station (RPS 8520 DCC).</p>

Route	Impact Assessment
	<p>Two Georgian Squares, the aforementioned St. Stephen's Green and Merrion Square, are located within the study area and are surrounded by a number of significant buildings. Two Dutch billies are located on 41-43 St. Stephen's Green (RPS 7781-7782 DCC) while the west side of Merrion Square is formed by Leinster House (RPS 4198 DCC), the National Gallery of Ireland (RPS 5191 DCC) and the National History Museum (RPS 5186 DCC).</p> <p>Both squares are sites of architectural heritage merit (listed as a Historic Gardens and Designed Landscapes in the NIAH).⁸ A significant number of Georgian houses are also located on Leeson Street Lower (RPSs 4388-4454 DCC).</p> <p>Sites of architectural heritage merit within the study area comprise historic street furniture and paving on Pearse Street, Westland Row, Merrion Street Upper, Merrion Square, St. Stephen's Green and Leeson Street Lower.</p>

5.1.5 Ranking of Options

For the archaeological, architectural and cultural heritage assessment, based on the information available, rankings have been allocated to each route option within the study area in accordance with the assessment ranking scale outlined in **Section 3.4**. Where there are no feasible alternative route options (i.e. fixed sections), a neutral ranking has been assigned.

A matrix has been compiled for each of the sub-sections to come up with a preferred route and is presented in the following sections.

5.1.5.1 Section 1: Swords North to Dublin Airport

North-West Swords

An evaluation of the seven route options assessed in North-West Swords is presented in **Table 5.1.11**.

Table 5.1.11: Evaluation of North-West Swords Route Options

Section	Route Option	Archaeological and Cultural Heritage	Architectural Heritage
North-West Swords	GE1	Orange	Orange
	GE2	Green	Orange
	GE3	Orange	Orange
	PG1	Orange	Green
	PG2	Green	Green
	PG3	Orange	Green
	SW14	Yellow	Yellow

In terms of archaeological and cultural heritage, route options GE2 and PG2 have no constraints within their respective study area and are therefore considered to have some advantages over GE1, GE3, PG1 and PG3.

The study area for each of the latter four route options contains one Recorded Monument and one site of archaeological and cultural heritage merit. The latter is a significant sub-surface archaeological complex in the townlands of Mooretown and Oldtown.

Although this site is located within the study area of all four route options (i.e. GE1, GE3, PG1 and PG3) route options GE3 and PG1 both pass through a sub-surface ecclesiastic enclosure site that is part of the complex, while GE1 and PG3 are located to the north of the complex where less intense evidence for sub-surface archaeological stratigraphy has been identified.

In terms of the route options assessment route options PG1, PG2 and PG3 have some advantages over route options GE1, GE2 and GE3 with only one site of architectural heritage merit located within their respective study areas. GE1, GE2 and GE3 are considered to have some disadvantages with one Protected Structure and two sites of architectural heritage merit located within their respective study areas.

As route option SW14 is a fixed route option with no feasible alternative it has, for the purpose of this assessment, been assigned a neutral rating. However, one site of architectural heritage merit comprising the former demesne lands of Balheary House, has been identified within its study area. This site has been significantly altered and is now partially occupied by industrial units.

Swords Central

Two route options were evaluated in the Swords Central area: SW16 and SW17 as presented in **Table 5.1.12**.

Table 5.1.12: Evaluation of Swords Central Route Options

Section	Route Option	Archaeological and Cultural Heritage	Architectural Heritage
Swords Central	SW16		
	SW17		

In terms of both archaeological and cultural heritage, and architectural heritage route option SW16 has significant disadvantages over route option SW17 as its study area incorporates Swords Castle National Monument, the ZAP for the medieval town of Swords in addition to seven Protected Structures and seven sites of architectural heritage merit. Route option SW17 has significant advantages over route option SW16 as it does not contain any Recorded Monuments, Protected Structures or sites of archaeological, architectural and cultural heritage merit.

Swords Central to Dublin Airport

Two route options were evaluated between Swords Central and Dublin Airport: SW20 and SW21 as presented in **Table 5.1.13**.

Table 5.1.13: Evaluation of Swords Central to Dublin Airport Route Options

Section	Route Option	Archaeological and Cultural Heritage	Architectural Heritage
Swords Central to Dublin Airport	SW20		
	SW21		

As both SW20 and SW21 are fixed route options they have therefore for the purpose of this assessment been assigned a neutral rating.

No Recorded Monuments or sites of archaeological and cultural heritage merit have been identified within the study area for route options SW20 and SW21.

In terms of architectural heritage, one Protected Structure has been identified within the study area for route option SW21. No architectural heritage constraints were identified within the study area for route option SW20.

5.1.5.2 Section 2: Dublin Airport to Royal Canal

Dublin Airport

Eight route options were evaluated at Dublin Airport: DA0, DA1, DA2, DA3, DA4, DA5, DA6 and DA7 as presented in **Table 5.1.14**.

Table 5.1.14: Evaluation of Dublin Airport Route Options

Section	Route Option	Archaeological and Cultural Heritage	Architectural Heritage
Dublin Airport	DA0		
	DA1		
	DA2		
	DA3		
	DA4		
	DA5		
	DA6		
	DA7		

No Recorded Monuments or sites of archaeological and cultural heritage merit have been identified within the study area for route options DA0, DA1, DA2, DA3, DA4, DA5, DA6 and DA7 and these route options are therefore neutral when compared to each other.

In terms of architectural heritage, one Protected Structure has been identified within the study area for option DA2 (Castlemoate House - RPS 611 FCC) and one site of architectural heritage merit has been identified within the study area for route options DA4, DA5 and DA6. However, it should be noted that the site of architectural heritage merit, identified for route sections DA4, DA5 and DA6 (Corballis House and its Demesne lands) was removed by the construction of Terminal 2 at Dublin Airport and will not be impacted by the installation of the proposed scheme. Section DA2 is therefore considered to have some disadvantages to the other route options.

Dublin Airport to Royal Canal

Four route options were evaluated between Dublin Airport and the Royal Canal: SY4, SY1, SY2 and F1 as presented in **Table 5.1.15**.

Table 5.1.15: Evaluation of Dublin Airport to Royal Canal Route Options

Section	Route Option	Archaeological and Cultural Heritage	Architectural Heritage
Dublin Airport to Santry	SY4		
Santry	SY1		
	SY2		
Santry to Royal Canal	F1		

As SY4 and F1 are fixed route options with no feasible alternative they have, for the purpose of this assessment, been assigned a neutral rating.

No Recorded Monuments or sites of archaeological and cultural heritage merit have been identified within the study area for either of these route options.

In terms of architectural heritage, one Protected Structure and two sites of architectural heritage merit have been identified within the study area for route option SY4 whereas, 34 Protected Structures, one site of architectural heritage merit and the Dublin City CA have been identified within the study area for fixed route option F1.

In terms of archaeological and cultural heritage, route option SY2 has some advantages over SY1 as no Recorded Monuments or sites of archaeological and cultural heritage potential are located within its study area. Route option SY1 has some disadvantages as Saint Pappin's Graveyard, a site of archaeological and cultural heritage merit, is located within its study area.

In terms of architectural heritage, route option SY2 has some advantages over option SY1 as no Protected Structures and only one site of architectural heritage merit is located within its study area. Route option SY1 has some disadvantages as two sites of architectural heritage merit and the Dublin City CA are partially located within its study area.

5.1.5.3 Section 3: Royal Canal to St. Stephen's Green

North City Centre

The North City Centre area comprises route options between the Royal Canal and the bridge crossings across the Liffey.

Four route options were evaluated in the North City Centre: N1, N2, N3 and N4 as presented in **Table 5.1.16**.

Table 5.1.16: Evaluation of North City Centre Route Options

Section	Route Option	Archaeological and Cultural Heritage	Architectural Heritage
Royal Canal to River Liffey	N1		
	N2		
	N3		
	N4		

In terms of archaeological and cultural heritage route sections N1 and N2 have some advantages over the other route options as no National Monuments are located within the study area for these route options. In light of the fact that the National Monuments legislation also legally protects access and the visual amenity associated with these monuments and also requires consent from the Minister for invasive works in the vicinity of the monuments, this is considered an advantage over the other options. The study area for these route options each contain four Recorded Monuments. Route options N3 and N4 have some disadvantages over the other route options, with the study area for each route containing three National Monuments and between four and two Recorded Monuments respectively.

In terms of architectural heritage all these route options are located within a historically sensitive part of the city and all routes therefore include significant numbers of Protected Structures, structures of architectural heritage merit, ACAs and CAs within their study areas. As mentioned previously, for the purpose of the route options assessment and in the absence of a detailed design, a worst case scenario approach has been adopted and the passing of the route options through ACAs and the quantitative assessment of architectural heritage items are considered in the evaluation of these options.

N1 is considered to have significant advantages over N2, N3 and N4. Although the study area for N1 includes approximately 137 Protected Structures, one CA and five sites of architectural heritage merit, N1 does not pass through an ACA.

The study area for route option N1 also contains sites of architectural and cultural heritage merit primarily comprising historic street furniture and paving.

The study area for N2 has approximately 150 Protected Structures, one ACA, one CA and four sites of architectural heritage merit. However it is worth noting that the N2 route section passes around two sides of the Mountjoy ACA.

The study area for route option N2 also contains sites of architectural and cultural heritage merit most notably Mountjoy Square garden.

The study area for route option N3 contains 144 Protected Structures, one ACA, one CA and seven sites of architectural heritage merit. Route Section N3 passes along the east side of Parnell Square and through the O'Connell Street ACA. The study area for route option N3 also contains sites of architectural and cultural heritage merit such as the Taxi Drivers Shrine, the Spire and historic street furniture and paving on O'Connell Street.

Route Section N4 has significant disadvantages over the other route options with 188 Protected Structures, two ACAs, one CA and eight sites of architectural heritage merit. This route option passes along the north side of the Mountjoy ACA, the east side of Parnell Square and through the O'Connell Street ACA. Sites of architectural and cultural heritage merit include Mountjoy Square garden in addition to the Taxi Drivers Shrine, the Spire and historic street furniture and paving on O'Connell Street.

South City Centre

The South City Centre area comprises route options between the River Liffey and St. Stephen's Green.

Four route options were evaluated in South City Centre: S1, S2, S3 and S4 as presented in **Table 5.1.17**.

Table 5.1.17: Evaluation of South City Centre Route Options

Section	Route Option	Archaeological and Cultural Heritage	Architectural Heritage
River Liffey to St Stephen's Green	S1	Green	Red
	S2	Red	Yellow
	S3	Green	Yellow
	S4	Red	Green

In terms of archaeological and cultural heritage, route options S1 and S3 have significant advantages over route options S2 and S4, as no National Monuments are located within the study area for these route options. As mentioned previously, in light of the fact that the National Monuments legislation also legally protects access and the visual amenity associated with these monuments and also requires consent from the Minister for invasive works in the vicinity of the monuments, this is considered an advantage over the other options.

The study area for route options S1 and S3 contain 13 and 10 Recorded Monuments respectively. Route options S2 and S4 have significant disadvantages over the other route options, with the study area for each route option containing one National Monument and between 15 and 12 Recorded Monuments respectively.

In terms of architectural heritage all these route options are located within a historically sensitive part of the city and all route options therefore include significant numbers of Protected Structures, structures of architectural, industrial and cultural heritage merit, ACAs and CAs within their respective study areas. As mentioned previously, for the purpose of the route options assessment and in the absence of a detailed design, a worst case scenario approach has been adopted and the passing of the route sections through ACAs and the quantitative assessment of architectural heritage items are also considered in the evaluation of these options.

Route option S4 is considered to have significant advantages over S1, S2 and S3. Although the study area for S4 includes approximately 238 Protected Structures, one CA and 12 sites of architectural heritage merit, S4 does not pass through an ACA.

Route option S1 has significant disadvantages over the other route options with 352 Protected Structures, two ACAs, one CA and 15 sites of architectural heritage merit. This route option passes through the O'Connell Street ACA, along the north and east side of Merrion Square and along the east side of the Fitzwilliam Square ACA. Sites of architectural, cultural and industrial heritage merit within the study area for S1 include a sub-surface Victorian Toilet Block on the intersection of College Street and Westmoreland Street, a brick kiosk at the junction of Adelaide Road/Leeson Street and the Grand Canal.

Route options S2 and S3 have some disadvantages over the other route options. The study area for route option S2 has approximately 291 Protected Structures, one ACA, one CA and 12 sites of architectural heritage merit. However it is worth noting that the S2 route option passes along two Georgian squares – the west side of Merrion Square and the east side of St. Stephen's Green, which is also a National Monument.

The study area for route option S3 contains 301 Protected Structures, one ACA, one CA and 15 sites of architectural heritage merit. Route option S3 passes along two Georgian squares – the north and east side of Merrion Square and the east side of Fitzwilliam Square, which is also an ACA. The study area for this route option also contains sites of architectural and industrial heritage merit such as a brick kiosk at the junction of Adelaide Road/Leeson Street and the Grand Canal.

5.1.6 Conclusion

As outlined in the report, at this stage of the project, conclusions have been reached based on the information currently available. Any aspects of the scheme identified as having a potential impact on archaeological, architectural and cultural heritage will require further investigations during the detailed design phase and will be examined in more detail in the archaeological, architectural and cultural heritage assessment which will be included in the EIS.

In order to mitigate direct ground disturbance impacts during the construction stage and indirect visual impacts during the operational stage, the preferred route identified for the proposed scheme needs to be sensitively designed in relation to the identified constraints.

At this early design stage, it is anticipated that the majority of construction impacts will arise from ground excavations required to construct the proposed scheme, in particular where stops and utility installations are required. Ground disturbance impacts to archaeological, architectural and cultural heritage sites during the construction phase have the potential to be permanent and negative.

Careful design of the proposed scheme will also serve to reduce potential visual impacts which may arise at operational stage on upstanding archaeological, architectural and cultural heritage constraints. Due consideration at design stage will therefore be given to the location of proposed stops in order to mitigate potential impacts.

Potential visual impacts at construction stage may be further mitigated through the implementation of good site management practices and appropriate screening of construction works.

5.1.6.1 Archaeological and Cultural Heritage

There are five National Monuments located within the study area for the proposed scheme. The setting, access and visual amenity of a National Monument is protected under the National Monuments Act 1930–2004 (as amended).⁹ All ground works and landscaping works within 30m proximity of a National Monument will require Ministerial Consent. Particular effort should be made in the design stage to ensure that ground disturbance and/or landscaping works within proximity of a National Monument are minimised. Ground disturbance should be avoided, where possible, or the depth of required ground disturbance at these locations should be kept as shallow as possible to minimise the potential of exposing subsurface remains relating to the National Monument.

It should be noted that the majority of Recorded Monuments and sites of archaeological and cultural heritage merit within the study area are sub-surface with no above ground expression, a significant example of which is the site of archaeological heritage merit at Oldtown/Mooretown. In accordance with the policies of the (DoAHG as provided in the Framework and Principles for the Protection of the Archaeological Heritage¹⁹ which favours the preservation *in situ* of archaeological sites and monuments, mitigation will seek, where practical, to ensure preservation *in situ* of archaeological remains and the avoidance of impacts on archaeological, architectural and cultural heritage constraints. To mitigate direct impacts and implement the policies of the DoAHG, careful consideration of the detailed design of the proposed scheme along the preferred route option will be required. Detailed design should endeavour to avoid known constraints and/or minimise the number of constraints which may be directly or indirectly impacted by the proposed scheme.

