

16 LANDSCAPE AND VISUAL IMPACT

16.1 Introduction

The term 'landscape' refers primarily to the visual appearance of an area, including its shape, form and colour and the interaction of these elements to create specific patterns that are distinctive to particular localities. Landscape is also not purely a visual phenomenon. Its character relies closely on the local physical geography and environmental history. Besides any scenic and/or visual dimension, there are also a whole range of other constituents of significance. These include:

- Topography
- Ecology
- Landscape history
- Land use
- Buildings and settlement
- Architecture

This section describes the existing landscape in the vicinity of the proposed pipeline corridor and the visual character of the local landscape. This section also set out the factors that impinge on the landscape and visual characteristics of the locality, setting out how the proposed development interacts with them and specifying any significant effects.

16.2 Study Area

The assessment area has been defined, with reference to the potential for landscape and visual impact from the proposed scheme by a distance of 500m from the proposed pipeline corridor.

16.3 Assessment Methodology

This landscape and visual impact assessment has been undertaken in accordance with the following guidelines:

- Department of Environment and Local Government - *Landscape and Landscape Assessment, Consultation Draft of Guidelines for Planning Authorities, June, 2000*
- The Landscape Institute - Institute of Environmental Assessment – *Guidelines for Landscape and Visual Impact Assessment, 2nd Edition, 2002*.

16.3.1 Existing Landscape Assessment

The landscape character, values and sensitivity of the area in the vicinity of the proposed pipeline corridor is outlined in accordance with the Department of Environment and Local Government Guidelines - *Landscape and Landscape Assessment, Consultation Draft of Guidelines for Planning Authorities, 2000*. In these guidelines, landscape character, values and sensitivity are defined as:

- **Landscape character** can be established for an area where there is visual distinctiveness and identity through a continuity of similar characteristics. This description outlines 'what is physically on the land surface', resulting from geology, soils, hydrology, topography, vegetation and land-use
- **Landscape values** can be described as the environment or cultural benefits that are derived from various landscape resources. These resources may include physical and visual components
- **Landscape sensitivity** can be described as the extent to which a landscape can accommodate change without unacceptable loss of existing character or interference with values

A desktop study and walkover survey were undertaken to determine the existing landscape of the area and visual envelope of the proposed pipeline corridor within the area.

The patterns and scale of the landscape character including landform, landcover, land use and built development was determined using Ordnance Survey Ireland (OSI) Discovery Series Mapping of the area and available aerial photography and imagery of the route.

The proposed pipeline traverses both DCC in the south of the scheme and FCC's in the north of the scheme. The proposed pipeline corridor terminates within the Local Area Plan of Dublin Airport. Landscape values such as amenity areas, designated views and prospects, and historical archaeological and architectural heritage in the vicinity of the proposed pipeline corridor were identified using documentation and mapping provided in the:

- Fingal Development Plan 2011–2017
- Dublin Airport Local Area Plan 2006
- Dublin City Development Plan 2011–2017

The desktop survey aids in identifying the landscape areas and the sensitive receptors within the vicinity of the site that will be potentially impacted by the proposed development.

16.3.2 Visual Impact Assessment

The landscape impact assessment describes the nature and scale of changes to the landscape elements and character and outlines the effect of the proposed development on the landscape character of the area. Landscape impacts may be viewed as positive, neutral or negative.

The magnitude of the effects from the proposed pipeline on landscape is rated as follows:

- No change – very minor loss or alteration to one or more key elements/features/characteristics of the baseline i.e. the introduction of elements that are not uncharacteristic with the surrounding landscape
- Low – minor loss or alteration to one or more key elements/features/characteristics of the baseline i.e. the introduction of elements that may not be uncharacteristic when set within the attributes of the receiving landscape
- Moderate – partial loss or alteration to one or more key elements/features/characteristics of the baseline i.e. the introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape
- High – total loss or major alteration to one or more key elements/features/characteristics of the baseline i.e. the introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape.

The significance of the change to the landscape is dependent on firstly the sensitivity of the receiving landscape or viewer as well as the magnitude of the change.

Significance of Change

The visual impact assessment will describe the visual effects or changes due to the proposed development. Visual impact may occur by means of intrusion and/or obstruction. These terms can be defined as:

Visual Intrusion: An impact on a view without blocking
Visual Obstruction: An impact on a view involving blocking thereof.

Visual impacts on a particular view may be viewed as positive, neutral or negative. The significance of these effects will be rated as follows:

- *Little/None* - arises where the proposal is adequately screened by existing landforms, vegetation or the general built environment and there is no discernible deterioration within the existing view.
- *Low* - arises where views affected by the proposal form only a small element in the overall panorama and there is a perceptible deterioration within the existing view
- *Moderate* - arises where an appreciable segment of the panorama is affected and where may be readily noticeable to the receptor or where there is an intrusion into the foreground and there would be a noticeable deterioration within the existing view

- *High* - arises where the view is significantly affected, obstructed or so dominated by the proposal as to form the focus of attention and there is a significant deterioration of the existing view.

16.4 Existing Environment

16.4.1 Existing Landscape Character

Dublin city's landscape is both natural and man-made and consists of a pattern of streets and urban spaces within the natural setting of rivers and the bay and mountains to the south. The urban character consists of individual buildings, streets, urban spaces and neighbourhoods. The Dublin City Development Plan objective is to enhance and promote "*Dublin as a City of Character and Culture, promoting an active artistic and cultural community at city-wide and neighbourhood levels is central to making a vibrant city that is an attractive destination for tourism and the creative industries*".

