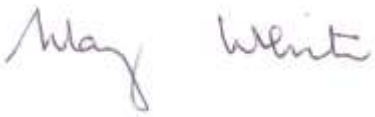
CLIENT:	Fingleton White & Co. Ltd.
PROJECT:	Aviation Fuel Pipeline
PROJECT NO.:	0362
TITLE:	Route Selection Report
DOCUMENT NO.:	0362-RG-0002

REVISION NO. 2	**PURPOSE: Planning Issue**		
Name	**Position**	**Signature**	**Date**
Ken Moore **Author**	**Project Engineer**		***27/02/2015***
Mary White **Checked**	**Project Engineer**		***27/02/2015***
M Lennon **Approved**	**Director**		***27/02/2015***

HISTORY OF ISSUES / APPROVALS

REV	DATE	DESCRIPTION OF CHANGES	FILE NUMBER

CONTENTS

List of Abbreviations

DCC	Dublin City Council
DAA	Dublin Airport Authority
DPC	Dublin Port Company
FCC	Fingal County Council
FW	Fingleton White
NHA	Natural Heritage Area
NRA	National Roads Authority
IPC	Independent Pipeline Company
SAC	Special Area of Conservation
TIN	Traffic Impact Number

1.0 EXECUTIVE SUMMARY

Independent Pipeline Company (IPC) intends to construct an underground 200mm (8") nominal diameter pipeline to transport Jet A1 fuel from Dublin Port to Dublin Airport.

In October 2001 IPC received planning permission for a 150mm (6") nominal diameter pipeline. Due to several factors in the intervening period, the project did not go ahead. The main issue was the 9/11 attack on New York and the consequent uncertainty relating to air travel which impacted on projections of fuel usage at Dublin Airport. This planning permission has now expired.

From 2004 there was a significant increase in fuel usage at Dublin Airport with projections now indicating a requirement for a 200mm (8") nominal diameter pipeline.

Prior to preparing a new planning application, Fingleton White on behalf of IPC carried out a complete review of the project, including route selection.

The route selection process considered six distinct suitable options between Dublin Port and Dublin Airport. This report outlines the steps followed to arrive at the preferred route corridor for the pipeline.

The selection criteria used in the route development process was based on the following:-

1. IS EN 14161 Petroleum and natural gas industries-Pipeline transportation systems, Annex D which includes the following criteria:

- Public Health and Safety
- Impact on Local Community
- Planning / Land Use issues/constraints
- Pipeline Construction and Operation
- Location of and Access to Block Valves
- Proximity to Occupied Buildings
- Impact on Wildlife / Habitats and Environmenta Designated Areas
- Impact on Archaeology / Cultural Heritage Site
- Visual Impact
- Cost & Programming

2. Desk top survey, including use of aerial photography and utility services records.

3. Visual appraisal.

4. Consultations with relevant stakeholders including:

- Dublin City Council
- Dublin Port Company
- Irish Rail
- Various Service Providers
- Fingal County Council
- Dublin Airport Authority
- NRA
- Landowners

5. The Dublin City Council Route Feasibility Study Report, commissioned by Dublin City Council, completed by RPS Group Ltd and issued in March 2009.

6. AMEC Safety and Environmental Impact Evaluations

Using a matrix the identified selection criteria were listed against identified corridor options, six in total including the previously approved route. The planning corridor includes the road, footpath and verges.

The proposed route of the pipeline within the planning corridor is based on a review of the information available in relation to known services and consultations with various utility providers. The final location will be determined by slit trenching prior to pipelaying.

Each route has both positive and negative attributes. From the initial assessment Options 3, 5 & 6 emerged as potential routes.

Option 1, the original Route, was eliminated due to services and traffic congestion at Luke Kelly Bridge and proposed works on the R132. Option 2 was eliminated due to potential traffic congestion and existing services congestion on the Swords Road and proposed works on the R132. Option 4 was eliminated due to construction through an SAC, which would not be acceptable when there are other alternatives, and engineering difficulties associated with the railway crossing at Collins Avenue East.

Further assessment of the remaining routes and ongoing stakeholder consultation identified significant constraints with Options 3 & 5. Option 3 was eliminated due to severe services congestion in a section of the Clonshaugh Road. Option 5 was eliminated because the route traversed parks and amenity areas. The necessity to maintain a permanent way leave through these areas might curtail future park and amenity development and impact on the amenity value of these areas.

Option 6 has the least number of potential constraints when evaluated against the other identified potential routes. It has the least impacts on local amenities and the receiving environment. This option emerged as the preferred option despite the increased length, cost and traffic management requirements.

The preferred route corridor Option 6, detailed below, is shown overleaf.

Dublin Port, Tolka Quay Road, East Wall Road, Tolka River crossing, Alfie Byrne Road, Clontarf Road, Howth Road, Copeland Avenue, Malahide Road (R107), Malahide Road (R139), Clonshaugh Road North, AUL/FAI Sports Grounds, M1 Crossing, DAA Long Term Car Park (Red), Eastlands Car Hire Compound, ALSAA Sports Complex, Swords Road, Corballis Road and Dublin Airport.

Preferred Route Corridor

2.0 INTRODUCTION

Independent Pipeline Company Limited (IPC) intends to construct an underground 200mm (8”) nominal diameter pipeline to transport Jet A1 fuel from Dublin Port to Dublin Airport.

In October 2001 IPC received planning permission for a150mm (6”) nominal diameter pipeline. Due to several factors in the intervening period, the project did not go ahead. The main factor was the 9/11 attack in New York and the consequent uncertainty relating to air travel which impacted on projections of fuel usage at Dublin Airport. This planning permission has now expired.

Since 2004 there has been a significant increase in fuel usage at Dublin Airport with projections now indicating a requirement for a 200mm (8”) nominal diameter pipeline.

Other changes that have taken place in the intervening period are:

- Increased underground services congestion in Dublin City
- Increased traffic congestion in Dublin City
- Relaxation of the restrictions imposed during construction of the Port Tunnel in relation to construction activities in the vicinity of the tunnel.

Prior to submitting a new planning application, Fingleton White conducted a complete review of the project including route selection. This report outlines the steps taken and decisions made in order to arrive at the preferred pipeline route corridor.

The planning corridor includes the road, footpath and verges. The proposed route of the pipeline within the planning corridor is based on a review of the information available in relation to known utility services and consultations with various utility providers. The final location will be determined by slit trenching prior to pipe laying.

3.0 ADVANCE BUILD

Dublin Port Tunnel

At the request of Dublin City Council a section of pipeline was installed in August 2005, during construction of the southern entrance to the Dublin Port Tunnel at the junction of the Tolka Quay Road and East Wall Road.

4.0 SPECIFICATION /STANDARDS

The design, selection, specification and use of materials, routing, land acquisition, construction, installation, testing, operation, maintenance and decommissioning of this proposed pipeline complies with IS EN 14161:2011 Petroleum and Natural Gas Industries - Pipeline Transportation Systems

5.0 ROUTE SELECTION

5.1. ROUTE SELECTION CRITERIA

Selection criteria were established based on a combination of statutory, technical, environmental, health and safety issues likely to be encountered during the installation and operation of the pipeline as per IS EN 14161.

These were used to identify potential route corridors and with further investigation, selection of a preferred route corridor.

Additional Considerations

RPS Route Feasibility Study Report

Reference was made to the Dublin City Council's Route Feasibility Study Report completed by RPS Group Ltd and issued in March 2009. This report assessed the feasibility of alternative routes for the proposed aviation fuel pipeline between Dublin Port and Dublin Airport.