5.1.6.2 Architectural Heritage

A significant number of protected structures are located within the study area. As BRT vehicles on the preferred route will primarily traverse existing road networks it is currently not anticipated that Protected Structures will be directly impacted by the proposed scheme. However, it is important to note that the designation of, and protection afforded to a Protected Structure is not restricted to the house itself but to all elements within its curtilage such as coal cellars, out houses boundary walls railings and gates.

It is also currently anticipated that the proposed scheme will not impact on the coal cellars of the Georgian buildings which line the streets within Sections F1, N1, N2, N3, N4, S1, S2, S3 and S4. However, as the proposed scheme design progresses, the location of stops and the encroachment of works into the footpaths may result in direct impacts on the coal cellars associated with these buildings.

The encroachment of work into footpaths may also result in direct impacts on historic street furniture and paving located within these sections. Where works may directly impact on ACAs, CAs and streets of architectural heritage merit containing historic paving and street furniture, the design should endeavour to maintain or reinstate the existing paving pattern, in addition to the pattern of the lamps, trees and other street furniture in so far as possible.

5.2 Flora and Fauna

5.2.1 Introduction

This section was prepared by Faith Wilson (BSc CEnv MCIEEM), an independent Ecologist and licensed Bat Specialist.

A desk study was undertaken to determine the proximity of route options to designated areas for conservation utilising the online National Parks and Wildlife Service (NPWS) website database. The NPWS was consulted in relation to records of rare or protected plant species from within the study area and general area.

Other ecological sites and watercourses in the study area were initially identified by examining GIS datasets, maps and aerial photographs, and by drawing on existing information. This assessment also built on detailed flora and fauna surveys conducted by Faith Wilson for the Swords Quality Bus Corridor for Dublin City Council in 2013.

A review of data held in the Bat Conservation Ireland database was conducted seeking records of any known bat roosts or activity near the proposed routes. Other bat specialists were also contacted regarding records for the study area. Key areas likely to be of importance for mammals and foraging and roosting bats were identified using the satellite imagery on Google Maps.

The desk survey built on previous field surveys which were conducted by Faith Wilson in August/September 2013 and May 2014.

The potential impacts on ecological sites and fisheries waters were then assessed on the basis of the quality of the site and the scale of the likely impact.

5.2.2 Assessment Methodology

The flora and fauna assessments identified designated ecological areas and other areas of ecological importance within the study area which extends in general from Lissenhall Little in the north to the Grand Canal (Grove Road, Mespil Road, Haddington Road) in the south and from Dublin Airport and Drumcondra in the west to Fairview Park and Beaumont in the east.

Due to the nature of the proposed scheme, which is typically anticipated to run on existing road infrastructure, potential impacts on flora and fauna are likely to be associated with (but not limited to) the following:

- Temporary landtake (e.g. construction compounds, working areas along roadbed and utility works);
- Construction activities (e.g. runoff and other pollution, increase of suspended solids, alteration of hydraulic conditions, noise and dust emissions, lighting, movement of vehicles, presence of construction personnel);
- Permanent landtake (e.g. stops, localised road widening); and
- Operation of Swiftway vehicles and maintenance of the road (e.g. runoff and other pollutants, increase of suspended solids, noise, and dust emissions, lighting, movement of vehicles, presence of maintenance personnel).

All ecological sites and fisheries waters which were identified were then assessed according to the criteria for site evaluation outlined in the *Guidelines for the Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009). These are summarised below in **Table 5.2.1** and outlined in detail in **Appendix B.1**.

Table 5.2.1: Rating Criteria for Site Evaluation

Ratings for ecological sites and fisheries waters	
A	Internationally important
B	Nationally or regionally important
C+	County importance
C	High value, locally important
D	Low value, locally important
E	Very low value

The significance of the impact of a route option on an ecological site or watercourse was then assessed on the basis of criteria also outlined in **Appendix B.2**, and summarised below in **Table 5.2.2**. This is taken as a combination of the importance of the site/watercourse and the extent of the likely impact on that site/watercourse.

Table 5.2.2: Significance of Impact

Scheme Impacts	Abbreviations used
Severe negative	-ve severe
Major negative	-ve major
Moderate negative	-ve mod
Minor negative	-ve minor
Not significant	Neutral

5.2.3 Existing Environment

5.2.3.1 General Description

The study area as illustrated on **Figures 5.2.1 – 5.2.3** extends between the jurisdiction of two local authorities - Fingal County Council and Dublin City Council. The various proposed Swiftway routes commence at locations north of Swords and finish in Dublin City Centre and are ultimately designed to utilise the existing road infrastructure passing through mainly urban habitats. Habitats were identified to level three using the Heritage Council 'Guide to Habitats in Ireland' (Fossitt, 2000).

These include; stone walls (BL1), buildings and other artificial surfaces (BL3), playing pitches and amenity grassland (GA2), urban gardens and park lands which contain mature specimen trees (WS5), ornamental/non-native shrubs (WS3), flower beds (BC4), artificial ponds (FL8) and amenity grassland.

Adjoining the various proposed routes are occasional patches of natural habitats such as dry grassy verges (GS2) with linear features such as treelines (WL2), hedgerows (WL1), and earthen banks (BL2) or surface water bodies which include streams and rivers (FW2), canals (FW3) or drainage ditches (FW4). The River Liffey is brackish at O' Connell Bridge and hence is classified as a tidal river (CW2).

Areas of undeveloped agricultural lands are a feature of the northern section of the study area. These are currently under either improved agricultural grassland (GA1), arable crops (BC1), horticultural crops (BC2), or are recently tilled (BC3), with associated drainage ditches (FW4), treelines (WL2) and hedgerows (WL1).

Within the study area there are a number of sites of national and international conservation importance as well as surface water bodies, city parks and gardens (Refer to **Figure 5.2.1- Figure 5.2.3** for illustration of ecological constraints in the study area).

5.2.3.2 Designated Conservation Areas

Sites designated for nature conservation purposes under both national (Wildlife Act 1976, amended 2000) and international legislation (EU Birds and Habitats Directives) which are crossed by or which are in close proximity to the proposed Swiftway route options include:

- Malahide Estuary SPA (Site Code: 004025), SAC and pNHA (Site Code: 000205);
- Santry Demesne pNHA (Site Code: 000178);
- The Royal Canal pNHA (Site Code: 002103); and
- The Grand Canal pNHA (Site Code: 002104).

The Malahide Estuary SPA (Site Code: 004025), SAC and pNHA (Site Code: 000205) is ranked as an A site whereas the Santry Demesne pNHA (Site Code: 000178), the Royal Canal pNHA (Site Code: 002103) and the Grand Canal pNHA (Site Code: 002104) are all ranked as B sites.

The closest designated conservation site to the various proposed route options is Santry Demesne pNHA which forms part of Santry Demesne Regional Park. The existing R132 runs along the eastern boundary of this site. This pNHA was designated on the basis of woodland habitats present which are remnants of a former demesne woodland. The main tree species include Beech (*Fagus sylvatica*), Wych Elm (*Ulmus glabra*), Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*), Hawthorn (*Crataegus monogyna*) and Scot's Pine (*Pinus sylvatica*).

A wide range of herbaceous species were recorded, including Wood Speedwell (*Veronica montana*), Sanicle (*Sanicula europaea*), Ramsons (*Allium ursinum*), Early Dog-violet (*Viola reichenbachiana*), Goldilocks Buttercup (*Ranunculus auricomus*), Giant Fescue (*Festuca gigantea*) and False Brome (*Brachypodium sylvaticum*).

A species legally protected under the Flora Protection Order 1999, Hairy St. John's Wort (*Hypericum hirsutum*), was recorded here in 1991. There are also old NPWS records of Yellow Archangel (*Lamium galeobdolon*) from the Santry area.

The site was surveyed as part of the national native woodland survey in 2005 (BEC, 2008) and it is listed as long established and ancient woodland by National Parks and Wildlife Service (Perrin & Daly, 2010).

5.2.3.3 Ecological Sites

Of particular interest from an ecological perspective within the study area are the various parks, gardens and surface water bodies. These form what are hereafter referred to as 'Ecological Sites' and are all ranked as either C+, C or D sites.

These sites include:

- Ward River Valley Park;
- Santry Demesne Regional Park;
- Griffith Park;
- St. Kevin's Park;
- Ellenfield Park;
- Mounjoy Square;
- Merrion Square;
- Fitzwilliam Square; and
- St. Stephen's Green Park

Surface water bodies include (and are depicted in **Figure 5.4.1-Figure 5.4.3**):

- Broad Meadow River*;
- Ward River*;
- Sluice River*;
- Cuckoo Stream*;
- Mayne River;
- Santry River;
- Tolka River;
- Royal Canal^;
- George's Dock;
- River Liffey;
- Grand Canal and Grand Canal Dock^; and
- Unnamed streams, ditches and lakes and ponds including ponds at Feltrim Hall, Forest Little Golf Course and St, Stephen's Green.

Many of these features are included within areas mapped as either ecological corridors (marked as * in the above list) or as areas of green infrastructure (marked as ^ in the above list) by Fingal County Council and Dublin City Council respectively. A summary of these features is provided in **Table 5.2.3**.

Fingal County Council has also identified 'Nature Development Areas' within the Fingal Biodiversity Action Plan. These include:

- Broadmeadow River Park;
- Swords Town Park;
- Ward River Valley Park;
- Santry Demesne Regional Park; and
- Forest Little Golf Course.

Table 5.2.3: Ecological sites and watercourses of importance in the study area.

Site Name	SAC/ SPA	NHA	Floral Importance	Faunal Importance	Salmonid interest	Coarse Fishery	Recognised Ecological Corridor/ Green Infrastructure	Nature Development Area	Ecological Rating
Broad Meadow River Park & Broad Meadow River			X	X	X		X	X	C+
Malahide Estuary	X	X	X	X			X		A
Santry Demesne		X	X	X			X	X	B
Swords Town Park							X	X	C+
Ward River Valley Park & Ward River			X	X	X		X	X	C+
Sluice River			X	X	X		X		D
Cuckoo Stream					Restoration proposed		X		D
Santry River					Restoration proposed		X		D
Santry Demesne Regional Park		X	X	X			X	X	B
Mayne River			X	X	Potential		X		D
Griffith Park			X	X			X		C+
Tolka River			X	X	X		X		C+

Site Name	SAC/ SPA	NHA	Floral Importance	Faunal Importance	Salmonid interest	Coarse Fishery	Recognised Ecological Corridor/ Green Infrastructure	Nature Development Area	Ecological Rating
Royal Canal		X	X	X		X	X		B
St. Kevin's Park			X	X			X		D
Ellenfield Park									D
River Liffey				X	X		X		C
Mountjoy Square			X	X			X		D
George's Dock						X	X		D
Merrion Square			X	X			X		D
Fitzwilliam Square			X	X			X		D
St. Stephen's Green Park			X	X			X		D
Grand Canal and Grand Canal Dock		X	X	X		X	X		B
Unnamed streams, ditches and lakes and ponds including ponds at Feltrim Hall, Forest Little Golf Course and St, Stephen's Green.			X	X			X	X	D
Treelines and hedgerows adjoining streets and carriageways									D

5.2.3.4 Rare Plants

A review of the NPWS database of historical records of rare and protected flora revealed that there are several records of rare, scarce or threatened flora within the 10km grid squares in which the various route options are located (namely grid square reference O13 & O14). Several of these are legally protected under the Flora Protection Order (1999) as summarised below in **Table 5.2.4**. There have been no recent surveys for many of these species, with the exception of populations of opposite leaved pondweed which has been the subject of monitoring by Waterways Ireland following dredging works to the canals.

Table 5.2.4: Records of rare, scarce or threatened flora from the 10km squares in which the route options are located (O13 & O14) (data provided by NPWS).

Common Name	Scientific Name	FPO 1999	Location
Divided Sedge	<i>Carex divisa</i>	+	North Lotts
Cornflower	<i>Centaurea cyanus</i>		Newtown Caroline, Co. Dublin
Blue Fleabane	<i>Erigeron acer</i>		Dunsinea, Cabragh, Co. Dublin
Red Hemp-Nettle	<i>Galeopsis angustifolia</i>	+	Feltrim
Opposite-Leaved Pondweed	<i>Groenlandia densa</i>	+	Royal Canal
Opposite-Leaved Pondweed	<i>Groenlandia densa</i>	+	Grand Canal
Hairy St John's-wort	<i>Hypericum hirsutum</i>	+	Santry
Yellow Archangel	<i>Lamiastrum galeobdolon</i>		Santry

5.2.3.5 Fisheries

Several species of fish which are found from watercourses within the study area are protected under national and international legislation.

The Atlantic salmon (*Salmo salar*) is listed under Annex II and Annex V of the EU Habitats Directive and is protected under the Fisheries Acts 1959 to 2006. It is a red list species, which is classified in Ireland as 'vulnerable' (King et al., 2011).

Brown trout (*Salmo trutta*) is protected under the Fisheries Acts 1959 to 2006. It is a red list species, which is classified in Ireland as a species of 'least concern' (King et al., 2011).

Eel (*Anguilla anguilla*) are protected under the Fisheries Acts 1959 to 2006 Conservation of Eel fishing bye law No.C.S.303, 2009; EC Regulation (Council Regulation 1100/2007) for the recovery of the eel stock, and are listed under Annex II of CITES. They are a red data book species which are listed as 'Critically Endangered' both in Ireland and at a global level (King et al., 2011).

Pike (*Esox lucius*) are protected under the Fisheries Acts 1959 to 2006 and the Conservation of Pike Bye Law No. 809 (2006). They are a red data book species which are listed as ‘Non-native non-benign’ (King et al.,2011) but recent research has found that they are a native species to Ireland (Pedreschi,2013).

Tench (*Tinca tinca*) are protected under the Conservation of and prohibition on sale of coarse fish bye law No. 806 (2006), the Fisheries Acts 1959 to 2006. They are a red data book species which are listed as ‘Non-native non-benign’ (King et al.,2011).

Roach (*Rutilus rutilus*) are protected under the Conservation of and prohibition on sale of coarse fish bye law No. 806 (2006), the Fisheries Acts 1959 to 2006. They are a red data book species which are listed as ‘Non-native non-benign’ (King et al.,2011).

Perch (*Perca fluviatilis*) are protected under the Conservation of and prohibition on sale of coarse fish bye law No. 806 (2006), the Fisheries Acts 1959 to 2006. They are a red data book species which are listed as ‘Non-native non-benign’ (King et al.,2011).

- Desktop review and consultation with Inland Fisheries Ireland has confirmed fisheries interest in the following rivers:
- Broad Meadow River* - Atlantic salmon and brown trout;
- Ward River* - Atlantic salmon and brown trout;
- Sluice River* - Atlantic salmon and brown trout;
- Cuckoo Stream – salmonids are not currently present in this watercourse but Inland Fisheries Ireland have plans in place for restoration works and a restocking programme;
- Mayne River – potential to support salmonids;
- Santry River – salmonids are not currently present in this watercourse but Inland Fisheries Ireland have plans in place for restoration works and a restocking programme;
- Tolka River* – salmonid watercourse;
- Royal Canal - supports important coarse fisheries in an urban environment. Fish species present include roach (*Rutilus rutilus*), roach hybrids, perch (*Perca fluviatilis*), tench (*Tinca tinca*), pike (*Esox lucius*) and eel (*Anguilla anguilla*) (CFB,2009);
- River Liffey* – salmonid watercourse; and
- Grand Canal and Grand Canal Dock - supports important coarse fisheries in an urban environment. Fish species present include roach (*Rutilus rutilus*), tench (*Tinca tinca*) and pike (*Esox lucius*).

Rivers marked as * in the above list represent salmonid watercourses.