It is recognised that the built heritage contributes significantly to the city's identity. The street pattern, local architectural features, the form of buildings and spaces, civic buildings, the unique Georgian squares and streets together with the larger areas of Victorian and Edwardian architecture, and the industrial buildings all contribute to the city's character and reinforce its identity. The proposed section of the pipeline within DCC's functional area, passes through some of these urban landscapes leaving the industrial landscape of Tolka Quay Road and East Wall area (Figures 16.1, 16.2 and 16.3), to pass by the recreational/amenity area of Fairview Park and the Alfie Byrne Open Space (Figure 16.4) along Alfie Byrne Road (Figure 16.5) and continuing through a mix of urban settings such as residential, amenity and commercial (Figures 16.6, 16.7, 16.8) along Clontarf Road, Howth Road, Copeland Avenue and the southern section of the Malahide Road (R109), mixed services, industrial and residential (Figures 16.9) at the northern section of the Malahide Road (R109) from Coolock to Clare Hall and primarily open space/green areas with some residential (Figures 16.11) at the northern end of DCC's functional area along the R139 (Malahide Road) passing Darndale and Belcamp Parks. There is also institutional, educational, community and mixed service facilities dispersed through these areas.



Figure 16.1: Tolka Quay Road, looking east



Figure 16.2: East Wall Road Looking south east



Figure 16.3: East Wall Road (near junction with Alfie Byrne Road), looking east



Figure 16.4: Alfie Byrne Road, looking south



Figure 16.5: Clontarf Road, looking west



Figure 16.6: Howth Road, looking north



Figure 16.7: Copeland Avenue, looking north



Figure 16.8: Malahide Road at Donnycarney, looking south



Figure 16.9: Malahide Road at Artane, looking south

Within the FCC area (eastern section of Malahide Road (R139) to Dublin airport section of pipeline corridor), a Landscape Character Assessment has been carried out as part of the development plan. This assessment divides the Fingal area into seven Landscape Character Areas (LCAs):

- Coastal Character Area
- Estuary Character Area
- River Valleys/Canal Character Area
- Airport and Swords Character Area
- High Lying Agricultural Character Area
- Low Lying Agricultural Character Area
- Rolling Hills with Tree Belts Character Area.

The proposed pipeline passes through the 'Low Lying Agricultural' and 'Airport and Swords' character areas. The 'Low Lying Agricultural Character Area' is defined as a mix of pasture and arable farming on level land or land with few views or prospects. Generally, it consists of large fields with few tree belts or large settlements. The more open character of the land combined with larger field patterns and low roadside hedges, makes it a more difficult landscape to find suitable sites for development. This open low lying landscape is characteristic of the Clonsaugh Road and Stockhole Lane area (Figure 16.12). High technology development is evident on the fringes of the DCC area in low lying land along the Northern Cross area (R139) (Figure 16.13). This area is also the preferred location of the Greater Dublin Area new wastewater treatment plant.



Figure 16.10: Northern Cross (N32), looking west



Figure 16.11: Clonsaugh Road, looking north

The Airport Character Area includes the lands surrounding the airport and the nearby town of Swords. The proximity of the airport and the development of the M1 and M50 motorways have resulted in the expansion of light industrial and warehouse activities in this area.

The proposed pipeline corridor crosses by the long-term car parking facilities for the airport and south of the Eastlands Car Hire Compound within Dublin Airport. There are also a number of commercial units, the ALSAA and UAL/FAI Sports Centres and a limited number of one off residential dwellings in this area. Within the main airport campus, which is located on the eastern side of the airport lands, there are a number of terminal buildings, piers and car parks. Commercial buildings (Figure 16.14) such as hotels and car hire services are also located within the central area of the Main Airport Campus. The existing fuel farm and cargo areas are located on the southern and south-eastern portions of the campus, where the proposed pipeline will terminate.



Figure 16.12: Airport Campus, viewed from Radisson Blu Hotel

The primary land use adjoining the airport to the north, south and west is agricultural land consisting of grasslands together with arable land which are bounded by hedgerows and tree lines. The airport consists mainly of cultivated or disturbed land including a large proportion of airport-managed grassland.

Permission has been granted for the Metro North Scheme which includes a stop and a depot at Dardistown which is located south-west of the proposed pipeline corridor as it terminates at the airport tank farm.

16.4.2 Existing Landscape Values

Values which are attributed to a landscape are:

- Aesthetic - most frequently visual, vistas, scenic areas, outstanding landscapes, areas of special amenity
- Socio-cultural - buildings, settlements, monuments, social history or social geography.

(Department of Environment and Local Government, 2000)

Aesthetic Values

Within the DCC functional area, aesthetic values are mainly reliant on the city's built heritage, the cities protected structures and architectural buildings which are discussed in detail in Chapter 15 (Archaeology, Architecture and Cultural Heritage). Due to the urban nature of the area, views and prospects are generally limited. No views and prospects are identified for preservation in the development plan.

The proposed pipeline corridor does not lie within any site that has been designated for nature conservation. It does, however, lie adjacent to a number of national and European designated sites located within Dublin Bay. Further details on these sites have been provided in Chapter 11 – Flora and Fauna.

The proposed pipeline corridor crosses a number of river and streams and while it does not traverse any public amenity areas it does run adjacent to amenity areas such as Fairview Park, Alfie Byrne Open Space, Darndale Park, Belcamp Park as well as several other small local parks. The DCC Development Plan *aims to protect amenity areas to encourage a sense of wellbeing and enhance the social and recreational life of the city's communities*. Such proposal include the development of a linear park along the banks of the River Tolka.