The RPS report examined three routes,

Route A Dublin Port –Castle Avenue, Vernon Avenue, Sybil Hill Road, Brookwood Rise, Harmonstown Road, Edenmore, Stardust Memorial Park, Oscar Traynor Road, Clonshaugh Road, Dublin Airport.

Route B Dublin Port, Tolka Quay Road, East Wall Road, Fairview Park, Malahide Road, Griffith Avenue, Whitehall, Santry, Northwood, Dublin Airport

Route C Dublin Port, Bull Wall, Golf Links access road, Causeway Road, James Larkin Road, Kilbarrack Road, Grange Road, Belcamp Lane, Clonshaugh Road, Dublin Airport

Route B was recommended on the basis that "*Route B does not have environmental or private ownership constraints. The route has been substantially through the planning process. Despite the heavy traffic drawback Route B may well be the more deliverable route and within a satisfactory timeframe given the desirability of timely removal of tankers from the Port Tunnel".*

"The currently proposed fuel pipeline route, Route B, is considered to be technically feasible and achievable using conventional construction methods. It also avoids any environmentally sensitive area. However in in several areas there will be significant challenges in terms of traffic management".

Fingleton White included the RPS report in their review. Subsequent detailed examination of Route B in consultation with the local authorities, identified traffic volumes and services congestion, on the Swords Road as a major constraint and Route B was not brought forward for further consideration.

Safety and Environmental Impact Evaluations

AMEC Environmental and Infrastructure UK Ltd. carried out Safety and Environmental Impact Evaluations in 2004, 2007 and 2011 for various route options. The evaluations covered failure frequency and spill sizes. The risks associated with the transfer of the same volume of fuel using road tankers were presented for comparison. The risk of a leak from a tanker is over 90 times higher than that of a leak from the pipeline. Fingleton White included the AMEC reports in their review

Selected Criteria

Public Health and Safety

The provision of the fuel pipeline will have an overall positive impact on Public Health and Safety.
The main negative impact on public health and safety will be during the construction stage which will give rise to noise and dust. The duration of the construction works and consequent impact will depend on length of pipeline, traffic volumes, width of the road and the congestion of existing services.
During the operation of the pipeline the risk of a release of fuel and the consequent impact on Health and safety is extremely low.

Impact on Local Community

The impacts on the local community during the construction of the pipeline will include traffic disruption and interference with access to residences, businesses, schools, hospitals, parks/amenity.
There will be no impact on the local community during the operation of the pipeline.

Proximity to Occupied Buildings

Proximity of the pipeline to all occupied buildings was identified. Impacts from noise, dust, vibration, will increase with decreasing proximity

Planning / Land Use issues/constraints

Impacts on land use during the construction phase will be predominately short term and temporary.
During the operation phase there will be restrictions on development within the way leaves associated with the pipeline.

Impact on Wildlife / Habitats and Environmentally Designated Areas

Watercourses and construction through environmentally designated areas were identified.

Impact on Archaeology / Cultural Heritage

Protected Structures were identified.

Visual Impact

The visual impact during construction will be of a temporary nature.
When the pipeline is operating the visual impact of the pipeline inlet station in Dublin Port and the reception station in Dublin Airport will be minimal. The main visual impact related to the pipeline will be the 2 no. above ground control cabinets for the emergency shutdown valves.

Pipeline Construction and Operation
Ease of construction and access to the pipeline for operation purposes were evaluated. Special Engineering Difficulties (SEDs) were identified

Cost & Programming
The cost and programming of the works is related to the length of the pipeline and the SEDs.

5.2. ROUTE CORRIDOR SELECTION

Since planning permission for the original route was granted in October 2001, several factors have required the consideration of alternative options. This assessment involved a desk top survey, the examination of utility records and aerial photography and visual appraisal. This consideration of alternative routes includes the original route, from Dublin Port to Dublin Airport. As both the pipeline inlet station and reception stations locations are fixed there will be pipeline requirements common to all route corridors.

The routes reviewed / selected were as follows:

Option 1
Dublin Port**,** Tolka Quay Road, East Wall Road, Poplar Row, Luke Kelly Bridge, Richmond Road, Grace Park Road, Griffith Avenue, Swords Road, Corballis Road and Dublin Airport.
Reference Section 5.3

Option 2
Dublin Port, Tolka Quay Road, East Wall Road to junction with Faith Avenue, Tolka River Crossing, Fairview Park, Malahide Road (R107), Griffith Avenue, Swords Road, Corballis Road and Dublin Airport.
Reference Section 5.4

Option 3
Dublin Port, Tolka Quay Road, East Wall Road to junction with Faith Avenue, Tolka River crossing, Fairview Park, Malahide Road (R107), Kilmore Road, Oscar Traynor Road, Clonshaugh Road (South), Malahide Road (R139), Clonshaugh Road (North), AUL/FAI Sports Grounds, DAA Long Term Car Park (Red), ALSAA Sports Complex, Corballis Road and Dublin Airport.
Reference Section 5.5

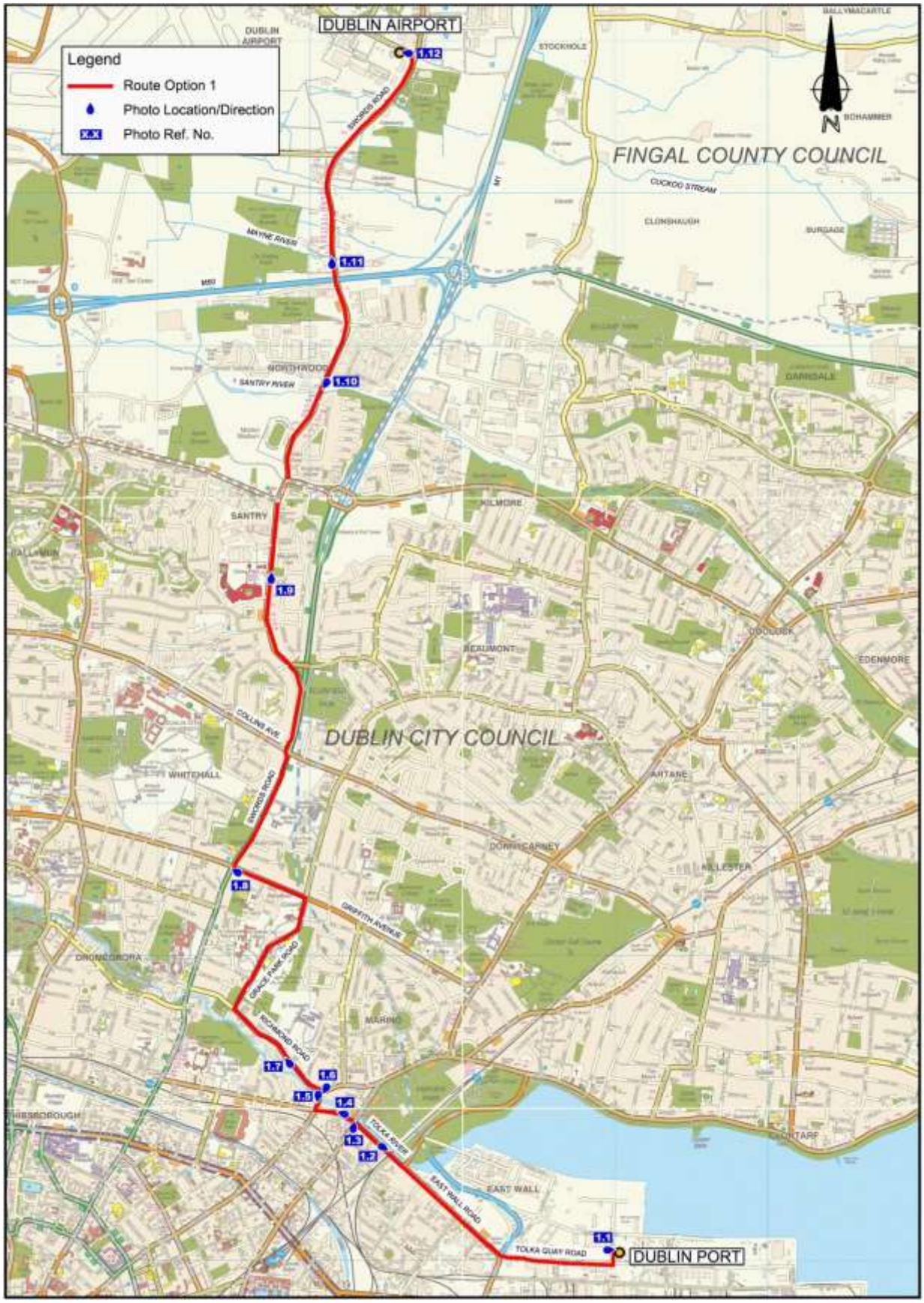
Option 4
Dublin Port, Bond Drive, Promenade Road, Tolka Estuary Crossing, Clontarf Road, Castle Avenue, Howth Road, Collins Avenue East, Clanree Road, Malahide Road (R107) Kilmore Road, Oscar Traynor Grounds, M1 Crossing, DAA Long Term Car Park (Red), ALSAA Sports Complex, Corballis Road and Dublin Airport.
Reference Section 5.6