5.2.3.6 Bats

All species of bats in Ireland are legally protected under Annex IV of the EU Habitats Directive, while the Lesser Horseshoe Bat is given additional protection under Annex II. They are also protected under the Bern Convention and the Wildlife Act (2000).

All species of bat are red data book species and with the exception of Brandt's Bat, which is data deficient for Ireland, and Leisler's Bat, which is listed as 'Near Threatened' for Ireland, are listed as species of 'Least Concern' at an Irish level. The Lesser Horseshoe Bat is considered 'Near Threatened' at an EU level, while all other species are listed as species of 'Least Concern' at an EU level (Marnell et al., 2009).

The desktop review confirmed there are no known records of any roosting bats from any buildings immediately adjoining the various route options in the Bat Conservation Ireland Database.

Within a 10km radius of the routes there are various records of the following bat species:

- Unidentified Pipistrelle species (*Pipistrellus sp.*);
- Common Pipistrelle (*Pipistrellus pipistrellus*);
- Soprano Pipistrelle (*Pipistrellus pygmaeus*);
- Brown Long Eared Bat (*Plecotus auritus*);
- Leisler's Bat (*Nyctalus leisleri*);
- Whiskered/Brandt's Bat (*Myotis mystacinus/brandtii*); and
- Daubenton's Bat (*Myotis daubentonii*).

These include records made by other bat specialists, ad hoc records by local bat groups, BATLAS 2010 records and results of other Environmental Impact Assessment studies in the wider area. These records are held in the Bat Conservation Ireland database and are also illustrated in previous atlases (O'Sullivan, 1994, Richardson, 2000).

The proposed route options are not within the known range of the Lesser Horseshoe Bat (*Rhinolophus hipposideros*). This species is restricted in its distribution to the west of Ireland. This species is given additional protection under Annex II of the EU Habitats which requires member states to designate Special Areas of Conservation for the species.

Known Bat Roosts

Information on the roosts of several species of bats that are known within the study area are held by Bat Conservation Ireland. These include a roost of an unidentified Pipistrelle Bat at Turvey, a roost of an unidentified Pipistrelle Bat in a private dwelling in River Valley, Swords, a roost of Soprano Pipistrelle in the National Concert Hall and a tree roost of an unidentified bat in Santry Park.

Previous Detector Survey Records

There are detector records of Common and Soprano Pipistrelles from Jamestown/Lissenhall Little and Common and Soprano Pipistrelles and Daubenton's Bat from the Broadmeadow River/Balheary Demesne. These records were made during the Bat Conservation Ireland BATLAS 2010 project. This project ran from 2007 – 2010 and involved random surveys of suitable habitats for bats within an assigned 10 km square across Ireland and aimed to improve our understanding of the national distribution of four commonly encountered species of bats.

The Ward River and Broadmeadow River are a confirmed foraging/commuting habitat for both Common and Soprano Pipistrelles and Daubenton's Bat.

Common and Soprano Pipistrelles, Leisler's Bat and Brown Long-eared Bat were all recorded from the vicinity of Dublin Airport during both the Bat Conservation Ireland BATLAS 2010 project and various EIS surveys.

Common and Soprano Pipistrelles and Leisler's Bat have been recorded from near the Mayne River. Common and Soprano Pipistrelles and Leisler's Bat were recorded near the M50 at Ballymun and from the wider Ballymun area.

Common Pipistrelle has been recorded from the Glasnevin/Drumcondra area, while the Blessington Basin was the subject of a study of bats in Dublin City Centre and both Common Pipistrelle and Leisler's Bat were recorded here.

Dublin City Centre has a number of bat records made over several years. These include:

- Leisler's Bat has been recorded from the vicinity of the GPO on O'Connell Street;
- Soprano Pipistrelle, Whiskered/Brandt's Bat, Common Pipistrelle, Leisler's Bat and Brown Long-Eared Bat from the St. Stephen's Green area;
- Leisler's Bat has been recorded from the vicinity of Merrion Square;
- Soprano Pipistrelle, Common Pipistrelle and Leisler's Bat have been recorded from the vicinity of the National Concert Hall and a Soprano Pipistrelle roost is located nearby;
- Surveys of the Grand Canal for the Grand Canal Premium Cycle Route have recorded Soprano Pipistrelle, Common Pipistrelle, Leisler's Bat and Nathusius Pipistrelle. Soprano Pipistrelle, Common Pipistrelle and Leisler's Bat have been recorded from the Grand Canal basin.

Swords QBC 2013 Survey Results

A bat detector survey of the proposed Swords QBC route was conducted by Faith Wilson on the 29th August and 3rd September 2013. The survey initially focused at dusk on various points along the proposed route where bat activity would be expected. These had been identified from the desktop research as follows:

- Swords Road near the airport;
- Dublin Road north of the airport;
- Coolock Lane/Swords Road near Santry Park;
- Portion of the route near Highfield Private Hospital;
- Drumcondra Road Upper;
- Drumcondra Road Lower;
- Tolka River;
- Royal Canal;
- Griffith Avenue junction;
- Swords Road/Collins Avenue junction;
- South of Larkhill Road/Collins Avenue

- River Liffey;
- Trinity College area; and
- Merrion Square area.

The entire Swords QBC route was surveyed using a combination of driving transects and walking areas of suitable habitat. All bat activity was recorded using several types of bat detectors:

- Pettersson D100 heterodyne bat detector; and
- Bat Box Duet frequency division bat detector.

Bats were identified by their ultrasonic calls coupled with behavioural and flight observations. Bat activity levels were poor during the detector survey despite suitable survey conditions and some potentially rich foraging and roosting habitat at key locations along the route. The majority of the route from Swords into the city centre is very urban in nature with lit roads, extensive housing/buildings, little in the way of natural habitats and thus would hold limited interest for bats.

The following species of bats were encountered during the recent detector survey:

- Common Pipistrelle;
- Soprano Pipistrelle; and
- Leisler's Bat.

Soprano Pipistrelle was recorded foraging over the Balheary Game preserve lands at Lissenhall. There was no bat activity recorded at the Ward River on either night of survey.

There was no bat activity recorded along the length of the R132 between Swords and Dublin Airport. Although much of the carriageway is well planted with mature treelines of poplar, ash, sycamore, beech and willows with an understorey of Wych elm, field maple, dogwood, hawthorn and bramble the route is brightly lit, which would make the area less favourable for foraging bats.

Soprano Pipistrelle was recorded foraging around mature trees along the edges of the pond in Santry Demesne Park. Pipistrelle social calls were recorded from mature trees inside the stone wall of the park adjoining the Santry Stadium, which may indicate a transitional or mating roost. Common Pipistrelle was recorded foraging near the entrance to Plunkett College.

There was no activity recorded from either the Tolka River or the Royal Canal during the present surveys. Common Pipistrelle and Soprano Pipistrelle were noted in the bat assessment for the proposed cycle path along the Royal Canal from Cross Guns Bridge to Binn's Bridge so their presence is confirmed along this canal. Soprano Pipistrelle and Common Pipistrelle were recorded foraging along the edges of Merrion Square. No confirmed maternity roosts were identified during the survey.

5.2.3.7 Otter

The otter (*Lutra lutra*) is a species listed under Annex II and IV of the EU Habitats Directive and II of the Bern Convention.

The species is protected under the Wildlife Act (2000) and is a Red Data Book species, which is listed as 'Near Threatened' at an Irish and EU level (Marnell et al., 2009).

Otter has been recorded from the Ward River (NPWS records) and their presence there was confirmed during the current survey by spraints (Wilson, 2013).

Otter are known to use the Tolka, the Liffey and the Royal Canal and have been seen on a number of occasions by local people. A recent survey completed for Dublin City Council by the Irish Wildlife Trust in 2013 show evidence of otter from the city boundary to Drumcondra Bridge on the Tolka (Maryann Harris (Parks Superintendent, DCC), pers. comm.).

Surveys of the Tolka, Royal Canal and Liffey for Fingal County Council indicate that otters are regularly present at Ashtown (Tolka), Ashtown/ Finglas and Clonsilla (Royal Canal), Strawberry Beds (Liffey) and from the Luttrellstown estate and into Chapelizod (Liffey).

5.2.3.8 Other Mammals

Mammals are restricted in urban areas by a conflict between the need of the people for housing and development and the minimal requirements of the particular species of mammal. The most widespread species are those that are at least tolerant of human activities and that best benefit from human buildings, food and other shelter such as overgrown gardens and waterways.

Some such as the badger (*Meles meles*) exist in urban parks, large gardens and green areas in suburbs or at a distance from the city centre. There are records of badger from the airport exit off the M1 (NPWS records). Badgers are legally protected under the Wildlife (Amendment) Act 2000 and are a red data book species which are listed as a species of 'Least Concern' in both Ireland and at EU level (Marnell et al., 2009).

There are a number of rodent species present throughout the study area (rats were seen swimming the Royal Canal in 2013) and these all benefit from the canals, rivers, and available scraps and litter. Both brown rat (*Rattus rattus*) and house mouse (*Mus domesticus*) would be expected in the majority of the study area while the wood mouse (*Apodemus sylvaticus*) would be expected in those more rural areas. None of these species are a legally protected in Ireland and are all listed as a species of 'least concern' in the red data list (Marnell et al., 2009).

Foxes (*Vulpes vulpes*) have been regularly encountered in built up areas and a fox was seen exiting through the park railings of Merrion Square during the 2013 survey. The fox is not a legally protected species in Ireland and is listed as a species of 'least concern' in the red data list (Marnell et al., 2009).

Hedgehogs (*Erinaceus europaeus*) are common in many parks and private gardens and have been recorded from Swords (NPWS records). They are protected under the Wildlife (Amendment) Act 2000 and are listed as a species of 'least concern' in the red data list (Marnell et al., 2009).

The grasslands surrounding Dublin Airport are a well-known site for the Irish hare (*Lepus timidus subsp. hibernicus*) and rabbits (*Oryctolagus cuniculus*) are also recorded here and from other urban parks.

The Irish hare is an Irish sub-species and is legally protected under Annex V of the EU Habitats Directive and under the Wildlife (Amendment) Act, 2000. The species is listed as a species of 'least concern' in the red data list (Marnell et al., 2009). The rabbit is not a legally protected species in Ireland and is listed as a species of 'least concern' in the red data list (Marnell et al., 2009).

5.2.3.9 Amphibians

The common frog (*Rana temporaria*) is a species listed under Annex V of the EU Habitats Directive and Annex III of the Bern Convention. The common frog is protected by the Wildlife Act and is a red list species of least concern in both Ireland and the EU (King et al., 2011).

This species is regularly encountered in this area in areas of suitable habitat including from the pond in Santry Park Demesne as well as further afield from the Grand Canal and from nearby water bodies including the Royal Canal, Liffey, Tolka, Dodder and garden ponds and public parks. The NPWS also have records of frogs from the Ward River Valley and from near Swords.

The smooth newt (*Triturus vulgaris*), is a species protected by the Wildlife Act (2000) and is a red list species of least concern in both Ireland and the EU (King et al., 2011).

This species would also be expected and was recorded from the city centre in the Irish Wildlife Trust Newt Survey in 2010 from the disused section of the Iarnród Éireann railway at Broadstone – Broombridge (NPWS records).

5.2.3.10 Birds

The Broadmeadow and Ward Rivers are known foraging habitat for both Kingfisher (*Alcedo atthis*) and Little Egret (*Egretta garzetta*), which are both species listed under Annex I of the EU birds Directive. Otherwise the study area supports a wide variety of bird species common to urban areas as summarised below in **Table 5.2.5**.

Several bird species of conservation concern in Ireland (BOCCI species) (Colhoun & Cummins, 2013) were recorded during the surveys.

Yellowhammer which is a red listed breeding species was associated with the undeveloped agricultural lands near the northern end of the route. Red listed gull species include black-headed gull and herring gull (both red listed breeding species) which are found along waterways in the city as is the grey wagtail which is also red listed. The tufted duck which is a wintering red list species is also known from these waterways.

The kingfisher, which is a species listed under Annex I of the EU Birds Directive and an amber listed species, is known from the River Tolka, the Royal Canal and the River Liffey.

Other amber listed species recorded include; cormorant, sparrowhawk, swift, barn swallow, robin, goldcrest, greenfinch, mistle thrush, starling and house sparrow.

Other species encountered are those that are common to urban areas and are principally the more tolerant species that can avail of anthropogenic environments and are less dependent upon dense cover than most species.

Dublin city holds important populations of over-wintering birds but these are concentrated into the coastal areas including the Malahide Estuary, Portmarnock/Baldoyle, Bull Island and Sandymount.

Table 5.2.5: Birds of Dublin City recorded from the study area and proximate waterways.

Common Name	Scientific Name	Location along routes
Cormorant	<i>Phalacrocorax carbo</i>	Known to occur but absent during survey
Grey heron	<i>Ardea cinerea</i>	Seen along Royal Canal
Mute swan	<i>Cygnus olor</i>	Seen along Royal Canal
Mallard	<i>Anser platyrhynchos</i>	Seen along Royal Canal
Tufted duck*	<i>Aythya fuligula</i>	Not seen in this assessment but known from Royal Canal, Grand Canal and River Tolka
Sparrowhawk^	<i>Accipiter nisus</i>	Report of possible breeding site near Royal Canal and present throughout County Dublin
Moorhen	<i>Gallinula chloropus</i>	Seen along Royal Canal
Herring gull*	<i>Larus argentatus</i>	Flying over Royal Canal
Lesser black-backed gull^	<i>Larus fuscus</i>	Flying over Royal Canal
Black-headed gull*	<i>Larus ridibundus</i>	Not seen in current survey but present throughout Dublin
Woodpigeon	<i>Columba palumbus</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Feral pigeon	<i>Columba livia</i>	Present throughout Dublin
Swift^	<i>Apus apus</i>	Present in Phibsborough and Drumcondra but not seen in this survey
Barn swallow^	<i>Hirundo rustica</i>	Present throughout Dublin but not seen in this survey
Grey wagtail*	<i>Motacilla cinerea</i>	Royal Canal, Tolka River
Pied wagtail	<i>Motacilla alba</i>	Widespread
Wren	<i>Troglodytes troglodytes</i>	Present throughout Dublin, hedgerows and shrubs adjoining route

Common Name	Scientific Name	Location along routes
Robin [^]	<i>Erithacus rubecula</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Blue Tit	<i>Parus caeruleus</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Great Tit	<i>Parus major</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Coal Tit	<i>Parus ater</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Goldcrest [^]	<i>Regulus regulus</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Yellowhammer*	<i>Emberiza citrinella</i>	Agricultural lands at Lissenhall.
Greenfinch [^]	<i>Carduelis chloris</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Chaffinch	<i>Fringilla coelebs</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Mistle thrush [^]	<i>Turdus viscivorus</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Hooded crow	<i>Corvus corone</i>	Present throughout Ireland and widespread in Dublin but not seen in this survey
Jackdaw	<i>Corvus monedula</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Rook	<i>Corvus frugilegus</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Magpie	<i>Pica pica</i>	Throughout the study area
Starling [^]	<i>Sturnus vulgaris</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
House sparrow [^]	<i>Passer domesticus</i>	Present throughout Dublin, hedgerows and shrubs adjoining route
Kingfisher [^]	<i>Alcedo atthis</i>	Known from River Tolka (Glasnevin) Royal Canal (Cabra and westwards), River Liffey (Chapelizod)

* Red list BOCCI species

[^] Amber listed BOCCI species

5.2.4 Options Assessment

As outlined previously, the study area has been broken down into the following sections for the assessment:

- **Section 1:** Swords North to Dublin Airport;
- **Section 2:** Dublin Airport to Royal Canal; and
- **Section 3:** Royal Canal to St. Stephens Green.