Figure 16.13: Tolka River in vicinity of crossing, looking north



Figure 16.14: Santry River in vicinity of crossing, looking east

In Fingal, highly sensitive landscapes have been identified in areas of the County of high landscape value. These are areas of low capacity to absorb new development. The nearest of these zoned areas is located approximately 2.5 km east of the northern section of the pipeline at Feltrim/Kinsaley.

This assessment also identified important views and prospects in the area. There are no views and prospects in close proximity to the proposed pipeline corridor, with the nearest located at the R106 Strand Road from Baldoyle to Portmarnock, which is approximately 4.5 km to the east.

The proposed pipeline corridor will cross the Mayne River within Fingal's jurisdiction at a point where it is culverted under the road. It is the Council's policy to maintain rivers and streams in an open semi-natural condition, wherever possible and ensure that river corridors and valleys are protected and maintained for their biodiversity and landscape values.

Socio-Cultural Values

The development plan for each area aims to provide objectives for the protection, enhancement and management of the built heritage, to manage and control impacts to these monuments/structures so that they retain their significant historic character. DCC has designated nine ACA's within its jurisdiction, one of which is 180 m west of the proposed pipeline corridor - Marino Casino. Section 15 -Archaeology, Architecture and Cultural Heritage, discusses this aspect in detail.

16.5 Potential Visual and Landscape Impacts

16.5.1 Construction Impacts

The proposed pipeline will give rise to temporary visual intrusion during the period of construction, causing a transitory negative impact upon the existing character of the area. This impact, although short term will be moderate - significant in the immediate vicinity, being apparent from adjacent residential, industrial, recreational/amenity, community facilities, road users and pedestrians. Where the pipeline crosses through open landscape areas, particularly in the area of Stockhole to the north of the pipeline corridor, visibility may be available from greater distances.

Landscape and visual impacts associated with the construction phase will largely be due to the erection of fencing around each working area, the excavation of the trench and installation of the pipeline. The landscape character will undergo a moderate change from the current state to a construction area with associated works such as fencing, plant and machinery etc. The duration for the construction works is programmed to be completed in 10 months with four crews working at any one time. Permanent re-instatement of the trench will be carried out shortly after the pipeline is installed. Therefore, the duration of the landscape and visual impacts, while moderate in places, will be short term.

Visual and landscape impacts at rivers and streams crossings will arise from the installation of launch and reception pits either side of the crossing. These will have a short term (2 - 4 weeks) negative visual impact. As the crossing of the river/streams will be completed using trenchless technology, this will maintain the watercourses in their natural condition.

The proposed pipeline corridor will be routed along the Alfie Byrne Road, adjacent to the Alfie Byrne Open Space and Fairview Park and to the north within the AUL/FAI Sports grounds, where the pipeline corridor is located between the pitches and some maintenance facilities. As the pipeline will be laid within the public road which passes between Alfie Byrne and Fairview Parks where visual amenity is currently impacted by traffic using these roads, the potential short term impact on users within these recreational areas will not be low - moderate.

16.5.2 Operational Impacts

As the pipeline will be laid below ground level and all surfaces will be re-instated once the pipeline is installed, there will be no permanent impact from the pipeline itself.

Control panel enclosures for the two valves will be installed at the back of the footpath. These will be located on the Malahide Road R107 (refer to Strip Map No 16 in Appendix 3.4 of Volume 3 of the EIS) and the Malahide Road R139 (refer to Strip Map No 33 in Appendix 3.4 of Volume 3 of the EIS). Figure 16.15 and Figure 16.16 provide details of these units.