Option 5
Dublin Port, Tolka Quay Road, East Wall Road to junction with John McCormack Bridge, Tolka River crossing, Alfie Byrne Road, Clontarf Road, St Anne's Park, Howth Road, Raheny Church car park, St. Malachy's Park, Lough Derg Road, Springdale Road, St Malachy's Park, Malahide Road (R107), Darndale, Moatview, Belcamp Park, Malahide Road (R139), Clonshaugh Road (North), AUL/FAI Sports Grounds, M1 Crossing, DAA Long Term Car Park (Red), ALSAA Sports Complex, Corballis Road and Dublin Airport.
Reference 5.7

Option 6
Dublin Port, Tolka Quay Road, East Wall Road to junction with John McCormack Bridge, Tolka River crossing, Alfie Byrne Road, Clontarf Road, Howth Road, Copeland Avenue, Malahide Road (R107), Malahide Road (R139), Clonshaugh Road North, AUL/FAI Sports Grounds, M1 Crossing, DAA Long Term Car Park (Red), Eastlands Car Hire Compound, ALSAA Complex, Swords Road, Corballis Road and Dublin Airport.
Reference 5.8

The following section provides detail of each of the alternative routes considered.

5.3. OPTION 1 (10.8KM)



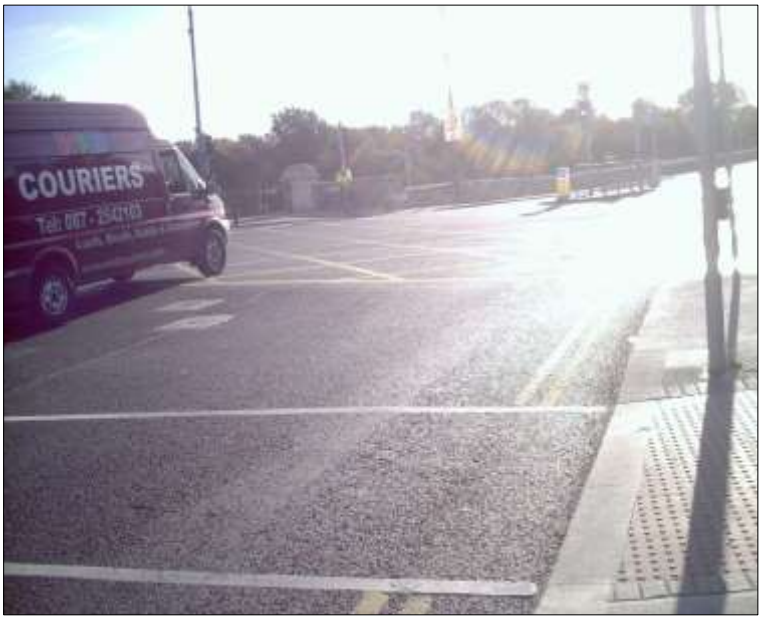
Option 1 starts at the Pipeline inlet station in Bond Drive and continues:

Along Tolka Quay Road, utilising the advance build section completed in August 2005 in co-ordination with the Dublin Port Tunnel project, East Wall Road, crossing under a CIE restricted railway bridge No.120/UBB3. This section has a Traffic Impact Number (TIN) of 4.

Pipeline inlet station Site, Bond Drive – Map Ref: 1.1

CIE Bridge East Wall Road – Map Ref: 1.2

Across the intersection with North Strand / Annesley Bridge Road (TIN 4) to Poplar Row (TIN 3). This major road crossing will require extensive traffic management.



Crossing from East Wall Road into Poplar Row – Map Ref: 1.3

Poplar Row towards Luke Kelly Bridge – Map Ref: 1.4

Onto the Luke Kelly Bridge crossing the Tolka River to Richmond Road (TIN 4).
This crossing will be extremely difficult to complete due to lack of suitable space,

- Within the bridge structure to accommodate the pipeline
- For Launch / Reception pits to complete a trenchless crossing under the Tolka River

Luke Kelly Bridge – Map Ref: 1.5

Luke Kelly Bridge Junction with Richmond Road – Map Ref: 1.6

The route continues west along Richmond Road, a re-development area, to Grace Park Road (TIN 4) and then north to the intersection with Griffith Avenue (TIN 3).
This intersection will require:

- Extensive traffic management
- Agreement from the NRA for crossing the Dublin Port Tunnel

Richmond Road towards Grace Park Avenue – Map Ref: 1.7

West along Griffith Avenue to the intersection with Swords Road (TIN 4), where again extensive traffic management will be required.

Griffith Avenue junction with Swords Road – Map Ref: 1.8

North along the Swords Road to the Airport Storage facility on Corballis Road.