The severity of the impacts of each route on ecological sites and watercourses is outlined in the following sections.

This is taken as a combination of the importance of the site (site rating) and the extent of the likely impact on that site or watercourse. The term ‘neutral’ is used if it appears that the route will either avoid a site, or will have no significant impact because the site is of very low ecological value, or where there are fixed route options.

5.2.4.1 Section 1: Swords North to Dublin Airport

The potential impacts associated with each section of the route are considered in **Table 5.2.6**. Refer to **Section 4** for a description of each route.

Table 5.2.6: Impacts of proposed options within the Swords North to Dublin Airport Corridor on Flora and Fauna

Route	Potential Impacts
GE1	<p>Some landtake will be required to give Swiftway priority along this route which may impact on areas of amenity grassland, undeveloped agricultural land and hedgerows.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; • Balheary Demesne Stream at the point where Balheary Road meets Glen Ellan Road; • A tributary of the Broadmeadow River at the Glen Ellan Pines Roundabout; and • Newtown River west of Bunbury Gate Avenue and Castleview Green housing estates. <p>This route does not cross or run adjacent to any site of international or national conservation value, but does cross an ecological corridor along the Ward River which has been mapped and identified by Fingal County Council and is used by otter. The general area is known to support three species of foraging bats which are likely to use this site, areas of natural habitat and other linear features in the area.</p> <p>Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.</p>

Route	Potential Impacts
GE2	<p>Some landtake will be required to give Swiftway priority along this route which may impact on areas of amenity grassland, undeveloped agricultural land and hedgerows.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; • Balheary Demesne Stream at the point where Balheary Road meets Glen Ellan Road.; • A tributary of the Broadmeadow River at the Glen Ellan Pines Roundabout.; and • A tributary of the Newtown River travelling south along the Murrough Road. <p>This route does not cross or run adjacent to any site of international or national conservation value, but does cross an ecological corridor along the Ward River which has been mapped and identified by Fingal County Council and is used by otter. The general area is known to support three species of foraging bats which are likely to use this site, areas of natural habitat and other linear features in the area.</p> <p>The route terminates in the vicinity of the Ward River park which is an area identified by FCC as a Nature Development Area.</p> <p>Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.</p>
GE3	<p>Some landtake will be required to give Swiftway priority along this route namely an area with hedgerows and treelines of high ecological value along the western end of the route, which may be lost through road widening.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; • Balheary Demesne Stream at the point where Balheary Road meets Glen Ellan Road.; • A tributary of the Broadmeadow River at the Glen Ellan Pines Roundabout.; and • A stream of the Newtown River west of Bunbury Gate housing estate. <p>This route does not cross or run adjacent to any site of international or national conservation value, but does cross an ecological corridor along the Ward River which has been mapped and identified by Fingal County Council and is used by otter. The general area is known to support three species of foraging bats which are likely to use this site, areas of natural habitat and other linear features in the area.</p>

Route	Potential Impacts
	Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.
PG1	<p>This route passes through an area of public parkland consisting of amenity grassland, scattered trees and shrubs and treelines. This area is likely to be of importance for foraging bats. The western end of the route is bounded by some hedgerows and treelines of high ecological value which may be lost through road widening.</p> <p>This route does not cross or run adjacent to any site of international or national conservation value, but does cross an ecological corridor along the Ward River and the Swords Town Park which has been mapped and identified by Fingal County Council as a Nature Development Area and is used by otter.</p> <p>The general area is known to support three species of foraging bats which are likely to use this site, areas of natural habitat and other linear features in the area.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; and • A stream of the Newtown River at two locations, immediately prior to the Rathbeale Road and Ardcian Park junction and west of Bunbury Gate housing estate. <p>Some landtake will be required to give Swiftway priority along this route namely an area of public parkland and an area with hedgerows and treelines along the western end of the route.</p> <p>Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.</p>
PG2	<p>This route also traverses the area of public parkland consisting of amenity grassland, scattered trees and shrubs and treelines. This area is likely to be of importance for foraging bats.</p> <p>This route does not cross or run adjacent to any site of international or national conservation value, but does cross an ecological corridor along the Ward River and the Swords Town Park which has been mapped and identified by Fingal County Council as a Nature Development Area and is used by otter. The general area is known to support three species of foraging bats which are likely to use this site, areas of natural habitat and other linear features in the area. The route terminates in the vicinity of the Ward River park which is an area identified by FCC as a Nature Development Area.</p>

Route	Potential Impacts
	<p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; and • A stream of the Newtown River is traversed at two locations; immediately prior to the Rathbeale Road/Ardcian Park junction and on the Murrough Road. <p>Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.</p>
PG3	<p>This route also traverses the area of public parkland consisting of amenity grassland, scattered trees and shrubs and treelines. This area is likely to be of importance for foraging bats.</p> <p>This route does not cross or run adjacent to any site of international or national conservation value, but does cross an ecological corridor along the Ward River and the Swords Town Park which has been mapped and identified by Fingal County Council as a Nature Development Area and is used by otter.</p> <p>The general area is known to support three species of foraging bats which are likely to use this site, areas of natural habitat and other linear features in the area.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; and • A stream of the Newtown River is traversed at two locations; immediately prior to the Rathbeale Road/Ardcian Park junction and west of Bunbury Gate housing estate. <p>Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.</p>
SW14	<p>This route is a fixed route option and does not cross or run adjacent to any site of international or national conservation value, any ecological site, area of floral diversity or area of known importance to fauna. There are some treelines and hedgerows of value along this road.</p> <p>This route does not cross or run adjacent to any rivers or streams so diversion works or construction of bridges or culverts, with potential for impacts on aquatic habitats or fauna, is not required.</p> <p>Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.</p>

Route	Potential Impacts
SW16	<p>It is considered that extensive landtake would be required to the Main Street in order to facilitate this route which could result in significant losses to treelines in the area.</p> <p>Overall impacts on flora/fauna from this route are assessed as major negative within the context of Swords Village.</p>
SW17	<p>This route does not cross or run adjacent to any site of international or national conservation value, any ecological site or area of known importance to fauna.</p> <p>There are significant hedgerows and treelines of value along the existing roadway, including some in the central median. This route also crosses an unnamed stream south of the R132 east of Lakeshore Drive</p> <p>Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.</p>
SW20	<p>This route is a fixed route option and does not cross or run adjacent to any site of international or national conservation value, any ecological site or area of known importance to fauna. There are significant hedgerows and treelines of value along the existing carriageway.</p> <p>There is also an area of dry grassy verge vegetation on the eastern side of the carriageway.</p> <p>This route crosses an unknown stream south of Pinnockhill roundabout. This stream is diverted beneath the roadway via a pipe culvert.</p> <p>Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.</p>
SW21	<p>This route is a fixed route option and does not cross or run adjacent to any site of international or national conservation value, but traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • An unnamed stream which is culverted beneath the R132 immediately south of the Texaco Station.; • There is a new piped culvert adjacent to the newly upgraded road into the McComish Concrete Factory. It crosses the R132 at 'Kilronan Bridge'; • Sluice River, which has been mapped and identified by Fingal County Council as an ecological corridor; and • The Wad Stream (at the southern extent of the route) which is culverted underground. <p>There are some hedgerows of value along this route and an area of immature woodland is found to the east of the carriageway.</p> <p>Overall impacts on flora/fauna from this route are expected to be minor negative due to the limited potential for loss of hedgerows and natural habitat.</p>

5.2.4.2 Section 2: Dublin Airport to Royal Canal

Dublin Airport

The potential impact of each of these proposed routes on Flora and Fauna is considered in **Table 5.2.7**.

Table 5.2.7: Impacts of proposed options within the Dublin Airport Campus on Flora and Fauna

Route	Potential Impacts
DA0 DA1 DA2 DA3 DA4 DA5 DA6 DA7	<p>These routes do not cross or run adjacent to sites of international or national conservation value. There are however, important populations of Irish hare at Dublin Airport.</p> <p>As outlined previously, the Wad Stream is culverted underground on the northern section of the Airport Roundabout.</p> <p>Option DA2 would turn off the Castlemoate Road north of Castlemoate House and cross agricultural land to connect with Cloghran Roundabout.</p> <p>Overall impacts on flora/fauna from all these routes are assessed as neutral.</p>

Dublin Airport to Royal Canal

Along this section of the route there were a limited number of practical or feasible options. Therefore, F1 and F2 are fixed portions of the route with no proposed alternative. SY1 and SY2 represent two further options along the route, namely whether to go through Santry village (SY1) or bypass (SY2) Santry village.

The potential impact of each section of the route on flora and fauna is considered in **Table 5.2.8**.

Table 5.2.8: Impacts of proposed options within the Dublin Airport to Royal Canal Corridor

Route	Potential Impacts
SY4	<p>This route does not cross or run adjacent to any site of international conservation value but will encroach into the Santry Demesne pNHA with a consequent impact on trees. This is a site of national conservation value and an area of floral diversity (the site contains historic records of two red data book plant species Yellow Archangel and Hairy St. John's-wort – the latter is a species listed under the Flora Protection Order 1999). The woodlands in the demesne which adjoin the road have been identified as ancient and long established woodland by the National Parks and Wildlife Service and were surveyed as part of the National Native Woodland Survey. The woodlands and pond within the demesne are of known importance to a variety of protected fauna including several species of bats (the site contains several bat roosts and is of importance for both foraging and commuting by bats), amphibians and badger.</p> <p>Several streetscape trees on the eastern side of the R132 at Morton Stadium were assessed for their potential to support roosting bats. No roosts were recorded in these structures and it is considered that they are of limited value for same.</p>

Route	Potential Impacts
	<p>Trees adjacent to Morton Stadium were also assessed and were found to have been used by pipistrelle bats as a transitional/mating roost.</p> <p>The route also passes over the following streams and rivers:</p> <ul style="list-style-type: none"> • Kealys Stream, just south of the Airport Roundabout. This stream is culverted beneath the existing R132; • Cuckoo Stream which is culverted beneath the R132. This stream has been mapped and identified as an ecological corridor by Fingal County Council; • Mayne River and one of its tributaries; and • Santry River passes beneath the R132 from Santry Park via an old stone arch/pipe culvert. <p>It is envisaged that there will be widening required along this section of the route resulting in encroachment into the Santry Demesne resulting in the loss of a number of trees.</p> <p>Given the likely encroachment into Santry Demesne the overall impacts on flora/fauna from this route option are assessed as major negative.</p>
SY1	<p>This route follows the R132 through Santry village from its junction with the R104 to the N50 junction/interchange.</p> <p>This route does not cross or run adjacent to any site of international or national conservation value or any area of floral diversity or area of known importance to fauna. The route does not pass over or adjacent to any waterbodies.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as neutral.</p>
SY2	<p>This route avoids Santry village by turning off the R132 onto the R104 and following the N50 to re-join the R132 just south of Santry village.</p> <p>This route does not cross or run adjacent to any site of international or national conservation value or any area of floral diversity or area of known importance to fauna, however there is existing verge planting associated with the existing N50 and Coolock Lane. The route does not pass over or adjacent to any waterbodies.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as minor negative.</p>
F1	<p>This route also follows the existing QBC corridor along the R132 and passes over the Tolka River which has been mapped and identified as an ecological corridor by Dublin City Council.</p> <p>This route does not cross or run adjacent to any site of international conservation but does cross the Royal Canal which is a site of national conservation value, an important ecological corridor and an area of floral diversity and of known importance to fauna. Further, the Tolka River is recognised as an important corridor for wildlife such as otter, kingfisher and bats.</p>

Route	Potential Impacts
	<p>There would be landtake south of Shantalla which will include some at the junctions with Collins Avenue and Griffith Avenue and which will likely result in some loss of trees.</p> <p>There will also be landtake from Tolka River Bridge to Royal Canal which may result in removal of a small number of trees from south of Fagans Pub to Drumcondra Station. These widening works will comprise widening of the Tolka River bridge with potential for impacts on water quality, disturbance to fauna, etc.</p> <p>There is no landtake required at the Royal Canal bridge (Binns Bridge).</p> <p>Overall impacts on flora/fauna from this route are expected to be minor negative depending on the potential for loss of trees.</p>

5.2.4.3 Section 3: Royal Canal to St. Stephen's Green

Given the 'spiders web' of route options available this section was split into two subsections to make the assessment manageable:

- **Subsection 3a:** North City Centre namely, Royal Canal to River Liffey (Route Options N1, N2, N3 and N4).
- **Subsection 3b:** South City Centre namely, River Liffey to St. Stephen's Green (Route Options S1, S2, S3 and S4).

The potential impacts of each route on flora and fauna are considered in **Table 5.2.9**.

Table 5.2.9: Impacts of proposed options within Subsection 3a and 3b.

Route	Potential Impacts
North City Centre - Royal Canal to River Liffey	
N1	<p>The route crosses the River Liffey at Talbot Memorial Bridge (southbound) and Butt Bridge (northbound), but bridge widening works are not required.</p> <p>Trees within the streetscape and the River Liffey have been recognised as part of the city green infrastructure by Dublin City Council.</p> <p>This route does not cross or run adjacent to any site of international or national conservation value or any area of floral diversity or area of known importance to fauna.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as neutral.</p>
N2	<p>This route would cross the River Liffey at Talbot Memorial Bridge (southbound) and Butt Bridge (northbound), but bridge widening works are not required.</p> <p>Trees within the streetscape and the River Liffey have been recognised as part of the city green infrastructure by Dublin City Council.</p>

Route	Potential Impacts
	<p>This route does not cross or run adjacent to any site of international or national conservation value or any area of floral diversity or area of known importance to fauna.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as neutral.</p>
N3	<p>This route would cross the River Liffey at O'Connell Bridge. It is not anticipated that any bridge widening works will be required.</p> <p>Trees within the streetscape along this route have been recognised as part of the city green infrastructure by Dublin City Council as is the River Liffey.</p> <p>This route does not cross or run adjacent to any site of international or national conservation value or any area of floral diversity or area of known importance to fauna.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as neutral.</p>
N4	<p>This route will cross the River Liffey at O'Connell Bridge. It is not considered that any bridge works will be required.</p> <p>Trees within the streetscape have been recognised as part of the city green infrastructure by Dublin City Council.</p> <p>This route does not cross or run adjacent to any site of international or national conservation value or any area of floral diversity or area of known importance to fauna.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as neutral.</p>
South City Centre - River Liffey to St. Stephen's Green	
S1	<p>Some road works would be required to facilitate Swiftway but it is not considered that any major works would be required.</p> <p>This route does not traverse any surface water bodies or any site of international or national conservation value or any area of floral diversity or area of known importance to fauna.</p> <p>Trees within the streetscape and the city parks have been recognised as part of the city green infrastructure by Dublin City Council.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as neutral.</p>
S2	<p>The main route may cross the Gallows Stream which is currently entirely underground and outfalls into the combined sewer system near the Clare Street / Merrion Street Lower junction. It may also cross the Stein River at the junction of Leeson Street and Earlsfort Terrace. The Stein is a sub-surface river which is culverted from the Charlemont Bridge/Adelaide Road area along St. Stephen's Green South to Mercer Street and eventually forms part of the surface water drainage network at Williams Street.</p>

Route	Potential Impacts
	<p>Trees within the streetscape and the city parks have been recognised as part of the city green infrastructure by Dublin City Council.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as neutral.</p>
S3	<p>This route does not traverse any surface water bodies or any site of international or national conservation value or any area of floral diversity or area of known importance to fauna.</p> <p>Trees within the streetscape and the city parks have been recognised as part of the city green infrastructure by Dublin City Council.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as neutral.</p>
S4	<p>As with route option S2, this route may cross the Gallows Stream and the Stein River both of which are entirely underground and form part of DCC's foul and surface water drainage systems, respectively.</p> <p>Trees within the streetscape and the city parks have been recognised as part of the city green infrastructure by Dublin City Council.</p> <p>Given the developed urban nature of this route overall impacts on flora/fauna from this route are assessed as neutral.</p>

5.2.5 Ranking of Options

An assessment of the routes described in the preceding tables is presented in **Table 5.2.10 – Table 5.2.16** inclusive, using the assessment ranking scale outlined in **Section 3.4**.