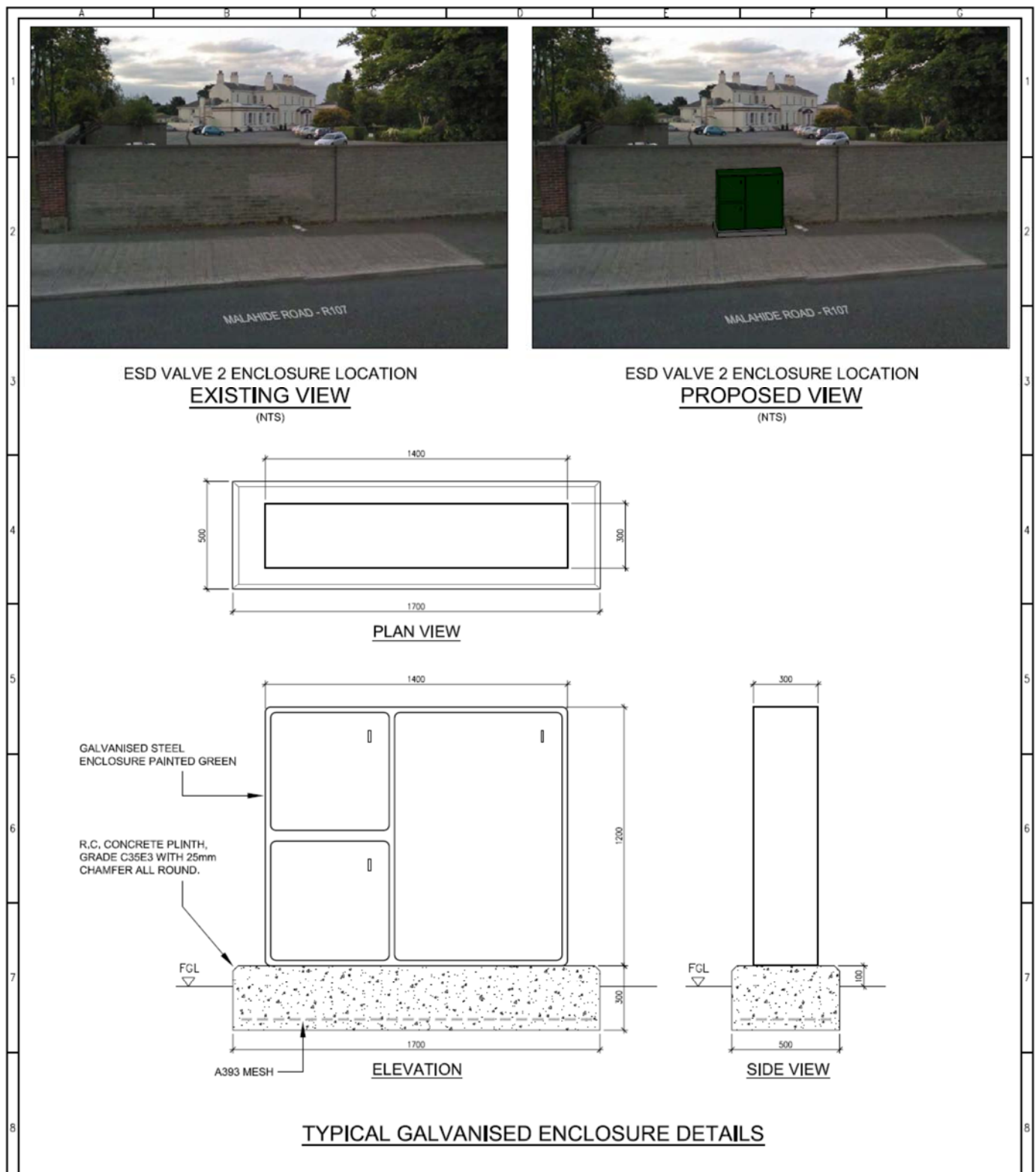
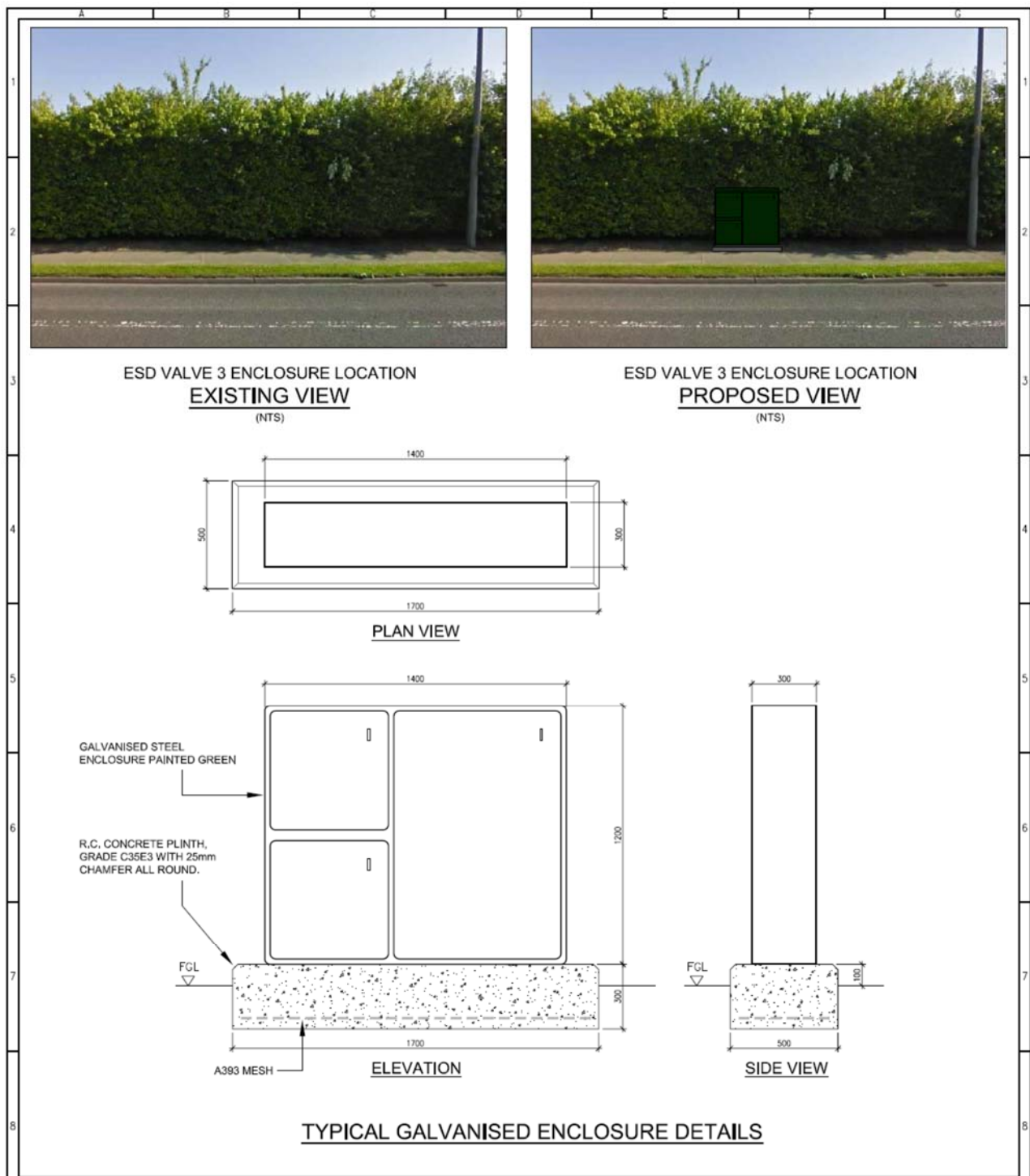
Figure 16.15: Enclosure Details – Malahide Road (R107)

Figure 16.16: Enclosure Details – Malahide Road (R139)

Above Ground Stations required at both Dublin Port (inlet) and Dublin Airport (reception) will be located in existing industrial compounds.