The route along the Swords Road is mainly residential to the Santry and Northwood areas and commercial / industrial to the airport and presents numerous difficulties:

- Traffic Congestion
- 3 x River Crossings – Santry, Mayne and Cuckoo
- R132 Upgrade

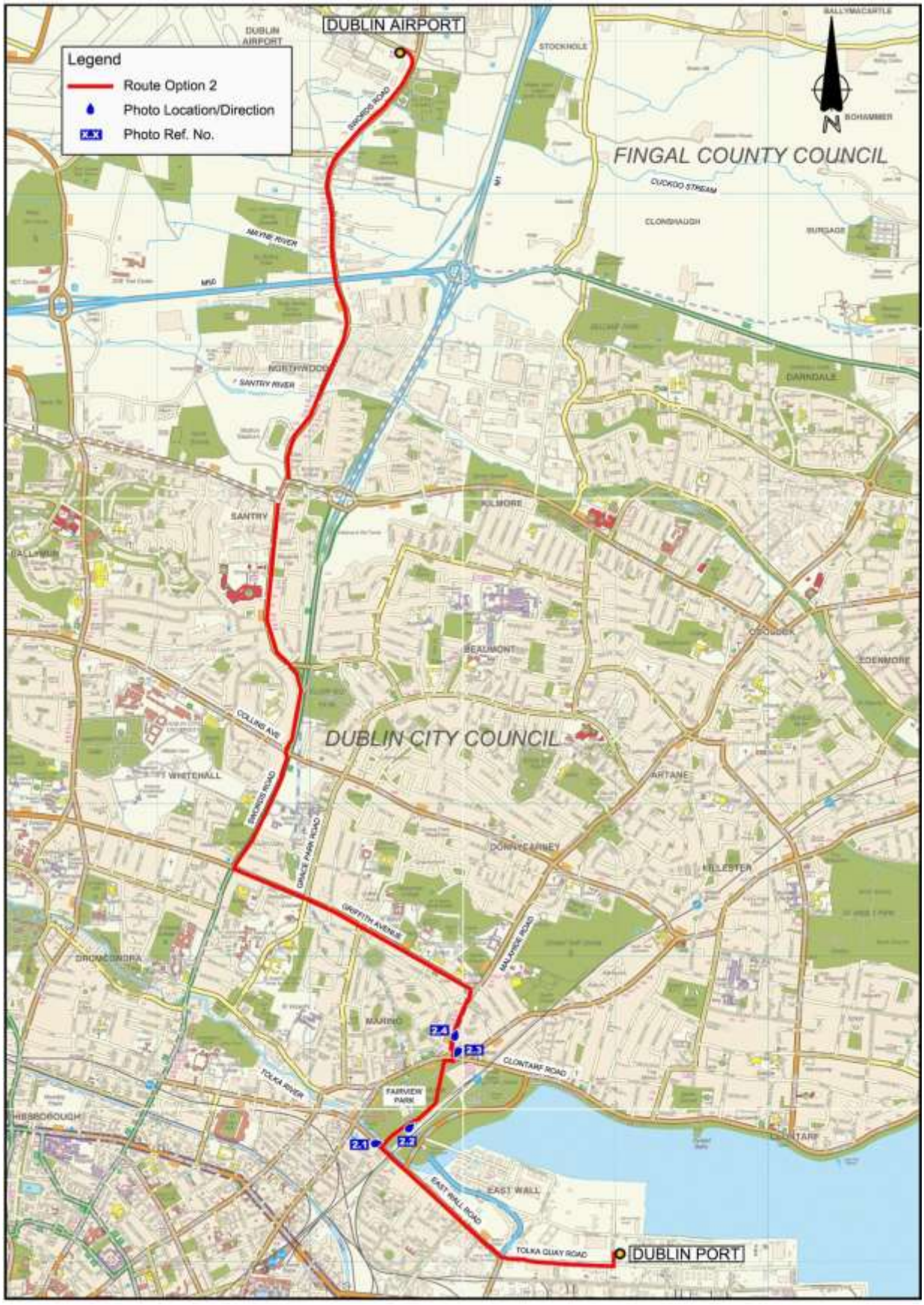
Swords Road Junction with Omni-Park Shopping Centre – Map Ref: 1.9

Swords Road at Santry River Crossing – Map Ref: 1.10

Swords Road at Mayne River Crossing – Map Ref: 1.11

DAA Fuel Storage Facility - Map Ref: 1:12

5.4. ROUTE OPTION 2 (11.1KM)



Route Option 2 shares a common route with Option 1 to East Wall Road at the junction with Faith Avenue and continues as follows;

Crossing under the Tolka River and into Fairview Park, using trenchless technology.

Tolka River Crossing, East Wall Road to Fairview Park - Map Ref: 2.1

Within Fairview Park, the route follows a line agreed with the Parks and Landscape Division of Dublin City Council, crossing above the Dublin Port Tunnel, which will require an agreement from the NRA, to a point opposite the Malahide Road intersection with the Clontarf Road.

Fairview Park adjacent to Soccer Pitch – Map Ref: 2.2

Across the Clontarf Road (TIN 4). This will require extensive traffic management.

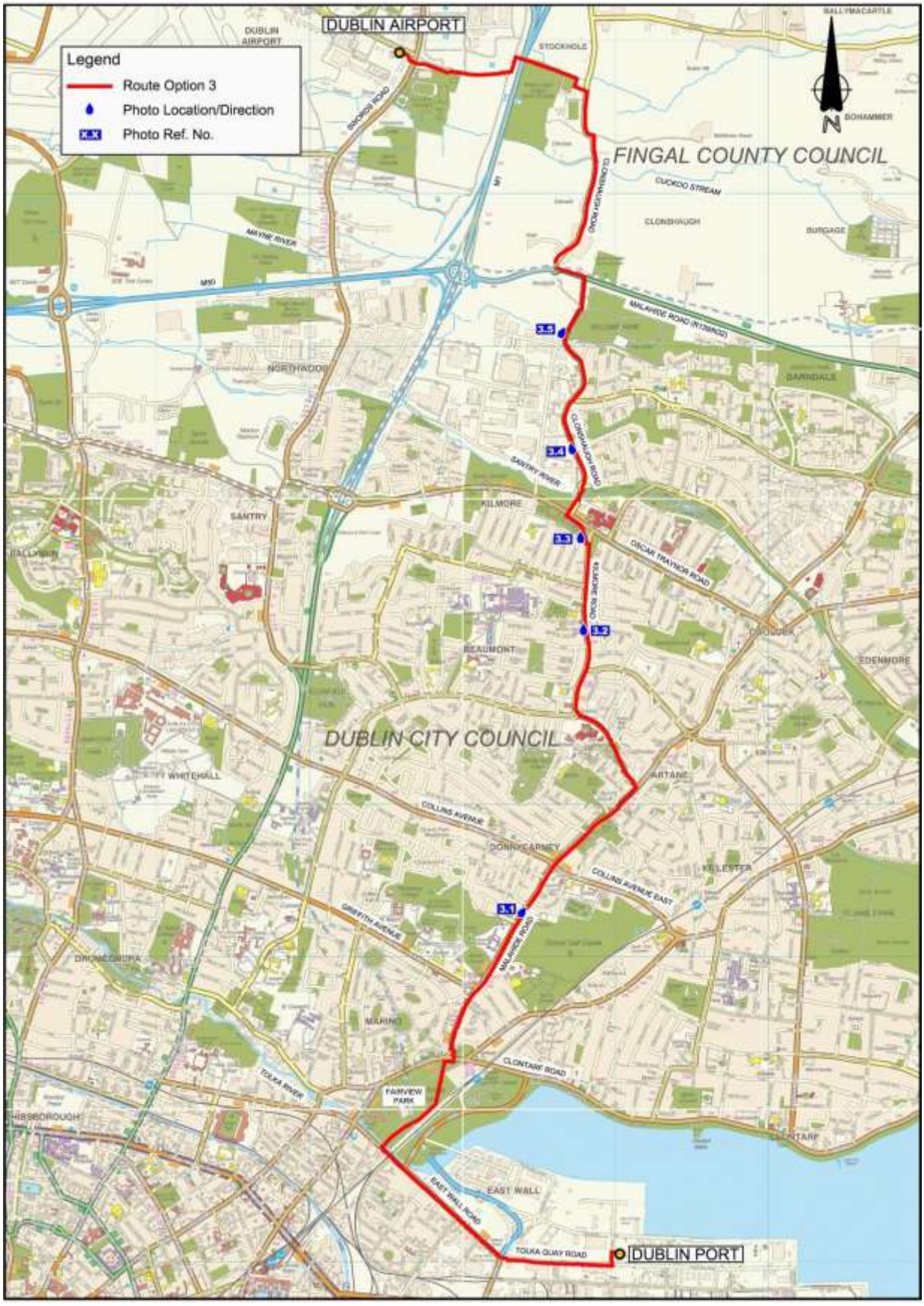
Malahide Road to Fairview Park crossing Clontarf Road – Map Ref: 2.3

North along the Malahide Road (TIN 5) to the junction with Griffith Avenue.