Table 5.2.10: Ranking of North-West Swords Route Options

Section	Route Option	Ranking
North-West Swords	GE1	
	GE2	
	GE3	
	PG1	
	PG2	
	PG3	
	SW14	

Table 5.2.11: Ranking of Swords Central Route Options

Section	Route Option	Ranking
Swords Central	SW16	
	SW17	

Table 5.2.12: Ranking of Swords Central to Dublin Airport Route Options

Section	Route Option	Ranking
Swords Central to Dublin Airport	SW20	
	SW21	

Table 5.2.13: Ranking of Dublin Airport Route Options

Section	Route Option	Ranking
Dublin Airport	DA0	
	DA1	
	DA2	
	DA3	
	DA4	
	DA5	
	DA6	
	DA7	

Table 5.2.14: Ranking of Dublin Airport to Royal Canal Route Options

Section	Route Option	Ranking
Dublin Airport to Royal Canal	SY4	
	SY1	
	SY2	
	F1	

Table 5.2.15: Ranking of North City Centre Route Options

Section	Route Option	Ranking
North City Centre	N1	
	N2	
	N3	
	N4	

Table 5.2.16: Ranking of South City Centre Route Options

Section	Route Option	Ranking
South City Centre	S1	
	S2	
	S3	
	S4	

5.2.6 Conclusion

The proposed scheme will require the removal of some trees, treelines, shrubs and areas of vegetation along its route. In general, it is considered that the proposed scheme will generally utilise the existing street network which will minimise the potential ecological impacts.

It is acknowledged that the fixed route option which encroaches on Santry Demesne pNHA (SY4) would result in the removal of a number of trees. However, it is not considered that there is a feasible alternative route option in this area that would meet the scheme objectives. During detailed design of the proposed scheme, the aim will be to minimise the direct and indirect impacts arising from the proposed scheme and to propose appropriate mitigation strategies where possible.

5.3 Soils and Geology

5.3.1 Introduction

In order to carry out the Soils and Geology assessment, the following attributes and potential impacts to these attributes (where applicable) have been assessed with regard to each route option:

- Historic land use and potential contamination;
- Geology / Areas of Geological Significance;
- Soil quality, drainage characteristics and range of agricultural uses of soil along each route corridor; and

- Potential implications for existing quarry or mining activities and future extractable reserves.

Note that there are no areas of Geological Heritage located along any of the routes or within 100m of any of the proposed routes.

5.3.2 Assessment Methodology

The assessment was prepared using desk study based information, mapping from online sources and GIS (Geographic Information Systems) to map the proximity of the proposed routes to the various attributes. Potential impacts to the attributes and /or constraints were then assessed for each route option. The attributes considered comprised the following:

- Bedrock Geology & Depth to Bedrock;
- Drift Geology;
- Active and historic Pits and Quarries; and
- Historic Industrial Use.

This information is depicted on **Figure 5.3.1 – 5.3.15** inclusive which is appended in **Appendix A**.

The ‘*Guidelines on Procedure for Assessment and Treatment of Geology, Hydrology and Hydrology for National Road Schemes*’ (NRA, 2009) and the ‘*Guidelines for the Preparation of Soils, Geology & Hydrogeology Chapters of Environmental Impact Statements*’ (IGI, 2013) have also been followed, with particular focus on route selection.

A 100m corridor either side of each route option has been used for this assessment.

A wide range of reference material was utilised for this assessment as follows.

- Bedrock, soils, bedrock, aquifer classification and vulnerability from the Geotechnical Map Viewer on www.gsi.ie
- Geological Survey of Ireland Quarry Database;
- Geological Survey of Ireland Quaternary Geology map of Dublin;
- Ordnance Survey of Ireland Historic Maps.

Following this assessment, each route option was rated using the scale outlined in **Section 3.4**.

5.3.3 Options Assessment

The study area has been broken down into the following sections for the assessment:

- **Section 1:** Swords North to Dublin Airport;
- **Section 2:** Dublin Airport to Royal Canal; and
- **Section 3:** Royal Canal to St. Stephens Green.

Within each section there are a number of route options. Potential impacts or constraints in relation the attributes are described in the tables below:

5.3.3.1 Section 1: Swords North to Dublin Airport

The potential impacts or constraints relating to soils, geology and potential contamination for each of the route options from Swords North to Dublin Airport are considered in **Table 5.3.1**.

Table 5.3.1: Impacts of proposed options within the Swords North to Dublin Airport Corridor

Route	Potential Impacts
GE1 GE2 GE3 PG1 PG2 PG3	<p>Minimal potential for impacts to soils and geology and no historic industries along most of the route.</p> <p>This route traverses the Ward, Balheary Demesne and Newtown Rivers and is underlain by alluvial soils along portions of the route, with potential for soft ground in places.</p> <p>Historic gravel pits are located at the eastern end of the route. The status of these features and any backfilling is unknown meaning possible landfilling may have taken place.</p>
SW14	<p>This route is a fixed route option.</p> <p>Minimal potential for impacts to soils and geology and no historical industries noted that could give rise to potential contamination.</p> <p>A historic gravel pit is located at the northern end of this route. The status of this feature and any backfilling is unknown meaning possible landfilling may have taken place.</p>
SW16	<p>Minimal potential for impacts to soils and geology however rock is very shallow along the central portion of the route.</p> <p>An historic gravel pit and several quarries are located along this route. The status of these features and any backfilling is unknown meaning possible landfilling may have taken place. There are also historic industries noted (Smithy) that may give rise to potential contamination.</p>
SW17	<p>Minimal potential for impacts to soils and geology and no historical industries noted that could give rise to potential contamination.</p>
SW20	<p>This route is a fixed route option.</p> <p>Minimal potential for impacts to soils and geology and no historical industries noted that could give rise to potential contamination.</p> <p>This route crosses an unknown stream south of Pinnockhill roundabout. This stream is diverted beneath the roadway via a pipe culvert. Soft alluvial soils may be encountered for any road widening works.</p>

Route	Potential Impacts
SW21	<p>This route is a fixed route option.</p> <p>Minimal potential for impacts to soils and geology however there are permeable glaciofluvial sands and gravels along the central portion of the route.</p> <p>No historical industries are noted that could give rise to potential contamination.</p> <p>The route traverses Sluice River with deposits of gravels and alluvium noted along the central portion of the route.</p> <p>Several historic quarries are located at the southern end of this route. The status of these features and any backfilling is unknown meaning possible landfilling may have taken place.</p>

5.3.3.2 Section 2: Dublin Airport to Royal Canal

Dublin Airport

The potential impacts or constraints relating to soils, geology and potential contamination for each of the route options within Dublin Airport Campus are considered in **Table 5.3.2**.

Table 5.3.2: Impacts of Proposed Options within the Dublin Airport Campus

Route	Potential Impacts
DA0 DA1	Minimal potential for impacts to soils and geology and no historical industries noted that could give rise to potential contamination.
DA2 DA3 DA4 DA5 DA6 DA7	<p>Minimal potential for impacts to soils and geology however the rock is very shallow along the most western section of the route. There are also no historical industries noted that could give rise to potential contamination.</p> <p>An historic quarry is located at the western extent of this route. The status of these features and any backfilling is unknown meaning possible landfilling may have taken place.</p>

Dublin Airport to Royal Canal

The potential impacts or constraints relating to soils, geology and potential contamination for each of the route options from Dublin Airport to the Royal Canal are considered in **Table 5.3.3**.

Table 5.3.3: Impacts of proposed options within the Dublin Airport to Royal Canal Corridor

Route	Potential Impacts
SY4	This route is a fixed route option. Minimal potential for impacts to soils and geology and no historical industries noted that could give rise to potential contamination. The route also passes over several streams and rivers where isolated soft alluvial soils may be encountered.
SY1	Minimal potential for impacts to soils and geology and no historical industries noted that could give rise to potential contamination.
SY2	Minimal potential for impacts to soils and geology and no historical industries noted that could give rise to potential contamination.
F1	This route is a fixed route option. Minimal potential for impacts to soils and geology and no historical industries noted that could give rise to potential contamination The route passes over the Tolka River and it is likely that soft alluvial soils may be encountered.

5.3.3.3 Section 3: Royal Canal to St. Stephen's Green

The potential impacts or constraints relating to soils, geology and potential contamination for each of the route options from the Royal Canal to St. Stephen's Green are considered in **Table 5.3.4**.

Table 5.3.4: Impacts of proposed options within the Royal Canal to St. Stephen's Green Corridor

Route	Potential Impacts
North City Centre - Royal Canal to River Liffey	
N1	Minimal potential for impacts to soils and geology however the presence of a number of historic industries along the route such as a saw mill, tobacco factory and a smithy could give rise to potential residual contamination.
N2	Minimal potential for impacts to soils and geology however the presence of a number of historic industries along the south section route such as a saw mill, printing works and dye works could give rise to potential residual contamination.
N3	Minimal potential for impacts to soils and geology however there are permeable glacial gravels and sands in the Parnell square area. Historic metal works and printing works are recorded near the route which could give rise to potential residual contamination.

Route	Potential Impacts
N4	Minimal potential for impacts to soils and geology however there are permeable glacial gravels and sands in the Parnell square area. Historic printing works are recorded along portions of the route which could give rise to potential residual contamination.
South City Centre - River Liffey to St. Stephen's Green	
S1	Minimal potential for impacts to soils and geology that could give rise to potential contamination however the presence of a number of historic industries along the route could give rise to potential residual contamination.
S2	Minimal potential for impacts to soils and geology however the presence of a number of historic industries along parts of the route could give rise to potential contamination.
S3	Minimal potential for impacts to soils and geology that could give rise to potential contamination however the presence of a number of historic industries along the route could give rise to potential residual contamination.
S4	Minimal potential for impacts to soils and geology however the presence of a number of historic industries along parts of the route could give rise to potential contamination.

5.3.4 Ranking of Options

An assessment of the routes described in the preceding tables is presented below in **Table 5.3.5 – Table 5.3.11** using the following assessment ranking scale detailed in **Table 3.3**.

Table 5.3.5: Ranking of North-West Swords Route Options

Section	Route Option	Ranking
North-West Swords	GE1	
	GE2	
	GE3	
	PG1	
	PG2	
	PG3	
	SW14	

Table 5.3.6: Ranking of Swords Central Route Options

Section	Route Option	Ranking
Swords Central	SW16	
	SW17	

Table 5.3.7: Ranking of Swords Central to Dublin Airport Route Options

Section	Route Option	Ranking
Swords Central to Dublin Airport	SW20	
	SW21	

Table 5.3.8: Ranking of Dublin Airport Route Options

Section	Route Option	Ranking
Dublin Airport	DA0	
	DA1	
	DA2	
	DA3	
	DA4	
	DA5	
	DA6	
	DA7	

Table 5.3.9: Ranking of Dublin Airport to Royal Canal Route Options

Section	Route Option	Ranking
Dublin Airport to Royal Canal	SY4	
	SY1	
	SY2	
	F1	

Table 5.3.10: Ranking of North City Centre Route Options

Section	Route Option	Ranking
North City Centre	N1	
	N2	
	N3	
	N4	

Table 5.3.11: Ranking of South City Centre Route Options

Section	Route Option	Ranking
South City Centre	S1	
	S2	
	S3	
	S4	

5.3.5 Conclusion

In terms of soils and geology there are no major issues along any of the routes that have the potential to give rise to significant impacts although there are small areas of potential infilled historic gravel pits of quarries along some of the routes which may have been backfilled with waste material.

There are also areas where historic industry may have resulted in residual contamination remaining in the underlying soils.

It is anticipated that any of the impacts and/or potential constraints detailed in the tables above could be mitigated for or designed out (subject to the appropriate level of ground investigation) in the general course of detailed design of the scheme. As a result, either neutral rankings, or some (minor) advantages or (minor) disadvantages over other options have been assigned to the route options.

Comparisons of route options which cover similar areas are summarised below:

- Regarding the comparison of route option SW16 with route option SW17, the presence of potential landfilling of an historic gravel pit / quarry along the central part of route option SW16 concludes that SW17 would be marginally preferable.
- Regarding the comparison of the airport route options, the presence of an historic quarry at the western end of DA2 - DA7 inclusive, combined with shallow rock along the west portion concludes that DA0 or DA1 would be marginally preferable.
- Regarding the comparison of route option SY1 with route option SY2, the route options are considered neutral when compared with one another.

5.4 Hydrology

5.4.1 Introduction

A hydrology assessment was carried out for each of the options outlined in **Section 4**. The following sources of information were referred to:

- OS base mapping of the area and aerial photography;
- EPA GIS Data on Rivers and Streams; and
- OPW Flood information www.floodmaps.ie.
- OPW, (2012). National Preliminary Flood Risk Assessment (PFRA).

5.4.2 Assessment Methodology

The hydrology assessment involved identification of existing hydrological constraints and an evaluation of the potential impacts associated with scheme construction along route options. In the operational phase it is considered that the impacts will be the same for all options and therefore the operational scenario for all options was considered to be neutral in this assessment.

The likely potential impacts which were considered include the following:

- Discharges to Receiving Waters and impacts to Water Quality;
- Changes to existing Drainage Network; and
- Flood Risk.

5.4.3 Options Assessment

As outlined in **Section 4** the study area has been broken down into three sections for the assessment:

- **Section 1:** Swords North to Dublin Airport;
- **Section 2:** Dublin Airport to Royal Canal; and
- **Section 3:** Royal Canal to St. Stephens Green.

As outlined previously, the route options are illustrated in **Figure 4.1** to **Figure 4.31** which are appended to this report (refer to **Appendix A**).

Surface water features within the study area are depicted on **Figure 5.4.1 – Figure 5.4.3** inclusive (refer to **Appendix A**).

5.4.3.1 Section 1: Swords North to Dublin Airport

The potential impacts associated with each of the route options in this section on local hydrology are considered in **Table 5.4.1**.