In Dublin Port, the fuel will be transferred from the existing storage tanks to a pumping station. The proposed pipeline inlet station will consist of a new control building, 3 m high. Pumps, traps and pipe work located external to the building on bunded hardstanding. The facility will be secured by paladin fencing.



Figure 16.17: Proposed Location of Inlet Station

At Dublin Airport the pipeline reception station will be located adjacent to the existing loading and storage facilities and will include a new control building, (3 m high). Pipe work and meters will be located external to the building.



Figure 16.18: Reception Station at Dublin Airport

As both of these sites are located in areas which already have significant industrial structures and use, there will be no significant visual impacts from either of the stations.

In the event that a leak does occur, temporary visual impacts will arise if localised excavation is required.

16.5.3 Decommissioning Impacts

Given that there will be no excavation associated with the decommissioning or re-validation of the pipeline, there will be no landscape or visual impacts.

16.5.4 Do-Nothing Impact

If this proposed development does not proceed, the landscape and visual environment along the proposed route will continue to evolve along some sections of the route, in particular along the Malahide Road where commercial and retail development is occurring and to the north of the scheme where a preferred site for the Greater Dublin Area new wastewater treatment plant has been identified.

16.6 Mitigation Measures

16.6.1 Construction

A number of measures for the mitigation of the potential visual impact from the proposed development have been introduced as part of the design of the overall scheme including the selection of a route which directly avoids designated areas, parks and amenities. In addition:

- Construction of the pipeline will be executed in working zones which will localise any temporary visual impacts to these areas
- Use of trenchless technology for all watercourse crossings while primarily for water quality reasons will also minimise impacts on the aesthetic value of the open channels of the Tolka and Santry Rivers
- It is expected that permanent re-instatement of the trench will be carried out shortly after the pipeline is installed.

16.6.2 Operation

As the pipeline will be located underground there are no requirements for mitigation measures during the operation of the proposed pipeline.

16.6.3 Decommissioning & Re-validation

As there will be no negative impacts arising from this phase of the scheme, no mitigation measures have been recommended.

16.6.4 Cumulative impact

As the proposed pipeline will be underground the potential for cumulative visual impacts will only arise if the construction of the pipeline coincides with another proposed development. Given that the pipeline will be constructed in sections, the cumulative impacts would be temporary and short-term in nature.

16.7 Predicted Impacts after Mitigation

During the construction period, the landscape in the immediate vicinity of the pipeline construction will be negatively impacted by visual intrusion. The implementation of the recommended mitigation measures will minimise the overall visual impact. However during the construction period visual impacts will be moderate. Following the complete reinstatement of the pipeline corridor, there will be no residual impacts.

16.8 References

- Department of Environment and Local Government, 2000, *Landscape and Landscape Assessment, Consultation Draft of Guidelines for Planning Authorities, June, 2000*
- The Landscape Institute - Institute of Environmental Assessment, 2002, *Guidelines for Landscape and Visual Impact Assessment, 2nd Edition, 2002.*

17 MATERIAL ASSETS

This section examines existing material assets in the area of the proposed development. It outlines the potential impacts that may occur on these assets and the measures proposed to mitigate these effects.

17.1 Study Area

This assessment is based on material assets which have the potential to be directly impacted by the proposed development and therefore are those that occur within the proposed pipeline corridor. Indirect impacts on material assets outside of the corridor have been addressed in other sections of the EIS.

17.2 Methodology

A desk-top study was undertaken to outline the material assets in the existing environment. In order to assess the impacts of the proposed development on material assets, a review of the proposed development to identify potential impacts on material assets was undertaken and the significance of these impacts assessed.

17.3 Existing Environment

Material assets are outlined by the EPA in their *Advice Notes on Current Practice for the Preparation of Environmental Impact Statements* (2002) as 'resources that are valued to specific places'. They may be of human or natural origin and can be important for either economic or cultural reasons as summarised in Table 17.1 below.

Table 17.1: Economic & Cultural Assets

Economic Assets	Cultural Assets
<ul style="list-style-type: none"> Transportation infrastructure (roads, railways, airports etc.) 	<ul style="list-style-type: none"> Archaeological, architecture and cultural assets
<ul style="list-style-type: none"> Utilities (water supplies, sewage, power systems etc.) 	<ul style="list-style-type: none"> Recreation & amenity
<ul style="list-style-type: none"> Towns and cities 	
<ul style="list-style-type: none"> Ownership and access 	
<ul style="list-style-type: none"> Non-renewable resources (e.g. minerals, soils) 	
<ul style="list-style-type: none"> Renewable resources (hydraulic head, wind exposure) 	
<ul style="list-style-type: none"> Settlements 	

Cultural Assets have been discussed in Chapter 16 – Material Assets - Archaeology, Architectural and Cultural Heritage

Economic assets such as transportation infrastructure and the human environment have been addressed in Chapter 9 – Transportation and Traffic, and Chapter 7 – Human Environment - Land Use respectively, Chapter 8 – Human Environment - Socio Economic.