Malahide Road towards Clontarf Road – Map Ref: 2.4

West along Griffith Avenue (TIN 3), to the junction with Grace Park Road where it joins a common route with the original route, (via Swords Road), to Dublin Airport.

5.5. ROUTE OPTION 3 (11.8KM)



Route Option 3 shares a common route with Option 1 to the Malahide Road junction with Griffith Avenue and continues as follows;

North along the Malahide Road to the junction with Kilmore Road. This section of the Malahide Road has a Traffic Impact Number (TIN) of 5 and whilst it is a busy road it would be feasible to install the pipeline within the incoming bus lane with the agreement from both Dublin City Council and Dublin Bus Company for a relaxation of the current working hour restrictions.

Malahide Road – Griffith Avenue to Kilmore Road Section– Map Ref: 3.1

North West along the Kilmore Road to the junction with the Artane Shopping Centre. This section has a TIN of 3, mostly commercial and again construction would be feasible.
North along the Kilmore Road (TIN3) to the junction with the Oscar Traynor Road. This section is mostly residential and again construction would be feasible.

Kilmore Road North to Oscar Traynor Road – Map Ref: 3.2

West along the Oscar Traynor Road to the junction with the Clonshaugh Road South (TIN 3) running parallel to the Northside Shopping Centre.

In order to avoid the pedestrian underpass under the Oscar Traynor Road to the Northside Shopping Centre, it is proposed to cross the grass area between the Kilmore Road and the Clonshaugh Road. This would also have the benefit of reducing the extensive traffic management requirement within this busy area.

Across Grass Area, Kilmore Road to Clonshaugh Road –Map Ref: 3.3

North along the Clonshaugh Road (TIN3) to the junction with the Malahide Road (R139). There would appear to be very little suitable space available for the pipeline within this section. The services include 3 no water mains, both AC and PVC, 2 no PE natural gas mains, surface water and wastewater pipelines, electricity and telecoms serving the adjacent Grattan Business Park.

At this point the route joins a common route with Option 5 to the airport via the Twin Roundabouts, Clonshaugh Road (North), AUL/FAI Sports Ground, M1 Crossing, DAA Long Term Car Park (Red), ALSAA Sports Complex, Corballis Road to Dublin Airport.

Clonshaugh Rd towards R132– Map Ref: 3.4

Clonshaugh Rd adjacent to Belcamp Park: Map Ref:

3.5*Route Option 4 (11.0km)*

Route Option 4 starts at the pipeline inlet station in Bond Drive and continues as follows;

North along Bond Drive, across Promenade Road, North and then East along Bond Road Extension to the Dublin Port storage site.
Through storage site to edge of the Tolka Estuary.

DPC Storage Site adjacent to Tolka Estuary – Drawing Ref: 4.1

Crossing under the Tolka Estuary to a point opposite Castle Avenue at the junction with the Clontarf Road. This crossing is within a designated Special Area of Conservation (SAC) and Proposed Natural Heritage Area (pNHA) – site code 000206 and as such would raise very serious concerns about the viability of this option.

Tolka Estuary towards Dublin Port – Drawing Ref: 4.2

North along Castle Avenue (TIN 3) to the Junction with Howth Road. This is within a residential area and would be feasible for construction.
South West along Howth Road (TIN 3) to the junction with Collins Avenue East. Again this is within a residential area and would be feasible for construction.
West along Collins Avenue East to the junction with Clanree Road. This area is a mix of retail and residential and with the exception of the CIE railway bridge crossing, construction would be feasible.

Collins Road East, CIE Bridge over Railway – Drawing Ref: 4.3

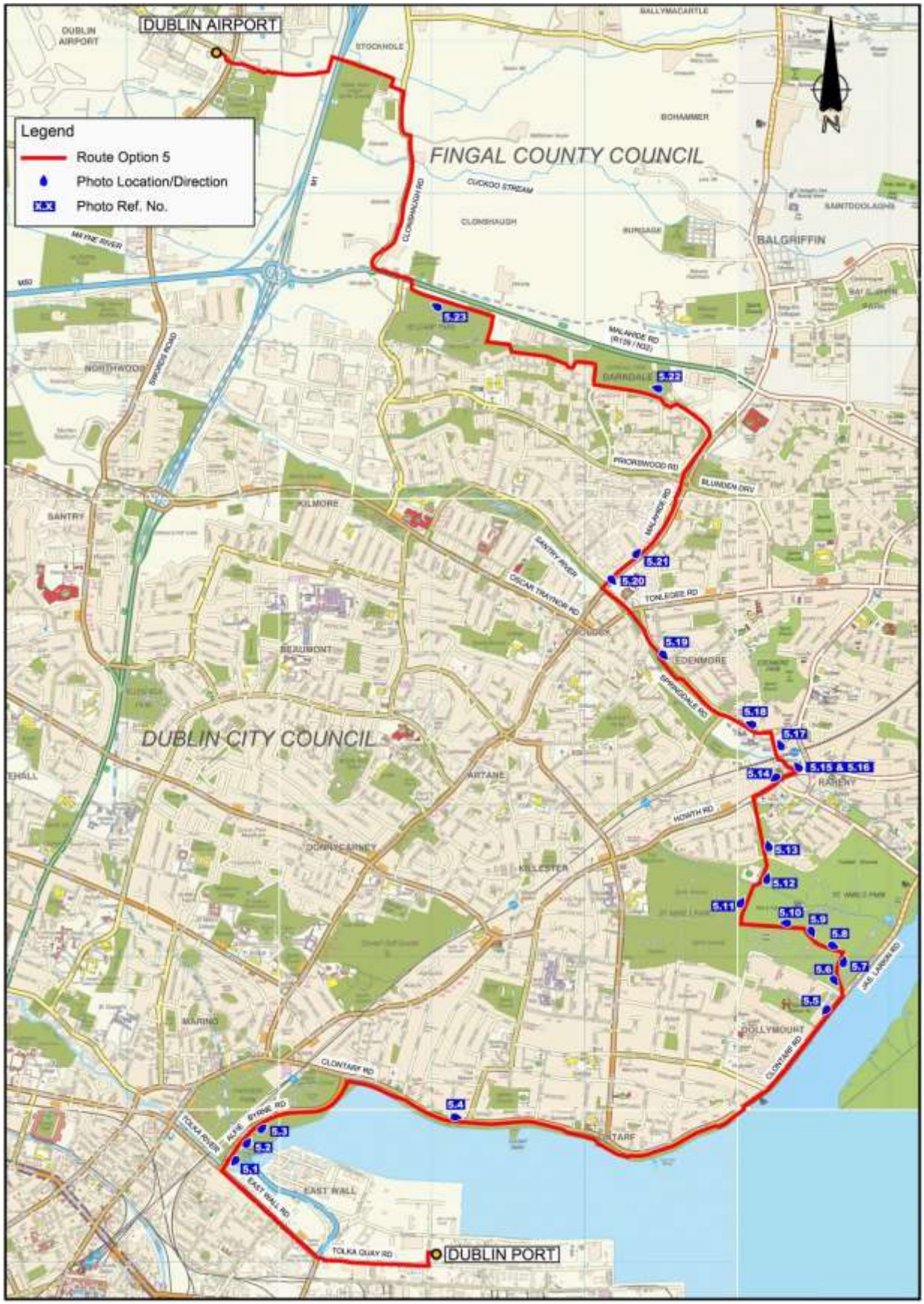
North along Clanree Road (TIN 1) to the playing fields. Clanree Road is a narrow road, approximately 6 metres wide, but with careful traffic management construction would be difficult but feasible.