Table 5.4.1: Impacts of proposed options within the Swords North to Dublin Airport Corridor

Route	Potential Impacts
GE1	<p>The most eastern extent of this route option encroaches onto an area identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in the event of both a 1-100 year and an extreme fluvial event.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; • Balheary Demesne Stream at the point where Balheary Road meets Glen Ellan Road; • A tributary of the Broadmeadow River at the Glen Ellan Pines Roundabout; and • Newtown River west of Bunbury Gate Avenue and Castleview Green housing estates. <p>Consideration will need to be given to the potential for impacts during construction in terms of water quality and flood risk.</p>
GE2	<p>The most eastern extent of this route option encroaches onto an area identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in the event of both a 1-100 year and an extreme fluvial event.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; • Balheary Demesne Stream at the point where Balheary Road meets Glen Ellan Road; • A tributary of the Broadmeadow River at the Glen Ellan Pines Roundabout; and • A tributary of the Newtown River travelling south along the Murrough Road. <p>Consideration will need to be given to the potential for impacts during construction in terms of water quality and flood risk.</p>
GE3	<p>The most eastern extent of this route option encroaches onto an area identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in the event of both a 1-100 year and an extreme fluvial event.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; • Balheary Demesne Stream at the point where Balheary Road meets Glen Ellan Road; • A tributary of the Broadmeadow River at the Glen Ellan Pines Roundabout; and

Route	Potential Impacts
	<ul style="list-style-type: none"> A stream of the Newtown River west of Bunbury Gate housing estate. <p>Consideration will need to be given to the potential for impacts during construction in terms of water quality and flood risk.</p>
PG1	<p>The most eastern extent of this route option encroaches onto an area identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in both the event of a 1-100 year and an extreme fluvial event.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; and A stream of the Newtown River at two locations, immediately prior to the Rathbeale Road/Ardcian Park junction and west of Bunbury Gate housing estate. <p>Consideration will need to be given to the potential for impacts during construction in terms of water quality and flood risk.</p>
PG2	<p>The most eastern extent of this route option encroaches onto an area identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in both the event of a 1-100 year and an extreme fluvial event.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location; and A stream of the Newtown River at two locations, immediately prior to the Rathbeale Road/Ardcian Park junction and on the Murrough Road. <p>Consideration will need to be given to the potential for impacts during construction in terms of water quality and flood risk.</p>
PG3	<p>The most eastern extent of this route option encroaches onto an area identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in both the event of a 1-100 year and an extreme fluvial event.</p> <p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> Ward River between the R132 and Balheary Road. A new structure would need to be provided at this location. A stream of the Newtown River, which is not visible on aerial photos but is included on the EPA rivers and streams database is traversed at two locations; immediately prior to the Rathbeale Road and Ardian Park junction and west of Bunbury Gate housing estate. <p>Consideration will need to be given to the potential for impacts during construction in terms of water quality and flood risk.</p>
SW14	<p>This route is a fixed route option. The northern extent of this route option encroaches onto an area identified by the OPW in the Draft Preliminary Flood Risk Assessment (PFRA) (OPW, 2012) as being at risk of flooding in the event of a fluvial extreme event.</p>

Route	Potential Impacts
	<p>Historically, there has been one flooding event at this location also. There is a potential for impacts if any works are carried out which may change the hydraulic regime in the area.</p> <p>This route does not cross or run adjacent to any rivers or streams so diversion works or construction of bridges or culverts is not required.</p>
SW16	<p>This route travels along Swords Main Street. At Swords Pavillion, the route runs approximately 120 m east of the convergence of the Ward River and Swords Glebe stream an area which has been identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in the event of both a 1-100 year and an extreme fluvial event.</p> <p>It is considered that extensive landtake would be required to the Main Street in order to facilitate this route. Consideration would need to be given to the potential for impacts during construction.</p>
SW17	<p>The area immediately south east of the Pinnockhill roundabout has been identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in the event of both a 1-100 year and an extreme fluvial event.</p> <p>This route also crosses an unnamed stream south of the R132 immediately east of Lakeshore Drive.</p> <p>Consideration would need to be given to the potential for impacts to water quality and flood risk during construction.</p>
SW20	<p>This route crosses an unknown stream south of Pinnockhill roundabout. This stream is diverted beneath the roadway via a pipe culvert. Road widening works will be required to the south of the roundabout including slip lanes which will require widening of the existing culvert.</p> <p>A historical flood event has been documented in the vicinity of this roundabout.</p> <p>Consideration would need to be given to the potential for impacts to water quality and flood risk during construction.</p>
SW21	<p>This route traverses the following streams/rivers:</p> <ul style="list-style-type: none"> • An unnamed stream which is culverted beneath the R132 immediately south of the Texaco Station. Road widening will occur in this location and the culvert will also need to be widened; • There is a new piped culvert adjacent to the newly upgraded road into the McComish Concrete Factory. It crosses the R132 at ‘Kilronan Bridge’; • Sluice River. It appears that a series of culverts carries this river beneath the R132 rather than a road bridge. The river has been identified at this location as being at risk of flooding in the event of 1-100 year and extreme fluvial events; and • The Wad Stream (at the southern extent of the route) is culverted underground at this location.

5.4.3.2 Section 2: Dublin Airport to Royal Canal

Dublin Airport

The potential impacts associated with each of the route options in this section on local hydrology are considered in **Table 5.4.2**.

Table 5.4.2: Impacts of proposed options within the Dublin Airport Campus

Route	Potential Impacts
DA0 DA1 DA2 DA3 DA4 DA5 DA6 DA7	As outlined previously, the Wad Stream is culverted underground on the northern section of the Airport Roundabout. None of the routes traverse or pass close to any other features of hydrological interest.

Dublin Airport to Royal Canal

Along this section of the route there were a limited number of practical options given the scheme objective to utilise the existing QBC along the R132. Therefore, SY4 and F1 are fixed portions of the route with no proposed alternative. SY1 and SY2 represent two options along the route, namely whether to go through Santry Village (SY1) or bypass Santry Village (SY2).

The potential impact of each section of the route on local hydrology is considered in **Table 5.4.3**.

Table 5.4.3: Impacts of proposed options within the Dublin Airport to Royal Canal Corridor

Route	Potential Impacts
SY4	<p>This route is a fixed route option and follows the existing QBC corridor along the R132 and passes through a number of areas identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in the event of both a 1-100 year and an extreme fluvial event.</p> <p>The route passes over the following streams and rivers:</p> <ul style="list-style-type: none"> • Kealy's Stream, which is culverted beneath the existing R132 south of the airport roundabout; • Cuckoo Stream which is culverted beneath the R132 immediately north of the Quick Park site; • A tributary of Mayne River is potentially culverted beneath the R132 immediately north of Whitehall Colmcille GAA Club. There is a record of historic flooding at this location; • Mayne River is culverted beneath the existing R132. There is also a record for historic flooding at this location; and • Santry River passes beneath the R132 from Santry Park via an old stone arch/pipe culvert.

Route	Potential Impacts
SY1	This route travels through Santry Village. It is considered that extensive landtake would be required through the village to facilitate this route. The route does not pass over or adjacent to any waterbodies.
SY2	This route avoids Santry Village by turning off the R132 onto the R104 and following the N50 to rejoin the R132 just south of Santry Village. This route will cross the outfall of the Naniken Siphon which is routed underneath the N50, N50 slip lanes and the Port Tunnel. The water then flows out onto the greenfield area to the south east of the junction.
F1	This route is a fixed route option and follows the existing QBC corridor along the R132 and passes over the Tolka River which is an area identified by the OPW in the PFRA (OPW, 2012) as being at risk of flooding in the event of both a 1-100 year and an extreme fluvial event. There are also a number of historical flood events along this route. The Tolka River bridge would need to be widened to accommodate Swiftway along this route. Therefore cognisance would need to be given to the flood risk in addition to impacts to water quality during construction works. This route also passes over the Royal Canal (Binns Bridge). It is not considered that any works will be required to this bridge.

5.4.3.3 Section 3: Royal Canal to St. Stephens Green

Given the ‘spiders web’ of route options available this section was split into two subsections to make the assessment manageable:

- **Subsection 3a:** North City Centre namely, Royal Canal to River Liffey.
- **Subsection 3b:** South City Centre namely, River Liffey to St. Stephen’s Green.

The potential impact of each of the route options on local hydrology within these subsections is addressed in **Table 5.4.4**.

Table 5.4.4: Impacts of proposed options within Subsection 3a and Subsection 3b.

Route	Potential Impacts
North City Centre - Royal Canal to River Liffey	
N1	This route traverses the River Liffey at Talbot Memorial Bridge (southbound) and Butt Bridge (northbound). It is not considered that any bridge widening works will be required at either bridge.
N2	This route will cross the River Liffey at Talbot Memorial Bridge (southbound) and Butt Bridge (northbound). It is not considered that any bridge widening works will be required at either bridge.

Route	Potential Impacts
N3	This route traverses the River Liffey at O'Connell Bridge. It is not considered that any bridge widening works will be required..
N4	This route traverses the River Liffey at O'Connell Bridge. It is not considered that any bridge widening works will be required at either bridge.
South City Centre - River Liffey to St. Stephen's Green	
S1	This route does not traverse any surface water bodies however, the southern extent of this route runs adjacent to the Grand Canal pNHA and cognisance would need to be given to its protection during construction.
S2	<p>This route may cross the Gallows Stream which is currently entirely underground and outfalls into the combined sewer system near the Clare Street / Merrion Street Lower junction.</p> <p>It may also cross the Stein River at the junction of Leeson Street and Earlsfort Terrace. The Stein is a sub-surface river which is culverted from the Charlemont Bridge/Adelaide Road area along St. Stephen's Green South to Mercer Street and eventually forms part of the surface water drainage network at Williams Street.</p>
S3	This route does not traverse any surface water bodies however, the southern extent of this route runs adjacent to the Grand Canal pNHA and cognisance would need to be given to its protection during construction.
S4	As with route option S2, this route may cross the Gallows Stream and the Stein River both of which are entirely underground and form part of DCC's foul and surface water drainage systems, respectively.

5.4.4 Ranking of Options

An assessment of the routes described in the preceding tables is presented in **Table 5.4.5 – Table 5.4.11** using the assessment ranking scale discussed in **Section 3.4**.

Table 5.4.5: Ranking of North-West Swords Route Options

Section	Route Option	Ranking
North-West Swords	GE1	
	GE2	
	GE3	
	PG1	
	PG2	
	PG3	
	SW14	

Table 5.4.6: Ranking of Swords Central Route Options

Section	Route Option	Ranking
Swords Central	SW16	
	SW17	

Table 5.4.7: Ranking of Swords Central to Dublin Airport Route Options

Section	Route Option	Ranking
Swords Central to Dublin Airport	SW20	
	SW21	

Table 5.4.8: Ranking of Dublin Airport Route Options

Section	Route Option	Ranking
Dublin Airport	DA0	
	DA1	
	DA2	
	DA3	
	DA4	
	DA5	
	DA6	
	DA7	

Table 5.4.9: Ranking of Dublin Airport to Royal Canal Route Options

Section	Route Option	Ranking
Dublin Airport to Royal Canal	SY4	
	SY1	
	SY2	
	F1	

Table 5.4.10: Ranking of North City Centre Route Options

Section	Route Option	Ranking
North City Centre	N1	
	N2	
	N3	
	N4	

Table 5.4.11: Ranking of South City Centre Route Options

Section	Route Option	Ranking
South City Centre	S1	
	S2	
	S3	
	S4	

5.4.5 Conclusion

In terms of hydrology there are no major issues along any of the routes that have the potential to give rise to significant impacts. Any of the issues raised in the preceding text could be designed out during the detailed design stage or mitigated as part of the scheme design. As a result a neutral ranking has been assigned to all of the route options considered.

5.5 Landscape/Townscape and Visual Aspects

5.5.1 Introduction

This section provides for an assessment of the potentially feasible Swiftway route options with regard to the likely landscape (townscape) and visual constraints. The assessment was prepared by Brady Shipman Martin, environmental, landscape and planning consultants.

The assessment takes account of the character, nature and landscape/townscape planning considerations of the route corridor; including, landuse; open space and amenities; protected views; architectural conservation areas/conservation areas; the prominence of protected structures; significance trees and stands of trees, etc.

While the assessment takes note of protected structures, architectural conservation areas and cultural/heritage aspects in so much as they inform or add to the character of an area, these aspects are considered in greater detail in Section 5.1 of this report.

It is noted at the outset that this assessment is limited to landscape / townscape and visual aspects and as such a route that utilises less sensitive city streets / major trafficked corridors will likely have townscape / visual advantages over a route which utilises significant urban city centre streets – irrespective of whether the route actually serves the needs or objectives of the proposed scheme or not.

5.5.2 Assessment Methodology

5.5.2.1 Key Characteristics of the Proposed Development

In assessing the options a number of likely characteristics of the proposed development have been taken into consideration in the assessment, including:

- Provision of Swiftway stops, with localised alteration of pavements, raising of gradients, provision signage, ticketing facilities, structures etc.;
- Alteration of junction areas – and other localised areas – to facilitate and prioritise Swiftway movements, this will include, re-alignment of kerbs potentially both reducing and enlarging footpath space, removal / addition of signage, change to road markings, etc.;
- Potentially significant alteration to existing traffic (private and public) patterns – especially within the city centre area;
- Potentially significant alteration to the allocation/distribution of available road space between Swiftway, other modes of traffic, cycleways and pedestrian facilities; and
- Changes to existing landuses (e.g. where route impacts on existing open space, recreational amenities, etc.).

5.5.2.2 Landscape/Townscape Planning Aspects

Various landscape/townscape planning and visual considerations were reviewed in the options assessment. These vary between Dublin City and Fingal County areas as set out in the Dublin City Development Plan and Fingal County Development Plan.

Dublin City Development Plan 2011 -2017

The following land use zoning objectives are noted in particular:

- Zone Z2: To Protect and/or improve the amenities of residential conservation areas;
- Zone Z8: To protect the existing architectural and civic design character, to allow only for limited expansion consistent with the conservation objective;
- Zone Z9: To preserve, provide and improve recreational amenity and open space and green networks;
- Zone Z11: To protect and improve canal, coastal and river amenities; and
- Zone Z12: To ensure the existing environmental amenities are protected in any future use of these lands.

The following specific objectives are noted in particular:

- Character Areas;
- Conservation Areas;
- Architectural Conservation Areas;
- Protected Structures; and
- Views and Prospects.

Fingal County Council Development Plan 2011-2017

The following land use zoning objectives are noted in particular:

- Objective LC: Protection of Landscape Character;
- Objective VP: Protection of Views and Prospects;
- Objective HA: Protect and enhance high amenity areas;
- Objective OS: Preserve and provide for open space and recreational amenities; and
- Objective RS: Provide for residential development and protect and improve residential amenity.

In addition, the following specific objectives are noted in particular:

- Preserved Views;
- Protected Structures; and
- Protect & preserve trees, woodlands and hedgerows.

Landscape character types were not considered relevant as the routes are all located within existing developed areas.

The assessment also included for a review of Local Area Plans (LAPs) located along the route options.

5.5.3 Options Assessment

5.5.3.1 Section 1: Swords North to Dublin Airport

North-West Swords

This section comprises route options GE1, GE2, GE3, PG1, PG2 and PG3.

The principal landscape/townscape and visual issues in relation to Swords North revolve around potential impacts on residential amenity, areas of existing open space and recreational amenity. Impacts are likely to be most significant during construction – but where proposed routes cross existing open spaces (e.g. Broadmeadow / Castlefarm / Pine Grove / Mooretown) significant localised impact will likely be a continuing feature.

An assessment of the various route options is provided in Section 5.5.4.

Swords Central

This section comprises route options SW16 and SW17 and the fixed route options SW14, SW20 and SW21.

The principal landscape/townscape and visual issues in relation to Swords East revolve around potential impacts to the streetscape along the Old Dublin Road and Main Street of Swords. Impacts are likely to be most significant during construction when alteration of existing traffic patterns, provision of stops and related features will be required.

An assessment of the various route options described above is provided in Section 5.5.4.

5.5.3.2 Section 2: Dublin Airport to Royal Canal

Dublin Airport

This section comprises route options DA0, DA1, DA2, DA3, DA4, DA5, DA6 and DA7.

There are a number of route options in the vicinity of Dublin Airport. However, all of the route options utilise sections of existing significant road infrastructure – comprising either the existing R132 and/or sections of airport road corridor.

All of these road sections – and consequently route options – are of a very low sensitivity from a landscape/townscape or visual consideration. As a result, there is little or no landscape/townscape or visual difference between the various route options.

An assessment of the various route options is provided in Section 5.5.4.

Santry

This section comprises route options SY1 and SY2. There are also fixed route options SY4 and F1 to the north and south of Santry respectively. Route option F1 continues to the Royal Canal.