This chapter will therefore focus on remaining economic assets not addressed elsewhere in this EIS.

17.3.1 Utilities Infrastructure

Utilities infrastructure is necessary to ensure that power (electricity/gas), water, sewerage and telecommunications are provided to areas in a reliable consistent manner. Due to a community's dependency on such sources, any disruption to a utility supply, can give rise to significant negative impacts.

As the proposed development is predominantly located in an urban setting, a large number of utility services are located in the area of the pipeline corridor. The proposed pipeline corridor also runs predominantly along existing road carriageways and this is where the majority of utilities are located.

This assessment is based on utility information that can be provided at this stage which has been collected through consultations with a number of providers including, telecommunications companies, DCC and FCC water and drainage divisions, DAA, Irish Water, ESB Networks and Bord Gais.

These utilities can be broken down into different functions and importance as follows:

- *Transmission networks:* these networks transfer utility services from a main supply/generation point to a distribution line. They are of national/regional importance. There is usually a backup supply if this network is impacted
- *Distribution networks:* these connect the transmission networks to the local connections. These are of local importance and there is usually no back-up supply if this network is impacted
- *Local connections:* this network connects the distribution network to the private properties. This network is of local importance and there is usually no back-up supply if this network is impacted.

Table 17.2 outlines the main types of utilities identified in the area of the proposed pipeline corridor.

Table 17.2: Summary of Main Utilities within the Proposed Pipeline Corridor

Location	Utility Services Identified
Dublin Port and Tolka Quay Road	Gas, Electricity, Water-Mains and Drainage, Telecoms
East Wall Road	Gas, Electricity, Water-Mains and Drainage, Telecoms
Alfie Byrne Road	Gas, Electricity, Water-Mains and Drainage, Telecoms
Clontarf Road	Gas, Electricity, Water-Mains and Drainage, Telecoms
Howth Road	Gas, Electricity, Water-Mains and Drainage, Telecoms
Copeland Avenue	Gas, Electricity, Water-Mains and Drainage, Telecoms
Malahide Road (R109)	Gas, Electricity, Water-Mains and Drainage, Telecoms
Malahide Road (R139)	Gas, Electricity, Water-Mains and Drainage, Telecoms
Clonsaugh Road	Gas, Electricity, Water-Mains and Drainage, Telecoms
Athletic Union League (AUL) Sports Complex and M1 motorway	Electricity, Water-Drainage, Telecoms
Dublin Airport Long Term Airport Carpark (Red), Eastlands Car Hire Compound and Swords Road	Gas, Electricity, Water-Mains and Drainage, Telecoms
Dublin Airport /Fuel Storage Depot	Gas, Electricity, Water-Mains and Drainage, Telecoms

Table 17.1 is not a definitive list and there may be additional unknown services in each area.

17.3.2 Non-Renewable Resources

Non-renewable resources include aggregate resources and water supply.

Aggregates from quarries and pits by their nature can only be worked where they occur. Thus there is a need to identify and protect aggregate resource areas to ensure that sources can meet future aggregate demands. There are no quarries or pits within the pipeline corridor. The nearest are Feltrim Quarry, c. 2 km north east of Stockhole Lane and Huntstown Quarry, c. 2.5 km south west of the airport.

Water supply is a non-renewable resource if the water resource is not carefully managed. The supply and demand for high quality drinking water in Dublin is finely balanced with water restrictions occurring in the inner city during times of shortage. Poulaphouca and Vartry Reservoirs, located in Wicklow, are the two major sources of Dublin's drinking water. This will remain the case in the short to medium term pending increased production, storage and delivery capacity. The Dublin Region Water Supply Project is in the process of identifying a new water supply source to avoid shortages of drinking water in the future.

Fingal's water supply currently comes from the Liffey via Leixlip water treatment plant and the Bog of the Ring water supply scheme which supplies drinking water from groundwater resources. The Liffey supplies a significant volume of Dublin City's drinking water resources as well as a treatment plant at Ballyboden. There are also three water reservoirs at Saggart, Stillorgan and Ballycoolin.

17.3.3 Renewable Resources

DCC and FCC in their respective development plans, promote energy efficiency, increasing the use of renewable energy and improved energy performance of all new building developments. The Councils support the development of enhanced energy supplies to the County, with an emphasis on renewable energy supplies such as wind energy, solar, geothermal, hydro-energy and bio-energy.

DCC has also carried out a feasibility study on the implementation of a citywide district-heating network and proactively promotes its benefits and encourages its provision.

There are no existing large scale renewable resource industries within 100 m of the proposed pipeline corridor nor has any received permission and are not yet built.

17.4 Summary of Key Possible Impacts

17.4.1 Utilities Infrastructure

Construction

Potential impacts on service utilities may occur during trench excavation which have the potential to lead to a disruption in service.

Operation

Consultations with DCC and FCC highlighted concerns in relation to the impact of a leak from the proposed aviation fuel pipeline on services in its vicinity. A number of studies have been conducted in the US and UK relating to migration of chemical compounds, including hydrocarbons, through pipe walls.

A study carried out by Feng Mao and supported and published by the American Water Works Association in 2009 entitled "*Impact of Hydrocarbons on PE/PVC Pipes and Pipe Gaskets*" reviewed the susceptibility of different piping systems to permeation of organic compounds.