Clanree Road towards Playing Fields – Drawing Ref: 4.4

North within the playing field area and onto the Malahide Road at the junction with Killester Avenue where it joins Options 2 and Option 5 on a common route to Dublin Airport.
This section, although feasible, would require permission from DCC Parks and Landscapes Division.

Playing Fields adjacent to Clanree Road and Malahide Road – Drawing Ref: 4.5

5.6. ROUTE OPTION 5 (17.5KM)



Route Option 5 shares a common route with Option 2 to East Wall Road at the junction with the John Mc Cormack Bridge and continues as follows;

Crossing under the Tolka River and onto the eastern side of Alfie Byrne Road using trenchless technology.

Tolka River Crossing - East Wall Road to Alfie Byrne Road – Map Ref: 5.1

Along the Alfie Byrne Road crossing the Dublin Port Tunnel, across the entrance road to East Point and into the Fairview Park playing fields area.

Eastern side of Alfie Byrne Road towards East Point – Map Ref: 5.2

Following a line to be agreed with DCC Parks and Landscape Division onto the Clontarf Road.

Grass strip adjacent to Alfie Byrne Road and Playing Fields – Map Ref: 5.3

East along the grass strip adjacent to Clontarf Road (TIN 4) to the junction with Bull Island and along carriageway to St Anne's Park adjacent to Mount Prospect Avenue.

Clontarf Road towards St Anne's Park – Map Ref: 5.4

Clontarf Road towards Dublin – Map Ref: 5.5

Across St Anne's Park along a line to be agreed with the DCC Parks and Landscape Division to a point on the Howth Road (TIN 3) adjacent to Wade's Avenue.

St Anne's Park towards Clontarf Road - Map Ref: 5.6

St Anne's Park Adjacent to Red Stables – Map Ref: 5.7

Anne's Park adjacent to Play Park – Map Ref: 5.8

St Anne's Park towards Picnic Area – Map Ref: 5.9

St Anne's Park towards Sybil Hill Road – Map Ref: 5.10

St Anne's Park adjacent to Sports Grounds near Tennis Club – Map Ref: 5.11

St Anne's Park towards Tennis Club – Map Ref: 5.12

St Anne's Park adjacent to Wade's Ave – Map Ref: 5.13

Along Howth Road, crossing the Santry River adjacent to the entrance to Raheny Church car park.

Howth Road – going out of Raheny Village towards St Anne's Park - Map Ref: 5.14

Through the Church car park to the proposed crossing point for the Dublin – Belfast and Dart railway line, this will require a private wayleave from the Church authorities.
Crossing under the railway line and into St Malachy's Park using directional drilling technology. An agreement with CIE will be required for this crossing.

Railway line at Raheny from Church Car Park – Map Ref: 5.15

Railway line at Raheny from Church Car Park (2) – Map Ref: 5.16

Across St. Malachy's Park on a line to be agreed with DCC Parks and Landscape Division to Lough Derg Road and onto Springdale Road (TIN 2).

St Malachy's Park towards Springdale Road from Rail Crossing – Map Ref: 5.17

Along Springdale Road crossing Harmonstown Road and into the adjacent section of St. Malachy's Park.

Springdale Road towards Harmonstown Road – Map Ref: 5.18

Across St Malachy's Park on a line agreed with DCC Parks and Landscapes Division running adjacent to Springdale Road (TIN 2) and onto the Malahide Road.

St Malachy's Park adjacent to Springdale Road – Map Ref: 5.19

Crossing Malahide Road St Malachy's Park to Greencastle Road – Map Ref: 5.20

North West along the Malahide Road (R107 - TIN 5) across the junction with Priorswood Road and into the adjacent grass verge to Belcamp Lane.

Malahide Road towards Priorswood Road - Map Ref: 5.21

West along the grass verge adjacent to Belcamp Lane, continuing into Darndale, and across Belcamp Park to the proposed Malahide Road (R139) crossing point on a line to be agreed with DCC Parks and Landscape Division.

Darndale towards Belcamp Park

Map Ref: 5.22

Belcamp Park towards Clonshaugh Road

Map Ref: 5.23

Across the Malahide Road (139) using trenchless technology. This will avoid traffic disruption on the R139 and damage to the cluster of trees inside Belcamp Park adjacent to the main road.
At this point the route joins Option 2 and Option 5, common routes to Dublin Airport.

5.7. ROUTE OPTION 6 (14.4K)

Option 6 shares a common route with Option 5 from the pipeline inlet station in Bond Drive to East Wall Road adjacent to the John McCormack Bridge and continues as follows;

Crossing under the Tolka River onto the eastern side of Alfie Byrne Road using trenchless technology.

Tolka River Crossing towards Alfie Byrne Road – Map Ref: 6.1

Crossing over to the western side of the Alfie Byrne Road (TIN 3), north along the carriageway, crossing over the Dublin Port Tunnel which requires an agreement from the NRA and onto the Clontarf Road.

Alfie Byrne Road – Map Ref: 6.2
(From Bridge towards Clontarf Road)

Alfie Byrne Road – Map Ref: 6.3
(Between Eastpoint and Clontarf Road)

Along the Clontarf Road carriageway, under the CIE railway bridge to the junction with Howth Road. The Clontarf Road has a TIN of 4 and will require extensive traffic management to ensure minimum disruption to traffic flows into Dublin City centre.

Clontarf Road – Map Ref: 6.4
(From Alfie Byrne Road towards Howth Road)

Clontarf Road – Map Ref: 6.5
(CIE Bridge No.UBB5)

Across the Clontarf Road to the Howth Road with the works being completed at off-peak times to minimise traffic disruption.

Howth Road / Clontarf Road Junction – Map Ref: 6.6

North along the western side Howth Road (TIN 3) to Copeland Avenue, a very busy commuter route requiring careful Traffic Management to minimise traffic disruption.

Howth Road towards Copeland Avenue – Map Ref: 6.7

West along Copeland Avenue (TIN 3) to the junction with the Malahide Road. Copeland Avenue is in a residential area with a 9 metre wide carriageway.

Copeland Avenue towards Malahide Road – Map Ref: 6.8

North along the eastern side of Malahide Road (R107-TIN 5) and passing across busy intersections with Collins Avenue East / West, Kilmore Road, Brookwood Avenue / Ardlea Road, Oscar Traynor Road / Tonlegree Road, before crossing under the Santry River on the city side of Greencastle Road. This river crossing would be completed using trenchless technology with the launch and reception pits being set up on the green areas on each side of the river.