Two feasible route options (SY1 and SY2) exist for Santry. SY1 makes use of the narrower more sub-urban residential R132 road corridor – while SY2 connects to the more significant road infrastructure of the N50.

Impacts are likely to be most significant during construction when alteration of existing traffic patterns, provision of stops and related features will be required. However, landscape/townscape and visual impacts will be more direct and pronounced, direct and longer lasting along the R132 Swords Road (SY1) as opposed to the N50 (SY2).

An assessment of the various route options is provided in Section 5.5.4.

5.5.3.3 Section 3: Royal Canal to St. Stephen's Green

Route options within the city centre (north and south) utilise some of the principal transport corridors through the city. However, these routes are also amongst the most important and significant elements of Dublin's character, urban form and structure and public space. Significant sections of route corridor are particularly important in terms of architectural character and as settings for a wide variety of protected structures, views and prospects. Significant sections of many route options pass through conservation and/or architectural conservation designations.

North City Centre - Royal Canal to River Liffey

Four broad route options are proposed through the north city centre from east to west summarised as follows (refer to Section 4 for full description):

- **N1:** Dorset Street – Belvidere Road – North Circular Road – Amiens Street – Beresford Place / Memorial Road;
- **N2:** Dorset Street – Belvidere Road – Belvedere Place – Mountjoy Square – Gardiner Street – Beresford Place / Memorial Road;
- **N3:** Dorset Street – North Frederick Street – Parnell Square East – Cavendish Row – O'Connell Street;
- **N4:** Dorset Street – Belvidere Road – Belvedere Place – Mountjoy Square North – Gardiner Place – Great Denmark Street – Parnell Square East – Cavendish Row – O'Connell Street.

Route option N1 circles the core of the city centre and passes between the North Georgian City and the Dublin Docklands North character areas which lie to either side of Amiens Street. Route option N2 utilises Gardiner Street the major north south axis through the centre of the North Georgian City. Route option N4 passes through the northern end of North Georgian City (Mountjoy Square) before moving through the linear character area of O'Connell Street (and Parnell Square). Route option N3 passes through the O'Connell Street (and Parnell Square) area only.

Therefore route options N1 and N2 make greater use of existing major transport corridors outside of the main city centre core/spine and as such, are marginally more preferable than route options N3 and N4. An assessment of the various route options is provided in Section 5.5.4.

South City Centre - River Liffey to St Stephen's Green

Three broad route options are proposed through the south city centre from east to west as follows:

- **S1:** O'Connell Bridge / D'Olier Street / Townsend Street / Lombard Street / Westland / Merrion Street Lower / Merrion Square North / Merrion Square East / Fitzwilliam Street (turnaround would be accommodated at Wilton Terrace and Cumberland Road). The northbound routing would follow the same streets as far as Merrion Street Lower / then Clare Street and Lincoln Place / Westland Row / Pearse Street / College Street / Westmoreland Street.
 - **S2:** O'Connell Bridge / D'Olier Street / Townsend Street / Lombard Street / Westland Row / Merrion Street Lower / Merrion Square West / Merrion Street Upper / Ely Place / Hume Street / St. Stephen's Green East / Earlsfort Terrace (turnaround via Hatch Street / Leeson Street / St. Stephen's Green East. The northbound routing would follow the same streets as far as Merrion Street Lower, then Clare Street and Lincoln Place / Westland Row, Pearse Street / College Street Westmoreland Street.
 - **S3:** City Quay / Lombard Street / Westland Row / Merrion Street Lower / Merrion Square North / Merrion Square East / Fitzwilliam Street / Leeson Street junction (turnaround would be accommodated at Wilton Terrace and Cumberland Road). The return route (northbound) would follow the same route as far as Merrion Street Lower then onto Clare Street and Lincoln Place / Westland Row / Pearse Street / Tara Street / Butt Bridge.
- S4:** City Quay / Lombard Street / Westland Row / Merrion Street Lower / Merrion Square West / Merrion Street Upper / Ely Place / Hume Street / St. Stephen's Green East / Earlsfort Terrace (turn around returning via Hatch Street / Leeson Street / St. Stephen's Green East. The route northbound would follow the same route as far as Merrion Street Lower then onto Clare Street and Lincoln Place / Westland Row / Pearse Street / Tara Street / Butt Bridge.

Routes pass through/by the city character areas of Trinity College, Dublin Docklands South and South Georgian City (Fig 3 Dublin City Development Plan) with all routes having significant length of route within the South Georgian City. Route options have broadly similar townscape and visual effects relating to potential changes to the perception /views of streetscape, heritage, character and amenity. Route option S1 is considered least preferable in that it has greater effect within the core of the South Georgian City. Route option S3 is broadly similar in character to S1. Both route options S2 and S4 have a broadly similar level of likely townscape and visual impact.

An assessment of the various route options is provided in Section 5.5.4.

5.5.4 Ranking of Options

An assessment of the routes described in the preceding section is presented in **Table 5.5.1 – Table 5.5.7** using the assessment ranking scale discussed in **Section 3.4**.

Table 5.5.1: Ranking of North-West Swords Route Options in terms of Landscape/Townscape & Visual

Section	Route Option	Comments/Considerations	Assessment
North West Swords	GE1	<p>Makes use of existing road corridors;</p> <p>Potential impacts on Open Space and GAA grounds on opposite side of Balheary Road;</p> <p>Passes through residential areas along Glen Ellan Road; and</p> <p>Terminates in mixed use development / open space area (partly under construction) within Oldtown/Mooretown LAP.</p>	
	GE2	<p>Makes use of existing road corridors;</p> <p>Potential impacts on Open Space and GAA grounds on opposite side of Balheary Road; and</p> <p>Passes through residential areas along Glen Ellan Road, Murrough Road, Brackenstown Road.</p>	
	GE3	<p>Makes use of existing road corridors;</p> <p>Potential impacts on Open Space and GAA grounds on opposite side of Balheary Road;</p> <p>Passes through residential areas along Glen Ellan Road, Murrough Road and Rathbeale Road; and</p> <p>Crosses open space between Pine Grove / Mooretown with direct impacts on these open spaces.</p>	
	PG1	<p>Requires link from Balheary Road to Broadmeadow Road to Rathbeale Road;</p> <p>Crosses open space between Pine Grove / Mooretown and Broadmeadow / Castlefarm;</p> <p>Crosses linear green space linking Broadmeadow Road and Castlegrange Green;</p> <p>Passes through residential areas along Rathbeale Road, Pine Grove, Mooretown, Broadmeadow, Castlefarm and Castlegrange; and</p> <p>Direct impact on open spaces between Pine Grove / Mooretown and Broadmeadow / Castlegrange.</p>	

Section	Route Option	Comments/Considerations	Assessment
	PG2	<p>Requires link from Balheary Road to Broadmeadow Road to Rathbeale Road;</p> <p>Crosses linear green space linking Broadmeadow Road and Castlegrange Green;</p> <p>Crosses open space between Pine Grove / Mooretown and Broadmeadow / Castlefarm;</p> <p>Passes through residential areas along Castlegrange, Castlefarm, Broadmeadow, Mooretown, Pine Grove, R125 Rathbeale Road, Murrough Road and Brackenstown Road; and</p> <p>Direct impact on open spaces between Pine Grove / Mooretown and Broadmeadow / Castlegrange.</p>	
	PG3	<p>Requires link from Balheary Road to Broadmeadow Road to Rathbeale Road;</p> <p>Crosses open space between Pine Grove / Mooretown and Broadmeadow / Castlefarm;</p> <p>Crosses linear green space linking Broadmeadow Road and Castlegrange Green;</p> <p>Passes through residential areas along Glen Ellan Road, Rathbeale Road, Pine Grove, Mooretown, Broadmeadow, Castlefarm and Castlegrange;</p> <p>Direct impact on open spaces at Broadmeadow / Castlegrange; and</p> <p>Terminates in mixed use development / open space area (partly under construction) within Oldtown/Mooretown LAP.</p>	
	SW14	<p>Makes use of existing R132 road corridor;</p> <p>Strong tree/vegetation-lined corridor with landscape median and managed hedgerow;</p>	

Table 5.5.2: Ranking of Swords Central Route Options in terms of Landscape/Townscape & Visual

Section	Route Option	Comments/Considerations	Assessment
Swords Central	SW16	Makes use of existing road corridors; Passes through centre (Main Street) of Swords; Passes through residential areas alongside Old Dublin Road and Seatown Road; Objectives to protect and preserve trees; and Protected Structures along Main Street Swords.	
	SW17	Makes use of existing R132 road corridor; Strong tree/vegetation-lined corridor with landscape median and managed hedgerow; Objective to protect and preserve trees, woodland and hedgerows within northern and southern quadrant of Malahide Roundabout; Passes access to Pavilion Shopping Centre off R132 northbound; and Passes access to Swords Business Park off R132 southbound.	

Table 5.5.3: Ranking of Swords to Dublin Airport in terms of Landscape/Townscape & Visual

Section	Route Option	Comments/Considerations	Assessment
Swords Central to Dublin Airport	SW20	Makes use of existing R132 road corridor; and Varied corridor to west with continuous development in Airside Retail Park to east.	
	SW21	Makes use of existing R132 road corridor; and Mixed corridor with some development to side; some tree/vegetation-lined sections and some open views to farmland.	

Table 5.5.4: Ranking of Dublin Airport Route Options in terms of Landscape/Townscape & Visual

Section	Route Option	Comments/Considerations	Assessment
Dublin Airport	DA0 DA1	Makes use of existing R132 road corridor; and No particular landscape/townscape or visual sensitivities.	
	DA2	In general route makes use of existing Airport road corridors; and Passes along Castlemoate Road and by Castlemoate House.	
	DA3 DA4 DA5 DA6 DA7	Makes use of existing Airport road corridors; and No particular landscape/townscape or visual sensitivities.	

Table 5.5.5: Ranking of Dublin Airport to Royal Canal Route Options in terms of Landscape/Townscape & Visual

Section	Route Option	Comments/Considerations	Assessment
Dublin Airport to Royal Canal	SY4	Makes use of existing R132 road corridor; Diverse corridor with sections of fronting residential, commercial and mixed use development; Some sections have a narrow sub-urban road character; Open space, mature trees, heritage area along Santry Demesne; and Objective to protect and preserve trees, woodland and hedgerows at Santry Demesne.	
	SY1	Makes use of existing R132 road corridor; Extensive residential development along R132 Swords Road; Open Space along sections of R132 road corridor; and Narrow sub-urban road character.	

Section	Route Option	Comments/Considerations	Assessment
	SY2	Makes use of existing R104 / N50 road corridors; Open Space alongside R104 Coolock Lane corridor; and Residential areas and church grounds along part of R104 Coolock Lane corridor and along Loran Park facing N50.	
	F1	Makes use of existing N1 Drumcondra / Swords Road - a heavily trafficked corridor; Land uses strongly residential and institutional, with sections of mixed use, hotel, commercial and retail <i>etc.</i> , <i>e.g.</i> at Drumcondra; Generally narrow sub-urban road corridor with numerous junctions and direct property accesses; Long sections of attractive mature tree-lined avenue; Individual and short lengths of protected structures – mainly south of Drumcondra; Z2 residential conservation areas - mainly south of Drumcondra; River Tolka Conservation Area; Royal Canal Conservation Area; and Small areas / lengths of open space (e.g. at Drumcondra Bridge over River Tolka.	

Table 5.5.6: Ranking of North City Centre Route Options in terms of Landscape/Townscape & Visual

Section	Route Option	Comments/Considerations	Assessment
North City Centre	N1	Conservation Areas at Royal Canal and at Busáras / Custom House; Protected Structures along sections of North Circular Road, Portland Row, Amiens Street, and Custom House; Z9 use zoning at Royal Canal, Custom House; Protected views east along the Liffey to Custom House and Quays (as per Fig. 4 Views and Prospects DCC Dev Plan);	

Section	Route Option	Comments/Considerations	Assessment
		<p>Dorset Street, North Circular Road, Amiens Street and surrounds of Custom House are significant in terms of broad urban structure, townscape character, quality of buildings and public function; and</p> <p>Dorset Street, North Circular Road, Amiens Street and surrounds of Custom House are existing significant transport corridors within the city centre.</p>	
	N2	<p>Conservation Areas at Royal Canal and along full extent of route from Belvedere Place; Z8 use zoning and Protected Structures Belvedere Place, Mountjoy Square North and West and Gardiner Street South, Custom House;</p> <p>Z9 use zoning at Royal Canal, Mountjoy Square, Gardiner Street/Sean MacDermott Park, Custom House;</p> <p>Protected views south along Gardiner Street to Custom House; and east along the Liffey to Custom House and Quays (as per Fig. 4 Views and Prospects DCC Dev Plan);</p> <p>Mountjoy Square, Gardiner Street and surrounds of Custom House are significant in terms of broad urban structure, townscape character, quality of buildings and public function; and</p> <p>Dorset Street, Gardiner Street and surrounds of Custom House are existing significant transport corridors within the city centre.</p>	
	N3	<p>Conservation Areas at Royal Canal and along full extent of route from Frederick Street North;</p> <p>Architectural Conservation Area along Cavendish Row, O'Connell Street, O'Connell Bridge;</p> <p>Z8 use zoning and Protected Structures along majority of route from Frederick Street North;</p> <p>Z9 use zoning at Royal Canal, Garden of Remembrance;</p> <p>Protected views along O'Connell Street and to Spire south from Parnell Square, north from O'Connell Bridge and east from Henry Street; east along the Liffey to Custom House and Quays (as per Fig. 4 Views and Prospects DCC Dev Plan);</p>	

Section	Route Option	Comments/Considerations	Assessment
		<p>Parnell Square, O'Connell Street and are significant cultural, amenity and open space assets. These streets are significant in terms of broad urban structure, townscape character, quality of buildings and public function; and</p> <p>Majority of the streets, but particularly Dorset Street, Parnell Square East and O'Connell Street, are also existing significant transport corridors within the city centre.</p>	
	N4	<p>Conservation Areas at Royal Canal and along full extent of route from Belvedere Place; Architectural Conservation Area along Cavendish Row, O'Connell Street, O'Connell Bridge;</p> <p>Z8 use zoning and Protected Structures along majority of route;</p> <p>Z9 use zoning at Royal Canal, Mountjoy Square, Garden of Remembrance;</p> <p>Protected views along O'Connell Street and to Spire south from Parnell Square, north from O'Connell Bridge and east from Henry Street; east along the Liffey to Custom House and Quays (as per Fig. 4 Views and Prospects DCC Dev Plan);</p> <p>Mountjoy Square, Parnell Square, O'Connell Street and are significant cultural, amenity and open space assets. These streets are significant in terms of broad urban structure, townscape character, quality of buildings and public function;</p> <p>Belvidere Road, Belvedere Place, Gardiner Place, Great Denmark Street and Gardiner Row are connecting urban streets with often narrower and/or terraced residential character; and</p> <p>Majority of the streets, but particularly Dorset Street, Parnell Square East and O'Connell Street, are also existing significant transport corridors within the city centre.</p>	

Table 5.5.7: Ranking of South City Centre Route Options in terms of Landscape/Townscape & Visual