The executive summary of this publication states:

- The overall impact of permeation on the water industry is relatively small. Reports of permeation of water mains are rare, with one incident per 14,000 miles of mains.

- Data obtained from the survey described in this report were not sufficient to draw conclusions regarding the thresholds of hydrocarbon contamination that would result in hydrocarbons permeation and require a utility to choose more resistant pipe or gasket materials.

In laboratory testing the PVC pipe is not affected by hydrocarbons to the same extent as PE. In terms of reported incidents there are more records of incidents with PVC pipe than PE.

Decommissioning & Re-Validation

The activities associated with the decommissioning and re-validation of the proposed pipeline will not result in impacts on utilities.

17.4.2 Non-Renewable Resources

Construction

The estimated total volume of material to be excavated and removed from site is approximately 15,120 m³, with a similar volume of material being required as backfill. A breakdown of the quantities of imported material required is as follows:

- | | |
|-------------|----------------------|
| • Surfacing | 3,024 m ³ |
| • Leanmix | 6,048 m ³ |
| • Granular | 5,397 m ³ |

All excavated material will be removed from site by a permitted contractor to an appropriate facility for recovery where possible.

Direct impacts on water supply schemes in DCC and FCC will not occur as the pipeline is not located in proximity to water sources or treatment plants. Impacts on both groundwater and surface water quality are discussed in Chapter 12 – Soils, Geology & Hydrogeology and Chapter 13 – Surface Water Quality & Drainage of this EIS.

Operation

The proposed development will indirectly positively impact on non-renewable resources by reducing the quantities of fossil fuel used in the current practice of transportation of aviation fuel by road tankers.

Decommissioning & Re-Validation

Water will be required in the decommissioning of the pipeline and the revalidation of the pipeline as outlined in Chapter 3 – Description of the Proposed Development, which will be sourced from mains supply.

17.4.3 Renewable Resources

The proposed development will not give rise to impacts on renewable resources or potential future renewable resources within the vicinity of the pipeline.

17.4.4 Do-Nothing Impact

If the proposed pipeline does not proceed, the number of road tankers using public roads will increase to meet the increased demands of Dublin Airport.

Given the urban nature of the proposed pipeline route through DCC's functional area in particular, the addition of new service infrastructure along the proposed pipeline route would be anticipated.

17.4.5 Cumulative Impacts

There is a possibility that the construction programme for the pipeline could overlap with the construction programme for another project such as the installation of other utilities or other road works. Should this occur then there is the potential for cumulative impacts on material assets such as non-renewable resources and/or utilities. However given the timeline for other projects is not known and therefore it is not possible to quantify this impact at this stage, however it should be noted that other projects of this nature will also be required to apply for road opening licences given that the roadway is a regulated environment. Therefore consultation with the local authority will ensure that the risk of multiple projects working in the same areas is minimised/avoided under the road opening licence application stage.

17.5 Mitigation Measures

Construction Mitigation Measures

Due to the considerable number of existing services along the proposed pipeline corridor, the precise position of the route has not been confirmed at this stage. It is proposed to undertake slit trenching as part of the construction works which will identify services along the route. This will minimise the impact on disruption or damage to existing utilities. It is not intended to divert existing services but instead where possible the pipeline will be re-routed within the pipeline corridor. Communication with the services providers will be maintained for the duration of the construction works. The exact alignment of the route within Dublin Port and Dublin Airport will be agreed with Dublin Airport Authority and Dublin Port Company in advance of any works. No alterations to existing services will be carried out without specific permission from Dublin Port Company and Dublin Airport Authority and in cases where approvals are given the works are to be certified.

Non-renewable resources will be sourced locally as far as possible to minimise transportation distances and indirect impacts on climate change.

Operational Mitigation Measures

Routine operational impacts are all positive and thus no mitigation is proposed.

A set of emergency response procedures is to be put in place to cover the unlikely event of an accident with the pipeline. These will include a communications link to Dublin Port Company, Dublin City Council, Fingal County Council and Dublin Airport Authority. The plan will be based on existing plans used by the aviation fuel transportation industry in the UK and adapted and modified as necessary to meet local conditions and agreed with the Dublin Fire Brigade. An outline emergency response plan is included in Appendix 3.7 of Volume 3 of the EIS.

The pipeline will be monitored by a SCADA system which will monitor the operations and provide status display, alarm and event history and logging of measurements. A PLC based alarm system will alert the on-call operator using a pager. If the operator fails to respond, a backup callout via 24 hour call centre service will be initiated to the emergency response team.

The procedure for clean-up from a leak is similar to that for a spillage from a road tanker, in relation to the use of Personal Protective Equipment (PPE), notification to statutory bodies, prevention of the spreading of fuel, absorbing fuel and removing or pumping fuel to a tanker.

Decommissioning & Re-validation Mitigation Measures

The quantities of water used in the decommissioning and re-validation process will be minimised as far as practicable. This will include the re-use of the water to test individual sections of the pipeline.

17.6 Residual Impacts after Mitigation

Following the full reinstatement of the construction corridor, there will be no residual impacts on material assets in the area.

While non-renewable resources such as backfill material are required onsite during the construction phase, the proposed development will also positively impact non-renewable resources by eliminating the use of fossil fuel in the transportation of the aviation fuel by road tankers.

In the event that the pipeline is damaged and a leak occurs the residual impact to other material assets will be very low following clean-up/remediation.