Malahide Road – Map Ref: 6.9
(Copeland Ave towards Kilmore)

Malahide Road – Map Ref: 6.10
(Artane towards Greencastle)

Santry River Crossing - Map Ref: 6.11
(Malahide Road adjacent to Greencastle Road)

Santry River Crossing – Map Ref: 6.12
(Green Areas for Launch and Reception Pits)

The route continues along the eastern side of the Malahide Road (R107) to a point north of the Priorswood Roundabout, crossing over to the west side and onto the junction with the Malahide Road (R139) adjacent to the Hilton Hotel.

Extensive management will be required at both the Priorswood and R139 junctions to maintain traffic flows.

Malahide Road – Priorswood towards Greencastle Road – Map Ref: 6.13

West along the southern side of Malahide Road (R139) to the Darndale entrance, across to the northern side and onto the twin roundabouts at the junction with Bewleys Airport Hotel and Clonshaugh Road North.
This section has a TIN of 5 and will require extensive traffic management to maintain access to and from the M1 and M50.

Malahide Road (R139) towards Twin Roundabouts- Map Ref: 6.14

The route crosses under the Mayne River using trenchless technology and continues North along the Clonshaugh Road, crossing under the Cuckoo Stream again using trenchless technology and onto the intersection with the Athletic Union's sporting complex's north boundary line. This section is within Fingal County Council, in a rural location leading to Portmarnock and Swords and should be feasible for construction. Consultations with the Greater Dublin Drainage Project Team, DCC and FCC Roads Planning will be required to co-ordinate the various major activities planned for the Malahide and Clonshaugh areas.

Malahide Road (R139) – Map Ref: 6.15
(Mayne River Crossing at Twin Roundabouts)

Clonshaugh Road – Map Ref: 6.16
(Cuckoo Stream Crossing)

West along the boundary fence line of the Athletic Union's Sports ground to the boundary fence line with the M1. This section requires a private wayleave from the AUL/FAI

AUL / FAI Sports Grounds towards M1 Map Ref: 6.17

Cross under the M1 into the DAA Red Long Term Car Park using trenchless technology. The NRA has agreed in principle to this crossing.

M1 Crossing Map Ref: 6.18

Along the east, south and west boundaries of Eastlands Car Hire Compound, through the land adjacent to the ALSAA sports facility to the junction with the Swords Road (R132).

Junction of Eastlands and exit road from DAA Long Term Car Park – Map Ref: 6.19

ALSAA Grounds adjacent to Corballis Road – Map Ref: 6.20

Across the Swords Road at the junction with the Corballis airport entrance.

Swords Road Crossing at Corballis Airport Entrance – Map Ref: 6.21

Along the Corballis Road to the storage facilities at the DAA reception station.

DAA Fuel Storage Facility - Map Ref: 6.22

5.8. ALL ROUTES

In addition, there is a requirement to install a 200mm fuel pipeline from the suppliers' fuel depot in the port to the main pipeline inlet station in Bond Drive which is within the Dublin Port Company's fuel storage area. This pipe will be installed on existing above ground racks.

6.0 ROUTE CORRIDOR EVALUATION

The selection criteria for each route option were entered into a matrix. The characteristics of each corridor in respect of the route selection criteria were evaluated. A colour coding system was used to assist in the evaluation.

Dark Green	Strongly Positive
Light Green	Slightly Positive
No Colour	Neutral
Orange	Slightly Negative
Red	Strongly Negative

The matrix facilitated a comparative evaluation of potential corridors and the previously approved route in terms of the selection criteria. All potential route corridors have both positive and negative outcomes. Initial evaluation identified Options 3, 5 and 6 as having the least number of constraints.

Option 1 was eliminated due to the traffic management difficulties at Luke Kelly Bridge.
Option 2 was eliminated from further consideration due to services congestion in a heavily trafficked road. This would extend the construction period and could result in road closures. In addition the R132 upgrade was in the planning stage and subsequent works along this section were unacceptable to Fingal County Council

Further assessment and ongoing discussions with stakeholders identified significant constraints with Options 3 and 5. The Option 3 constraints related to severe underground services congestion along a narrow section of the Clonshaugh Road. The services include 3 x water mains, both AC and PVC, 2 x PE natural gas mains, surface water and wastewater pipelines, electricity and telecoms serving the adjacent Grattan Business Park. Option 5 was eliminated because the route traversed parks and amenity areas. The necessity to maintain a permanent way leave through these areas might curtail future park and amenity development and impact on the amenity value of these areas.

A summary of the assessment of each potential route is outlined hereunder:

Option 1

- Planning permission granted in 2001 for 150mm nominal diameter (6") pipeline
- Shortest of the six options at 10.8km.
- Extensive Services Congestion
- Extensive Traffic Congestion
- Special Engineering Difficulties
    - CIE Railway Bridge - East Wall Road (Under)
    - Luke Kelly Bridge over Tolka river – lack of suitable space for
        - Installation of pipeline within bridge structure
        - Launch / Reception sites for crossing under the Tolka River adjacent to the bridge using trenchless technology
    - Dublin Port Tunnel Crossing on Griffith Avenue
    - M50 Road Bridge – Swords Road (Under)
    - Santry River crossing on Swords Road
    - Mayne River crossing on Swords Road
    - Cuckoo Stream crossing on Swords Road

Option 2

- Route Length – 11.1km
- Extensive Services and Traffic Congestion along Swords Road

- Special Engineering Difficulties
  - CIE Railway Bridge - East Wall Road (Under)
  - Tolka River crossing adjacent to Fairview Park Footbridge
  - Dublin Port Tunnel Crossing within Fairview Park
  - Dublin Port Tunnel Crossing on Griffith Avenue
  - M50 Road Bridge – Swords Road (Under)
  - Santry River crossing on Swords Road
  - Mayne River crossing on Swords Road
  - Cuckoo Stream crossing on Swords Road

Option 3

- Route Length – 11.8km
- Extensive Services congestion – Clonshaugh Road (N)
- Direct impact on Public Parks
- Special Engineering Difficulties
  - CIE Railway Bridge – East Wall Road (Under)
  - Tolka River crossing adjacent to Fairview Park footway bridge
  - Dublin Port Tunnel Crossing within Fairview Park
  - Santry River crossing Clonshaugh Road (S)
  - Mayne River Crossing adjacent to the twin roundabouts and Clonshaugh Road (N)
  - Cuckoo Stream Crossing on Clonshaugh Road (N)
  - M1 Crossing
  - Swords Road (R132) crossing at the Airport

Option 4

- Route Length – 11.0km
- Direct Impact on cSAC of South Dublin Bay and River Tolka Estuary
- Direct impact on Public Parks
- Special Engineering Difficulties
  - Tolka Estuary crossing
  - CIE railway crossing on Collins Avenue East – Lack of suitable safe space for Launch and Reception Pits
  - Santry River crossing Clonshaugh Road (S)
  - Mayne River Crossing adjacent to the twin roundabouts and Clonshaugh Road (N)
  - Cuckoo Stream Crossing on Clonshaugh Road (N)
  - M1 Crossing
  - Swords Road (R132) crossing at Airport

Option 5

- Route Length – 17.5km
- Direct impact on public parks and amenity areas
- Special Engineering Difficulties
  - Tolka River crossing adjacent to John McCormack Bridge
  - Dublin Port Tunnel crossing Alfie Byrne Road
  - Santry River crossing Howth Road, Raheny
  - Malahide Road (R139) crossing adjacent to Clonshaugh Road (S)
  - Mayne River Crossing adjacent to the twin roundabouts and Clonshaugh Road (N)
  - Cuckoo Stream Crossing on Clonshaugh Road (North)
  - M1 Crossing
  - Swords Road (R132) crossing at Airport