Section	Route Option	Comments/Considerations	Assessment
South City Centre	S1	<p>Architectural Conservation Area: O’Connell Bridge, D’Olier Street and Westmoreland Street;</p> <p>Architectural Conservation Area around Fitzwilliam Square and adjoining areas;</p> <p>Conservation Areas along Liffey Quays; and between Merrion Square – Fitzwilliam Square and Leeson Street;</p> <p>Z8 use zoning and Protected Structures along majority of route south of Pearse Street;</p> <p>Z9 use zoning at Liffey Quays, Merrion Square, at Church on Pearse Street;</p> <p>Protected views east and west along the Liffey Quays; and north along Fitzwilliam Place – Fitzwilliam Street Upper and Lower and Merrion Square East (as per Fig. 4 Views and Prospects DCC Dev Plan);</p> <p>Liffey Quays and bridges, Merrion Square and Fitzwilliam Square are significant cultural, amenity and open space assets;</p> <p>Majority of the streets are significant in terms of broad urban structure, townscape character, quality of buildings and public function; and</p> <p>Majority of the streets are also existing significant transport corridors within the city centre.</p>	
	S2	<p>Architectural Conservation Area O’Connell Bridge, D’Olier Street and Westmoreland St.;</p> <p>Conservation Area along majority of route;</p> <p>Z8 use zoning and Protected Structures along majority of route;</p> <p>Z9 use zoning at Merrion Square St. Stephen’s Green;</p> <p>Protected views east along the Liffey (to Custom House and Quays); and north along O’Connell Street from O’Connell Bridge (as per Fig. 4 Views and Prospects DCC Dev Plan);</p> <p>O’Connell Bridge, Liffey Quays, Merrion Square and St. Stephen’s Green are significant cultural, amenity and open space assets;</p> <p>The streets are significant in terms of broad urban structure, townscape character, quality of buildings and public function; and</p>	

Section	Route Option	Comments/Considerations	Assessment
		The streets are also existing significant transport corridors within the city centre.	
	S3	<p>Architectural Conservation Area around Fitzwilliam Square and adjoining areas; Conservation Areas along Liffey Quays; and between Merrion Square – Fitzwilliam Square and Leeson Street;</p> <p>Z8 use zoning and Protected Structures along majority of route south of Pearse Street; Z9 use zoning at Liffey Quays, Merrion Square, at Church on Pearse Street;</p> <p>Protected views east and west along the Liffey Quays; and north along Fitzwilliam Place – Fitzwilliam Street Upper and Lower and Merrion Square East (as per Fig. 4 Views and Prospects DCC Dev Plan);</p> <p>Liffey Quays and bridges, Merrion Square and Fitzwilliam Square are significant cultural, amenity and open space assets;</p> <p>Majority of the streets are significant in terms of broad urban structure, townscape character, quality of buildings and public function; and</p> <p>Majority of the streets are also existing significant transport corridors within the city centre.</p>	
	S4	<p>Conservation Area along majority of route;</p> <p>Z8 use zoning and Protected Structures along majority of route;</p> <p>Z9 use zoning at Merrion Square St. Stephen's Green;</p> <p>Protected views east along the Liffey (to Custom House and Quays); and north along O'Connell Street from O'Connell Bridge (as per Fig. 4 Views and Prospects DCC Dev Plan);</p> <p>O'Connell Bridge, Liffey Quays, Merrion Square and St. Stephen's Green are significant cultural, amenity and open space assets;</p> <p>The streets are significant in terms of broad urban structure, townscape character, quality of buildings and public function; and</p> <p>The streets are also existing significant transport corridors within the city centre.</p>	

5.5.5 Conclusions

In landscape/townscape and visual terms, the assessment of route options varies from location to location. In some instances, e.g. Dublin Airport, there is little or no discernible difference between the route options, while elsewhere, e.g. Swords North, there is clear difference and preference in terms of lesser potential for adverse landscape/townscape and/or visual impact is apparent.

Outside of the City Centre, the issues tend to be more localised or specific to amenities, residential areas, street plantings etc. By contrast, within the City Centre, issues tend to be related more towards potential impacts on overall character and presentation – often derived from likely alterations to traffic management/patterns and interventions in the streetscape/public realm.

Furthermore, and as noted at the outset, this assessment is limited to landscape/townscape and visual aspects and as such, a route that utilises less sensitive streets/major trafficked corridors will likely have townscape/visual advantages over a route which utilises significant urban city centre streets – irrespective of whether the route actually serves the needs or objectives of the proposed scheme or not.

It is acknowledged that the fixed route option which encroaches on Santry Demesne (SY4) would result in the removal of an existing boundary and of a number of trees. However, it is not considered that there is a feasible alternative route option in this area that would meet the scheme objectives. During detailed design of the proposed scheme, the aim will be to minimise the direct and indirect impacts arising from the proposed scheme and to propose appropriate mitigation strategies where possible.

5.6 Air Quality

5.6.1 Introduction & Methodology

An air quality impact assessment was carried out for each of the options outlined in **Section 4**. Sources of information referred to included:

- OS base mapping of the area and aerial photography; and
- Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (NRA, 2011).

The NRA guidelines define sensitive receptor locations as: residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present. The assessment considered each route, in terms of sensitive receptors and density of development in order to identify the most suitable route from an air quality perspective.

Following the assessment, the route options were rated using the scale outlined previously in **Table 3.3** to identify the preferred route option.

For the purposes of route option comparison, air quality is not considered to be a significant differentiator. The proposed Swiftway scheme will introduce more efficient and environmentally friendly buses onto the road network. In many instances these buses will replace the existing older and less efficient buses and will likely have a positive contribution to the air quality environment.

5.6.2 Options Assessment

As outlined in **Section 4** the study area has been broken down into three sections for the assessment:

- Swords North to Dublin Airport;
- Dublin Airport to Royal Canal; and
- Royal Canal to St. Stephens Green.

As outlined previously, the route options are illustrated in **Figure 4.1** to **Figure 4.31** which are appended to this report (refer to **Appendix A**).

5.6.2.1 Section 1: Swords North to Dublin Airport

The potential air quality impacts associated with each of the route options in this section are considered in **Table 5.6.1**.

Table 5.6.1: Air quality impacts of proposed options within the Swords North to Dublin Airport Corridor

Route	Potential Impacts
GE1, GE2, GE3	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in pollutant concentrations..
PG1, PG2, PG3	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in pollutant concentrations. This section requires the construction of a new section of road on an existing green strip between Castlegrange Green and Broadmeadow Road to accommodate Swiftway only. The air quality impacts associated with the construction works would be greater than the on-line works for the other route options on this section but are also not considered to be significant.
SW14	This route is a fixed route option. There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.

Route	Potential Impacts
SW16, SW17	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.
SW20, SW21	These routes are fixed route options. There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.

5.6.2.2 Section 2: Dublin Airport to Royal Canal

Dublin Airport

The potential air quality impacts associated with each of the route options in this section are considered in **Table 5.6.2**.

Table 5.6.2: Impacts of proposed options within the Dublin Airport Campus

Route	Potential Impacts
DA0, DA1, DA2, DA3, DA4, DA5, DA6, DA7	There will be some instances where the proposed scheme will result in traffic being relocated closer to buildings due to road widening. Should traffic be moved closer (or traffic volumes increase), there may be an increase in pollutant concentrations. It is noteworthy that most of the buildings within the airport campus are not considered to be sensitive receptors.

Dublin Airport to Royal Canal

The potential air quality impacts associated with each of the route options in this section are considered in **Table 5.6.3**. Route options SY4 and F1 are fixed route options.

Table 5.6.3: Impacts of proposed options from Dublin Airport to Royal Canal

Route	Potential Impacts
SY4, SY1, SY2, F1	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. However, should traffic be moved closer to sensitive receptors (or traffic volumes increase), the increase in pollutant concentrations is not likely to be significant.

5.6.2.3 Section 3: Royal Canal to St. Stephens Green

The potential air quality impacts associated with each of the route options in this section are considered in **Table 5.6.4**.

Table 5.6.4: Impacts of proposed options within Royal Canal to St. Stephen's Green

Route	Potential Impacts
N1, N2, N3, N4	<p>The extent of changes to traffic volumes associated with each route option is not available, at this stage of the assessment. It is possible that significant variations could occur due to the redistribution of traffic from one route to another. This has the potential to impact on localised air quality.</p> <p>These traffic variations will be assessed in detail for the preferred route and proposed scheme design through modelling during the EIS preparation stage of the project.</p>
S1, S2, S3, S4	<p>The extent of changes to traffic volumes associated with each route option is not available, at this stage of the assessment. It is possible that significant variations could occur due to the redistribution of traffic from one route to another. This has the potential to impact on localised air quality.</p> <p>These traffic variations will be assessed in detail for the preferred route and proposed scheme design through modelling during the EIS preparation stage of the project.</p>

5.6.3 Ranking of Options

An assessment of the routes described in the preceding tables is presented in **Table 5.6.5 – Table 5.6.10** using the assessment ranking scale discussed in **Section 3.4**.

Table 5.6.5: Ranking of North-West Swords Route Options

Section	Route Option	Ranking
North-West Swords	GE1	
	GE2	
	GE3	
	PG1	
	PG2	
	PG3	
	SW14	

Table 5.6.6: Ranking of Swords Central Route Options

Section	Route Option	Ranking
Swords Central	SW16	
	SW17	
	SW20	
	SW21	

Table 5.6.7: Ranking of Dublin Airport Route Options

Section	Route Option	Ranking
Dublin Airport	DA0	
	DA1	
	DA2	
	DA3	
	DA4	
	DA5	
	DA6	
	DA7	

Table 5.6.8: Ranking of Dublin Airport to Royal Canal Route Options

Section	Route Option	Ranking
Dublin Airport to Royal Canal	SY4	
	SY1	
	SY2	
	F1	

Table 5.6.9: Ranking of North City Centre Route Options

Section	Route Option	Ranking
North City Centre	N1	
	N2	
	N3	
	N4	

Table 5.6.10: Ranking of South City Centre Route Options

Section	Route Option	Ranking
South City Centre	S1	
	S2	
	S3	
	S4	

5.6.4 Conclusion

In terms of air quality, at this stage of assessment there are no major issues along any of the routes that have the potential to give rise to significant impacts. It is considered that potential impacts associated with construction works can be minimised through the appropriate mitigation.

Following the completion of a traffic impact assessment of the preferred route (at EIS stage), the air quality impacts due to the reassignment of traffic will be assessed.

Since air quality is not considered to be a significant differentiator for route option comparison purposes, a neutral ranking has been assigned to the majority of the route options.

5.7 Noise and Vibration

5.7.1 Introduction & Methodology

A noise and vibration impact assessment was carried out for each of the options outlined in **Section 4**. Sources of information referred to included:

- OS base mapping of the area and aerial photography; and
- Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA, 2004).

The NRA guidelines define sensitive receptor locations as: residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present. The assessment considered each route, in terms of sensitive receptors and density of development, in order to identify the most suitable route from a noise and vibration perspective.

Following the assessment, the route options were rated using the scale outlined previously in **Table 3.3** to identify the preferred route option.

For the purposes of route option comparison, noise and vibration is not considered to be a significant differentiator. The proposed Swiftway Scheme will introduce more efficient and environmentally friendly buses onto the road network. In many instances these buses will replace the existing older and less efficient buses and will likely have a positive contribution to noise environment.

5.7.2 Options Assessment

As outlined in **Section 4** the study area has been broken down into three sections for the assessment:

- Swords North to Dublin Airport.
- Dublin Airport to Royal Canal.
- Royal Canal to St. Stephens Green.

As outlined previously, the route options are illustrated in **Figure 4.1** to **Figure 4.31** which are appended to this report (refer to **Appendix A**).

5.7.2.1 Section 1: Swords North to Dublin Airport

The potential noise and vibration impacts associated with each of the route options in this section are considered in **Table 5.7.1**.

Table 5.7.1: Impacts of proposed options within the Swords North to Dublin Airport Corridor

Route	Potential Impacts
GE1, GE2, GE3,	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise.
PG1, PG2, PG3	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise. This section requires the construction of a new section of road on an existing green strip between Castlegrange Green and Broadmeadow Road to accommodate Swiftway only. The noise and vibration impacts associated with these works would be greater than the on-line works for the other route options on this section.

Route	Potential Impacts
SW14	This route is a fixed route option. There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise.
SW16, SW17	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise.
SW20, SW21	These routes are fixed route options. There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise.

5.7.2.2 Section 2: Dublin Airport to Royal Canal

Dublin Airport

The potential noise and vibration impacts associated with each of the route options in this section are considered in **Table 5.7.2**.

Table 5.7.2: Impacts of proposed options within the Dublin Airport Campus

Route	Potential Impacts
DA0, DA1, DA2, DA3, DA4, DA5, DA6, DA7	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise. It is noteworthy that most of the buildings within the airport campus are not considered to be sensitive receptors.

Dublin Airport to Royal Canal

The potential noise and vibration impacts associated with each of the route options in this section are considered in **Table 5.7.3**. Route options SY4 and F1 are fixed route options.

Table 5.7.3: Impacts of proposed options from Dublin Airport to Royal Canal

Route	Potential Impacts
SY4, SY1, SY2, F1	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise.

5.7.2.3 Section 3: Royal Canal to St. Stephens Green

The potential noise and vibration impacts associated with each of the route options in this section are considered in **Table 5.7.4**.

Table 5.7.4: Impacts of proposed options within the Royal Canal to St. Stephen's Green Corridor.

Route	Potential Impacts
N1, N2, N3, N4	<p>The extent of changes to traffic volumes associated with each route option is not available, at this stage of the assessment. It is possible that significant variations could occur due to the redistribution of traffic from one route to another. This has the potential to impact on the local noise environment.</p> <p>These traffic variations will be assessed in detail for the preferred route and proposed scheme design through modelling during the EIS preparation stage of the project.</p>
S1, S2, S3 S4	<p>The extent of changes to traffic volumes associated with each route option is not available, at present. It is possible that significant variations could occur due to the redistribution of traffic from one route to another. This has the potential to impact on the local noise environment.</p> <p>These traffic variations will be assessed in detail for the preferred route and proposed scheme design through modelling during the EIS preparation stage of the project.</p>

5.7.3 Ranking of Options

An assessment of the routes described in the preceding tables is presented in **Table 5.7.5 – Table 5.7.10** using the assessment ranking scale discussed in **Section 3.4**.

Table 5.7.5: Ranking of North-West Swords Route Options

Section	Route Option	Ranking
North-West Swords	GE1	
	GE2	
	GE3	
	PG1	
	PG2	
	PG3	
	SW14	

Table 5.7.6: Ranking of Swords Central Route Options

Section	Route Option	Ranking
Swords Central	SW16	
	SW17	
	SW20	
	SW21	

Table 5.7.7: Ranking of Dublin Airport Route Options

Section	Route Option	Ranking
Dublin Airport	DA0	
	DA1	
	DA2	
	DA3	
	DA4	
	DA5	
	DA6	
	DA7	

Table 5.7.8: Ranking of Dublin Airport to Royal Canal Route Options

Section	Route Option	Ranking
Dublin Airport to Royal Canal	SY4	
	SY1	
	SY2	
	F1	

Table 5.7.9: Ranking of North City Centre Route Options

Section	Route Option	Ranking
North City Centre	N1	
	N2	
	N3	
	N4	

Table 5.7.10: Ranking of South City Centre Route Options

Section	Route Option	Ranking
South City Centre	S1	
	S2	
	S3	
	S4	

5.7.4 Conclusion

In terms of noise and vibration, at this stage of assessment there are no major issues along any of the routes that have the potential to give rise to significant impacts. It is considered that potential impacts associated with construction works can be minimised through appropriate mitigation measures.

Following the completion of a traffic impact assessment of the preferred route (at EIS stage), the noise impacts due to the reassignment of traffic can be completed.

Since noise and vibration is not considered to be a significant differentiator for route option comparison purposes, a neutral ranking has been assigned to the majority of the route options.

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Appendix A

Figures

Appendix B

Ecological Site Evaluation and Significance