17.7 References

Say Kee Ong, James A. Gaunt, Feng Mao, Chu-Lin Cheng, Lidia Esteve-Agelet, and Charles R. Hurburgh *Impact of Hydrocarbons on PE/PVC Pipes and Pipe Gaskets*. 2008/2009.

18 INTER-RELATIONSHIPS & INTERACTIONS

This Chapter considers the potential for interactions and inter-relationships between one aspect of the environment and another which can result in an impact being either positive or negative, as well as having varying levels of significance.

Direct, indirect, cumulative, and interactive impacts were considered during the design of the proposed pipeline project to minimise impacts on the human environment, flora and fauna, traffic, hydrology, water quality and archaeological, architectural and cultural heritage to name just a few. However, all environmental topics are interlinked to a degree such that interrelationships exist on numerous levels. A summary matrix has been developed to identify key interactions that exist with respect to this specific project. As such, this does not represent a form of relative assessment of impacts and other interactions are recognised to exist and have been addressed in individual chapters of this EIS. Table 18.1 herein provides a matrix showing the key interactions and inter-relationships between the key environmental aspects of the proposed development.

Table 18.2 also provides further detail and examples of the diverse range of interactions and inter-relationships between the key environmental aspects.

Table 18.1: Summary of Interactions & Inter-relationships between the Key Environmental Aspects

	Air Quality & Climate	Noise & Vibration	Flora & Fauna	Soils, Geology & Hydrogeology	Surface Water Quality & Drainage	Human Environment	Material Assets	Traffic & Transportation	Archaeological, Architectural & Cultural Heritage	Landscape & Visual
Air Quality & Climate										
Noise & Vibration										
Flora & Fauna										
Soils, Geology & Hydrogeology										
Surface Water Quality & Drainage										
Human Environment										
Material Assets										
Traffic & Transportation										
Archaeological, Architectural & Cultural Heritage										
Landscape & Visual										



= interaction or inter-relationship



= no interaction or inter-relationship

Table 18.2: Description of Impacts

Interaction	Description
Human Environment, Air Quality & Climate, Traffic & Transportation	Impacts on air quality during the construction phase will occur due to dust emissions from construction activities. Impacts will also occur through increased traffic and associated exhaust emissions from construction traffic. Positive impacts may also arise from the potential removal of road tankers as a result of the scheme. These interactions were therefore considered as part of the EIS, with suitable mitigation measures provided to minimise these potential impacts. The indirect impacts on climate from the displacement of traffic emissions arising from fuel tankers was also considered during the assessment.
Noise and Vibration, Human Environment, Traffic & Transportation	Noise impacts may occur during the construction phase and will be associated with construction plant and traffic. Vibration impacts may also occur during certain aspects of the construction phase which has the potential to impact on the local community as well as buildings and structures. These interactions were therefore considered as part of the EIS. Mitigation measures have been carefully designed in order to minimise these impacts, particularly noise impacts.
Flora and Fauna, Soils, Geology & Hydrogeology, Surface Water Quality & Drainage	There are direct links between these key environmental aspects. Impacts on flora and fauna during the construction phase could include disturbance to birds and mammals from loss/changes in habitat. The hydrological regime could also be altered, through increased flooding and sedimentation/pollution of watercourses, which in turn could impact on flora and fauna. Excavations introduce the risk of increased sedimentation which would impact on flora and fauna and the hydrological environment. During the operation of the pipeline any leak has the potential to impact on soils, water quality and in turn flora and fauna species dependent on them. Given the direct links between these aspects, they were considered in the chapters that support all of these topics in recognition of the fact that impacts on one aspect of this complex system may have knock-on, indirect impacts on other aspects.
Vibration, Archaeology and Cultural Heritage, and Architectural Heritage	The potential for vibration impacts on features of archaeological or cultural importance and architectural heritage has been considered.
Noise and Vibration, Flora and Fauna	Noise impacts during construction (from construction plant and increased traffic) has the potential to impact on local flora and fauna (birds and mammals) in the surrounding environment. These interactions were therefore considered in the EIS, particularly in relation to assessing suitable mitigation measures to reduce the impacts.
Landscape and Visual, Archaeological, Architectural and Cultural Heritage	The construction of the proposed pipeline may impact in the short-term on archaeological, architectural and cultural heritage sites within and in the vicinity of the proposed pipeline corridor. These interactions have been considered in the EIS, particularly in defining mitigation measures to minimise any impacts.
Traffic & Human Environment	Traffic impacts and mitigation measures have the potential to impact on socio economic activity (human environment). The potential for indirect impacts of this nature has been considered when defining appropriate mitigation measures.
Human Environment - Land use and Socio-economics	Impacts on commercial land uses can often have a knock-on effect in terms of socio-economics. Interactions between the two environmental topics were therefore considered to ensure that both direct and indirect impacts were considered and appropriate mitigation measures put in place.

ⁱ White Paper 'Delivering a Sustainable Energy Future for Ireland' <http://www.dcenr.gov.ie/NR/rdonlyres/54C78A1E-4E96-4E28-A77A-3226220DF2FC/27356/EnergyWhitePaper12March2007.pdf>

ⁱⁱ Guidelines for the Treatment of Noise and Vibration in National Road Scheme, National Roads Authority, 2004

ⁱⁱⁱ National roads Authority, 2004. Guidelines for the Treatment of Noise & Vibration in National Road Schemes
4 Waste Management Act 1996. Waste Management (Amendment) Act 2001 (No 36 of 2001). Department of Environment, Community and Local Government.

⁵ Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects. June 2006. Department of Environment, Community and Local Government.