Option 6

- Route length – 14.4km
- Special Engineering Difficulties
  - Tolka River crossing adjacent to John McCormack Bridge
  - Dublin Port Tunnel Crossing - Alfie Byrne Road
  - CIE Railway Bridge (UBB5) - Clontarf Road (Under)
  - Santry River crossing Malahide Road adjacent to Greencastle Road
  - Mayne River Crossing adjacent to the twin roundabouts and Clonshaugh Road (N)
  - Cuckoo Stream Crossing on Clonshaugh Road (North)
  - M1 Crossing
  - Swords Road (R132) crossing at Airport

7.0 RECOMMENDATIONS

The comparative analysis of all potential routes using the listed criteria is tabulated in Appendix A – Route Selection Matrix and summarised below:-

Option 1	Eliminated	Unacceptable engineering and traffic management difficulties in crossing the Tolka River at Luke Kelly Bridge.
Option 2	Eliminated	Unacceptable traffic and underground services congestion along Swords Road.
Option 3	Eliminated	High level of services congestion along the recently reconstructed Clonshaugh Road. Traversing Parks would impact on amenity of users.
Option 4	Eliminated	Unacceptable Environmental and Engineering issues in crossing the Tolka Estuary within a designated SAC. Depth required at both sides of the Irish Rail railway crossing at Collins Avenue would result in unacceptable levels of traffic impact.
Option 5	Eliminated	Maintenance of permanent way leaves in parks and amenity areas could impact on the future development and amenity value of these areas.
Option 6	Recommended	Over 75% of the pipeline will be in laid in roads with 3 lanes or more. This will lessen the construction impact on the human environment and will allow for effective traffic management during construction. No impact on public amenity areas. No direct impact on designated sites.No Natura 2000 sites within the planning corridor. 1 no RMP, Record of Monument and Places within the planning corridor.

Option 6 is the Preferred Route Corridor.

In order to confirm the precise location of the pipeline within the planning corridor slit trenching will be carried out prior to pipelaying.

8.0 DRAWINGS

Strip Maps detailing the proposed route corridor are shown on Drawing Numbers 0362/D/02/G/0003-0044

Preferred Route Corridor

APPENDIX A

Route Selection Matrix

Key to Colour Code		Strongly Positive	Slightly Positive	Neutral	Slightly Negative	Strongly Negative	

No	Criteria	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
1	**Public Health and Safety**						
	Traffic Impact	**km**	**km**	**km**	**km**	**km**	**km**
	Private	0	0	0.5	0.5	0.6	0.5
	Parks - Amenity	0	0.8	1.2	0.4	7.5	0
	TIN 3	0.8	1.8	5.2	8.5	4.2	4.9
	TIN 4	10.0	8.0	2.7	1.2	1.7	1.2
	TIN 5	0	0.5	2.2	0.4	3.5	7.8
	Route Length (km)	10.8	11.1	11.8	11.0	17.5	14.4
	Existing Services	High congestion	High congestion	High Congestion	High Congestion	Moderate congestion	Moderate congestion
	Proposed Developments	R132 Upgrade	R132 Upgrade	R132 Upgrade	R132 Upgrade	R132 Upgrade	R132 Upgrade
	Width of Road	**km**	**km**	**km**	**km**	**km**	**km**
	2 Lanes or Less	4.2	2.1	6	7.0	2.4	1.3
	3 Lanes	2.2	2.6	1.5	1.5	1.3	2.3
	4 Lanes or more	4.5	5.6	2.2	0.4	1.4	8.2
2	**Impact on Local Community:**	**km**	**km**	**km**	**km**	**km**	**km**
	Residential	5.5	5.0	8.0	7.0	3.0	8.0
	Commercial	1.0	1.0	1.0	1.0	0.6	2
	Parks - Amenity	0.0	0.8	1.2	1.0	7.5	0.0
	Industrial	2.0	2.0	2.0	1.0	0.8	1.0
	Schools / Hospitals etc.	8 No	12 No	9 No	8 No	10 No	13 No
3	**Proximity to Occupied Buildings:**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**
	< 5m	0	8	16	8	0	11
	5 - 10m	88	18	32	42	18	17
	11 - 15m	125	89	113	139	119	135
4	**Planning / Land Use:**	**km**	**km**	**km**	**km**	**km**	**km**
	Private Wayleaves	0	0	1 No	1 No	2 No	1 No
	Parks - Amenity	0	0.8	1.5	0.4	7.5	0.0
5	**Wildlife / Habitats and Environmentally Designated Areas:**						
	Crossing watercourses	7 No	7 No	7 No	6 No	7 No	7 No
	Construction through NHA, SPA.	0	0	0	1 No	0	0
	Archaeology / Cultural Heritage:						
6	Protected Structures	11 No	4 No	12 No	28 No	30 No	14 No
7	**Visual Impact:**	2no above ground control cabinets for emergency shutdown valves	2no above ground control cabinets for emergency shutdown valves	2no above ground control cabinets for emergency shutdown valves	2no above ground control cabinets for emergency shutdown valves	2no above ground control cabinets for emergency shutdown valves	2no above ground control cabinets for emergency shutdown valves
8	**Pipeline Construction and Operation:**	**km**	**km**	**km**	**km**	**km**	**km**
	Private	0	0	0.5	0.5	0.6	0.5
	Parks - Amenity	0	0.8	1.2	0.4	7.5	0.0
	TIN 3	0.8	1.8	5.2	8.5	4.2	4.9
	TIN 4	10.0	8.0	2.7	1.2	1.7	1.2
	TIN 5	0	0.5	2.2	0.4	3.5	7.8
	Special Engineering Difficulties	CIE Bridge East Wall Road, Luke Kelly Bridge, Port Tunnel Griffith Avenue, M50 Underpass Swords Road, Santry River, Mayne River ,Cuckoo Stream Swords Road & R132 Upgrade	CIE Bridge East Wall Road, Tolka River,Port Tunnel Fairview Park & Griffith Avenue, M50 Bridge Swords Road,Santry River, Mayne River and Cuckoo Stream, Swords Road & R132 Upgrade.	CIE Bridge East Wall Road, Tolka River, Port Tunnel Fairview Park, Santry River, Mayne River and Cuckoo Stream, R139 and M1 crossings, Swords Road R132 Upgrade.	Tolka Estuary, CIE Bridge, Collins Ave East, Santry River, Mayne River and Cuckoo Stream, R139 and M1 crossings, Swords Road R132 Upgrade.	Tolka River, Port Tunnel Alfie Byrne Road, CIE Bridge Clontarf Road, Santry River, Mayne River and Cuckoo Stream, M1 and Swords Road (R132) crossings.	Tolka River, Port Tunnel Alfie Byrne Road, CIE Bridge Clontarf Road, Santry River, Mayne River and Cuckoo Stream, M1 and Swords Road (R132) crossings.
9	**Location of and Access to intermediate Isolation Valves:**	Richmond Road & Swords Road	Fairview Park & Collins Avenue	Fairview Park & Clonshaugh Road	Clontarf & Clonshaugh Road	Clontarf & Clonshaugh Road	Malahide Road R172 and Malahide Road R139
10	**Cost & Programming:**	(--) * Note1	(+) €100k	(+) €900k	(+) €2.1M	(+) €3.8M	(+) €3.0M

***Note 1** Cost of Option 1 is the benchmark